Adama Science and Technology University



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College of Electrical Engineering and Computing

Department of Electronics and Communication Engineering

Curriculum for Undergraduate program

November, 2024

Adama, Ethiopia

Prepared by:

Department of Electronics & Communication Engineering

Endorsement

This curriculum document is endorsed by the ASTU Senate

Date Endorsed

November,2024

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List of Acronyms

ASQAC Academic Standards and Quality Assurance Committee

ASTU Adama Science and Technology University

CGPA Cumulative Grade Points Average

CLO Course Learning Outcome

CQI Continual Quality Improvement

Cr.hr Credit hour

DAC Department Academic Council
ECTS European Credit Transfer System

EHEE Ethiopian Higher Education Entrance Examination

OBE Outcome Based Education

PEO Program Educational Objective
PLO Program learning outcome

SO Student Outcome

QMS Quality Management System

SLT Student Learning Time

1. Introduction

1.1. Background of the program

The department of Electronics and Communication Engineering (ECE) is one of the three departments in College of Electrical Engineering and Computing of Adama Science and Technology University. The current Electronics and Communication Engineering department of Adama Science and Technology University emerged Electrical/Electronic Technology Department of the former Nazareth Technical College (NTC) when the College was established in 1993. Since then, the department had gone through a series of curricular changes and the department continued until the commencement of the Electrical Engineering degree program and finally to Electrical and Computer Engineering Department. Now with the new direction of ASTU, it is renamed as Electronics and Communication Engineering Department.

Electronics and Communication Engineering is a program that aims to integrate separate engineering fields to meet the joint demands made by the Electronics and Communication industries in today's world. Electronics and communication engineering program curriculum include design, implementation and testing of a wide range of Electronics and Communication systems such as electronic devices, communications devices, digital signal processing and networking.

Graduates of this program are ideally placed to pursue their specialization in any of the two streams, either Electronics Engineering or Communication Engineering based on their zeal, interest and skill. Our graduates can work at the forefront of all the major areas of Electronics as well as Communication Engineering.

In Electronics Engineering, students will develop knowledge and skills to use semiconductor devices to create a wide variety of products and services which includes design and development of Microelectronic devices, PCB & IC fabrication and Embedded Systems as well.

In Communication Engineering, they will develop the knowledge and skill to design and use electronic, photonic and electromagnetic devices to exchange information among locations on earth and in space. A communication Engineer is responsible for designing, building and overseeing the installation of communication equipment and facilities, such as complex electronic switching systems, telephone, and fiber optics.

The courses within our degree program include both hardware and partial software technologies and an understanding of their application, ranging from the smallest embedded micro-processor to global communication systems. At ASTU, we adopt a teaching style that is research-led, so the latest cutting-edge technologies will be taught as part of the course. Our courses combine theory with practical and project work – an approach which can help the student to turn ideas into real systems.

Focused on strategic direction of ASTU for Ethiopian development, the department is working aggressively to produce qualified, competent, and socially responsible professionals in the fields of Electronics and Communication Engineering through promoting research-oriented Electronics and Communication Engineering. To achieve this, the curriculum of ECE undergraduate program is revised to meet the requirements of accreditation which relays on principles of outcome-based education (OBE) and also emphasis on continuous quality improvements (CQI). Enhancing the quality of our programs via curriculum accreditation helps to assure the structure and content of a program to meet internationally recognized standards. This will in turn allows international movement of educated workforce to all over the world. To this end, it is necessaryto revise the existing curriculum by applying accreditation process on the basis of ABET Accord for engineering programs.

1.2. Rationale of the Program

Engineering in general and Electronics & Communication in particular is a highly dynamic field of study in that the rapid development of the technology doesn't allow leaving academic curricula untouched for a long time. Thus, to minimize the gap between the state-of-the-art and the teaching process and maintain the relevance and educational standard, there is always a need for curricula review. The basic rationale of the programs is in the prevailing conditions in the Country with respect to the needs for professionals in this area and the future trends that are developing in the demands for the profession.

Ethiopia, like many of the developing countries, is essentially a user of products of Electronics and communication Engineering technology. So far, the undergraduate program is designed so as to meet the needs of the main employers of the graduates in the operation and maintenance of Electronics and Communication equipment. To meet these needs the program is made broad enough to cover most major areas of Electronics and

Communication. But it has now become necessary to look ahead to the future needs of the country and provide educational means to meet these needs.

It is still logical to maintain the broad nature of the undergraduate curricula that affords the graduates versatility in terms of employment. But it has now become necessary to look ahead to the future needs of the Country and provide educational means to meet these needs. The current revision of the curricula has therefore sought to address these through strengthening all the graduates.

1.3. Vision and Mission of the university

1.3.1. Vision

 ASTU aspires to be the first choice in Ethiopia and the premier center of excellence in applied science and technology in Africa by 2025.

1.3.2. Mission

M1: Produce ethical and internationally competent graduates in applied science and Technology through quality education.

M2: Conduct problem solving research.

M3: Provide demand driven community service.

M4: Serve as center for innovative knowledge and technology transfer for various industries.

1.4. Program Education Objectives (PEOs)

The Department of Electronics and Communication Engineering has developed and maintained a well-defined set of educational objectives and desired Student Outcomes. Educational objectives of the program cater to the requirements of the stakeholders such as students, parents, employers, alumni, faculty etc.

The program educational objectives shall describe accomplishments that a five years program graduates are expected to perform and attain/achieve in the first few years after graduation (e.g.in 3-5 years). The program educational objectives are as follows:

Table 1: Program Education Objectives (PEO)

PEO	Statement
PEO-1	To provide graduates with a strong foundation in mathematics, science and engineering fundamentals to enable them to devise and deliver efficient solutions to challenging problems in Electronics & Communications Engineering.
PEO-2	To produce ethically competent and technically qualified Electronics and Communication Engineers with the potential to become leaders in Industries and Companies associated with Electronics and Communication Engineering, and able to pursue research or have successful career in Academia.
PEO-3	To produce Electronics and Communication Engineers who are committed to sustainable development of Electronics and Communication Systems Companies and Industries for the betterment of society and nation.
PEO-4	To prepare graduates that can critically analyze existing literature in an area of specialization and ethically develop innovative and research-oriented methodologies to solve the problems identified to support the socioeconomic development of the nation.

1.5. Mapping of PEO with University Mission

The mapping Program Education Objectives to the university mission shall indicate the responsiveness of the program designed to the expressed interest of program stakeholders.

Table 2: Mapping of PEO with University Mission

M PEO	M1	M2	М3	M4
PEO-1	√			
PEO-2				$\sqrt{}$
PEO-3			√	
PEO-4		$\sqrt{}$		

1.6. Student Outcomes (SO)

The Electronics and Communication Engineering program is measured through its attainment of the Student Outcomes (SO)/Program Level Outcomes (PLO) of the program

and its courses. The Student Outcomes describe what a student should know, understand, and perform/ be able to do at the completion of their degree program.

Table 3: Student Outcome for Engineering

SO	Statement
S01	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
SO2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
S03	An ability to communicate effectively with a range of audiences.
S04	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
S05	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
S06	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
S07	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

1.7. Mapping of SO with PEO

The SO should be mapped with the PEO so that it clearly indicate/reflect the responsiveness of the Student Outcome to the Program Education Objectives settled based on the expressed interest of program stakeholders. During mapping, every SO shall be mapped to PEO.

Table 4: Mapping of SO with PEO

PEO	PEO-1	PEO-2	PEO-3	PEO-4
SO SO				
SO-1	V			
SO-2			√	
SO-2	•		√	

SO-3	\checkmark	
SO-4	V	
SO-5	V	
SO-6		√
SO-7		V

1.8. Degree Nomenclature

After successful completion of all the requirements a student graduating from the Electronics and Communication Engineering program will be awarded:

Bachelor of Science Degree in Electronics and Communication Engineering የሳይንስ ባችለር ዲግሪ በኤሌክትሮኒክስና ኮምውኒኬሽን ምህንድስና

1.9. Duration of study

1.9.1. Regular Program

The duration of the study of Undergraduate Electronics & Communication Engineering program is five years, ten semesters i.e. two semesters per academic year and two summer internship semesters. However, Fast track students may finish before ten semesters and delayed students may finish after ten semesters. For dual major/minor there may be one-year extension as stated in the university senate legislation August 2017, Article 98.1

1.9.2. Continuing education Program

The duration for study of the continuing undergraduate education programs shall be from five to eight years depending on the programs as stated in the university senate legislation August 2017, Article 98.2.

2. Program Requirements

2.1. Admission Requirements

2.1.1. Admission requirements for regular program

The minimum admission requirements for the undergraduate regular program are as stated in the Senate legislation August 2017, Article 72. Hence, admission to the undergraduate programs of ASTU shall be based on the completion of the preparatory and obtaining the necessary pass marks in the Ethiopian Higher Education Entrance Examination (EHEE) or equivalent academic achievements from foreign countries as well as the passing entrance examination set by the Ministry and/ or ASTU.

Upon on completion of the University Requirement courses students will join each school/program based on the Admission and Placement criteria supervised by Students Committee of the Senate according to the student interest of the program and the criteria set forsuch purposes as stated in the university senate legislation August 2017, Article 81.

2.1.2. Admission requirements for continuing education program

The admission requirements for the undergraduate continuing education program shall be in accordance with the developed criteria by institute of the continuing and distance education as stated in the senate legislation August 2017, Article 74.

2.2. Graduation Requirements

Graduation requirement for all undergraduate programs shall be stated /defined in a way to satisfy the course and credit requirements as stated in the university's senate legislation August 2017, Article 125 for engineering programs. Overall cumulative grade point average (CGPA), and CGPA for the core Electronics and Communication Engineering courses must each be at least **2.0** with no "F, I, NG" grades for successful completion. The students in this program must satisfy:

(a) The University regulations (university requirement) including the process of Academic Performance Evaluation

(b) The College regulations (College requirements) apply to all B.Sc. Programs in the school. Students should consult their College when planning their program and selecting courses.

- (c) Program requirements (core courses in the program)
- (d) Electives (Restricted and Free)
 - ✓ The student must select & take one of the courses listed under each RestrictedElective
 - ✓ The student must take any available course from the university for free Electives.

2.3. Total Credit Requirement

General	Basic	Major	Major	Free	Total
Mandatory	Mandatory	mandatory	Elective	Elective	
29	49	73	36	3	190

3. Course Plan

3.1. Course Code and numbering

All courses offered by the University shall be numbered as per the system of numbering courses provided by ASQAC as stated in the senate legislation August 2017, Article 87.

Hence, each course will have a prefix; each prefix contains four letters (ECEg = Electronics and Communication Engineering) without any space will be followed by four digits. In the numeric codes:

- The first digit indicates the year (level) in which the course is given,
- The second digit indicates the category to which the course belongs,
 - Category 0 = General,
 - Category 1 = Basic
 - Category 2 = major mandatory Courses
 - o Category 3= major Elective Courses,
- The last two digits indicate the semester in which the course is given.

 All courses given in the first semester represent by the last odd number (01, 03,05, 07, 09, 11...etc.)

 All courses given in the second semester represent by the last even number (02,04, 06, 08, 12...etc.)

3.2. Course design and category

3.2.1. Course design

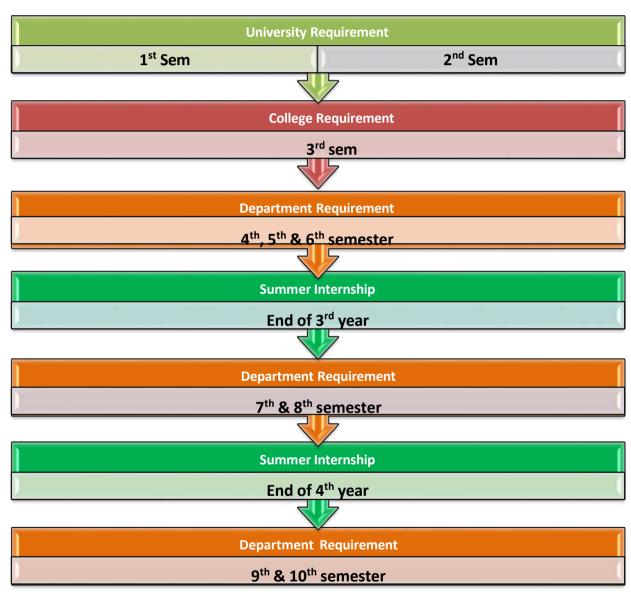


Figure 1: Course design

3.2.2. Course Categories

The structure of the course shall be categorized as Major, Basic, General and Free courses which in turn can be divided into Compulsory/mandatory and Elective depending on the level of importance of the delivery of the course at different Colleges and programs in the University, again it can be categorized as University, College, department or Individual (free) required.

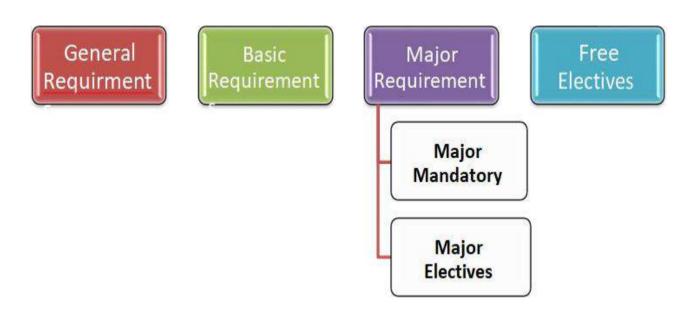


Figure 2: Course categories

I. General Requirements

General requirements are Humanities, Arts, Social Science and Business courses. All students must take at least **29** credits of general requirement courses.

II. Basic Requirements

Includes applied science courses that need to be completed for all majors and a few courses that apply to certain majors only. All students must take at least **49** credits of Basic requirement courses.

III. Major Mandatory

All students must meet major requirements in order to complete a major program. The total number of required credits is **73**.

IV. Major Electives

Major electives refer to all courses under a major excluding the major mandatory. Students can take courses that are related to their area of concentration or what they plan to study in graduate schools. Students should consult with their College when planning their program and selecting courses. The total credit hour for major elective is **36**.

V. Free Electives

A student can take any courses from any undergraduate programs of the University. However, consultation with the expected advisors is highly recommended. The total number of minimum required credits is **3**

Table 5: The category of the designed courses in the curriculum for a student who joined Electronics & Communication Engineering

S/NO.	Cour	se category	Course level	Credit requirement	Percentage from the total
1	General Requ	iirements		29	15.26%
2	Basic Manda	tory Courses		49	25.789%
		Mandatory	Department requirement	73	38.421%
3	Major	Elective	Department requirement	36	18.947%
		Subtotal		109	57.368%
4 Free electives			3	1.579%	
Total			190	100%	

4. Teaching - Learning methods and Assessment

4.1. Teaching - Learning / Instructional methods

Teaching and learning methods refers to the broad approaches to the learning and teaching activities. This may include a brief description of the range of teaching and learning methods employed and other innovative features of the program related to teaching and advising students. The teaching and learning methods may include student centered learning such as problem based learning, small group teaching, mini projects, group work, lectures, tutorial sessions, supervised study, student presentations, seminars, work-based learning, practical and development oriented design projects, readings and

discussion, role-play, case study, laboratory based learning, computer based learning, invited speakers, independent studies, internship, field work, project work, practical, Industrial visits, interactive "blended: E-learning", lectures by industry professionals, classes and demonstrations or a combination of these and others. Evidences of the extent to which the teaching and learning approaches are student centered and aligned with the Student Outcomes should be indicated.

4.2. Assessment and Evaluation Mechanisms

Assessment and evaluation mechanisms refer to the range and variety of assessment methods oral examination, written examination, oral presentation, test, paper/essay, portfolio, report about an internship, report on fieldwork, continuous assessment, group or individual projects, summative assessment such as final exams, project, problem solving assignments, senior essays, interactive computer and simulation assignments and group presentations ...etc. should be clearly indicated.

4.3. Grading System

Examinations are graded on letter grading system as stated in the university senate legislation August 2017, Article111. However, the grading system for industrial attachment/internship/, physical education and Final year project I shall be described as P/F in accordance with their respective curriculum. The status description is based on the raw mark interval given in Table 6.

Table 6: Grading System

Raw Mark interval (100%)	Correspondin gLetter Grade	Corresponding fixed number Grade
[90,100]	A+	4.0
[85,90)	A	4.0
[80,85)	A-	3.75
[75,80)	B+	3.5
[70,75)	В	3.0
[65,70)	B-	2.75
[60,65)	C+	2.5
[50,60)	С	2.0
[45,50)	C-	1.75
[40,45)	D	1.0
[0,40)	F	0

5. Quality Management System (QMS)

Quality management system indicates the reference points used to assess quality and standard of the proposed program. These may include standards and indicators in terms of the breadth and depth of academic content, innovations in teaching and learning, success and track record of graduates in employment, and program accreditation etc. It also includes the program monitoring mechanisms.

The mechanisms may include student, staff and stakeholder feedback schemes; procedures for innovation and improvement of the curriculum, standards and quality of teaching, learning and student performance.

Quality Management Systems Planning and Implementation for OBE shall be established in all academic units in line with the university's commitment to the continuous quality improvement. Therefore, the academic standard and quality assurance (ASQA) directorate shall prepare a different guideline to establish a quality management system in the university. Figure 3 shows different quality management system components.



Figure 3: Quality Management System Components

ASTU's commitment to continuous quality improvement is accomplished through a Continuous quality improvement (CQI) cycle in which the University adopts a systematic comparison of institutional performance to institutional purpose to evaluate institutional effectiveness. Figure 4 and 5; illustrate the overall outcome-based education implementation strategies practiced at each department and its quality management process at program level and course level. The diagrams show the processes where the outcomes are being measured at each level and the feedback systems to ensure Continuous quality improvement in our education system. The CQI at unit level (CO) is

Evaluated and assessed every semester, while the PO attainment at the programed level is conducted every year. The PEO assessment, evaluation and revision will be done every five years.

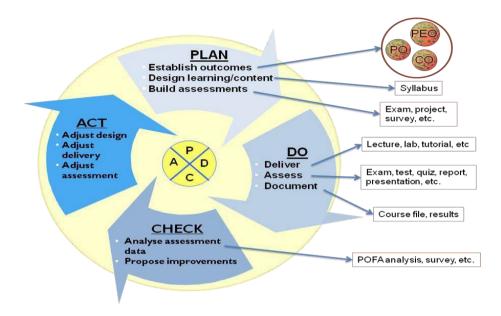


Figure 4: Overall OBE Implementation Strategies

Improvements based on feedback from evaluations will close the system loop and the process will continue year after year. Figure 4 shows that continual quality improvement cycle for outcome-based education.

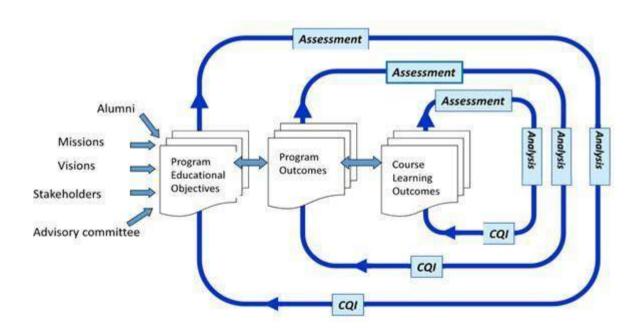


Figure 5: Continual Quality Improvement Cycle

6. Resource

6.1. Human resource/Staff Profile

Table 7: Staff Profile

No.	Staffs (Academics & Admin)	Nι	Number of Staff			
		Male	Female			
1	1 Professor 1 0					
2	Professional Engineers	1	1 0			
3	Associate Professor	7	0	7		
4	Assistant Professor	4	0	4		
5	Senior Lecturer	1	0	1		
6	Lecturer	19 4		23		
7	Senior Academic and Research Assistant (SARA)	7	0	7		
8	Academic and Research Assistant (ARA)	5 3		8		
9	Administration staff	1 1		2		
	Total					

NB. Professor & Professional Engineer is the same person.

6.2. Material Resources and Facility

ECE Department currently owns the following libraries, laboratories, equipment, ICT and access to electronic resources.

Libraries

- Central Library for all ASTU departments with access of books and electronic recourses

Laboratories

- Total Number of Computer Laboratory Rooms are 3.
 - o 1 Computer Lab room on B-510
 - o 1 Computer Lab room on B-613
 - o 1 Computer Lab room on B-606

- Electronics Laboratory
- Communication system laboratory
- Digital Logic Design Laboratory
- VLSI design Laboratory
- Micro processing & Interfacing Laboratory
- Telecommunication & switching Laboratory
- Antenna and Radio Wave Propagation Laboratory
- Micro Wave device and Circuit Laboratory

Offices

- The department has 12 Offices located on buildings B606, B605, B504, and B613 for all faculty members.

7. Guidelines for Double Major and Minor

7.1. General

Students with diverse or multiple areas of interest might consider adding breadth to their academic program by choosing to add a double major. A double major is one of several ways to prepare for the complexity of real-world problems whose solutions are draw on multiple disciplines. Students have CGPA 3.5 or higher may be permitted to have a double major or minor consisting of programs majors from two programs.

7.2. Deadline for declaring a double major

The deadline to declaring a double major is the registration date of a student's first semester of the fourth year. However, it is highly advised that a student declares a double major at the student's first semester of the third year.

7.3. Eligibility requirements

- Be registered as an undergraduate student in ASTU
- Have 3.50 CGPA or higher of the primary major
- Completed a minimum three semesters for engineering and two semesters for applied
- Science students in the primary major department
- Complete pre-requisites courses set by the respective departments, if any
- Advisor recommendations
- Apply on or before the deadline

7.4. Courses and Credit requirements for double major and minor

Students who need double major degree must successfully complete all courses specified by the program while taking all courses required by the first major program.

7.4.1. Courses & Credit requirements for dual major

Student from other program who wants to have **double major degree** in **Electronics** and **Communication Engineering** must take the following listed courses in addition to College requirement courses which is total of minimum **45** credit hours.

Table 8: List courses for dual major

Course Code	Course Title	Cr. Hr. (Lec/ Tut/Lab)	Pre-requisite
ECEg2202	Electronic Circuit II	4(2/3/3)	ECEg2201
EPCE2202	Electromagnetic Field	3(2/3/0)	Math2101
ECEg3205	Digital Signal Processing	3(2/3/0)	ECEg2204
ECEg3103	Probability and Random Processes	3(2/3/0)	Math1102
ECEg2204	Signals and System Analysis	3(2/3/0)	Math2101
ECEg3202	Introduction to Communication Systems	4(2/3/3)	ECEg2202
ECEg3201	Digital Logic Design	4(2/3/3)	ECEg2201
ECEg3306/ ECEg3318	Microelectronic devices & circuits/ Optoelectronics	3(2/0/3)	ECEg2202
ECEg4205	EM Waves and Guide Structure	3(2/0/3)	EPCE2202
ECEg4203	Digital Communication	3(2/0/3)	ECEg3202
ECEg4202	Microprocessors & Interfacing	4(2/3/3)	ECEg4201
ECEg4204	Antenna and Radio Wave Propagation	3(2/0/3)	ECEg4205
ECEg5201	Wireless and Mobile Communication	3(2/0/3)	ECEg4203
ECEg5203	Capstone Project	2(0/0/6)	All major courses
Total CR. HR		45	

7.4.2. Courses & Credit requirements for double minor

Student from other program who wants to have minor degree in Electronics and Communication Engineering must take the following listed courses in addition to College requirement courses which is total of minimum 27 credit hours.

Table 9: List of courses for Dual minor

Course Code	Course Title	Cr. Hr. (Lec/ Tut/Lab)	Pre-requisite
ECEg2202	Electronic Circuit II	4(2/3/3)	ECEg2201
ECEg3205	Digital Signal Processing	3(2/3/0)	ECEg2204
ECEg3202	Introduction to Communication Systems	4(2/3/3)	ECEg2202
ECEg3201	Digital Logic Design	4(2/3/3)	ECEg2201
ECEg3306/ ECEg3318	Microelectronic devices & circuits/ Optoelectronics	3(2/0/3)	ECEg2202
ECEg4203	Digital Communication	3(2/0/3)	ECEg3202
ECEg4204	Antenna and Radio Wave Propagation	3(2/0/3)	ECEg3202
ECEg5201	Wireless and Mobile Communication	3(2/0/3)	ECEg4203
Total CR. HR		27	

7.5. Maximum credit points each semester

The student who has been approved to pursue a double major may exceed the maximum credit points each semester set by the University. However, he /she may petition ahead of time to determine whether this will be approved. Students must be aware that exceeding the maximum credit points without approval is a violation of University regulations, which will render your ineligible for a degree.

7.6. Application process

- 1. Develop a double major academic plan with your academic advisor and complete application form.
- 2. Ask your faculty advisor to sign on the application.
- 3. Ask an administrative and/or advisor from the second program to review your plan and sign the application.

7.7. Duration of the study

In order to receive a diploma for a double major, a student must complete all requirements. If the student completes the requirements for one of the programs, he/she will have to decide between graduating with single major and continuing his/her

studies

Until completing both majors. However, the total duration of study may not exceed 12 semesters.

8. Course Requirement

8.1. General University/Department Requirement

Table 10: List of General University/Department Requirement courses

No.	Course Title	Credit- hour	ECTS
01	Entrepreneurship and Business Development	3	5
02	Communicative English	3	5
03	Basic Writing Skills	3	5
04	Introduction to Civics & Citizenship studies	3	5
05	Logic and Critical Thinking	3	5
06	Introduction to Economics	3	5
07	General Psychology and Life Skills	3	5
08	Physical Fitness and Conditioning I	P/F	P/F
09	Physical Fitness and Conditioning II	P/F	P/F
10	Geography of Ethiopia and the Horn	3	5
11	History of Ethiopia and the Horn	3	5
12	2 Project Management for Engineers		3
	Total	29	48

8.2. Basic Mandatory Courses

Table 11: List of Basic Mandatory Courses

No.	Course Title	Credit- hour	EC TS
01	Applied Mathematics I	4	7
02	Applied Mathematics II 4		7
03	Applied Mathematics III	4	7
04	Applied Modern Physics	3	5
05	Data Structures & Algorithms	3	5
06	Engineering Drawing	3	5
07	Fundamentals of Electrical Engineering		7

08	Fundamentals of Programming	3	5
09	General Chemistry	3	5
10	General Physics	3	5
11	Introduction to Computing	3	5
12	Introduction to Emerging Technologies	3	5
13	Linear Algebra	3	5
14	Computational methods	3	5
15 Solid State Physics		3	5
Total		49	83

8.3. Major Mandatory Courses

Table 12: List of Major Mandatory Courses

No.	Course Title	Credit- hour	ECTS
01	Electronic Circuit I	4	7
02	Electronic Circuit II	4	7
03	Signals and System Analysis	3	5
04	Electromagnetic Field	3	5
05	Engineering Application Software	1	2
06	Probability and Random Processes	3	5
07	Digital Logic Design	4	7
08	Network Analysis & Synthesis	3	5
09	Digital Signal Processing	3	5
10	Introduction to Communication Systems	4	7
11	Computer Architecture and Organization	3	5
12	Digital Communication	3	5
13	EM Waves and Guide Structure	3	5
14	Industry Internship – I	3	5
15	Industry Internship – II	3	5
16	Microprocessor & Interfacing	4	7
17	Antenna and Radio Wave Propagation	3	5
18	Engineering Research and Development Methodology	2	3
19	Data Communication and Computer Networks	3	5

20	Wireless and Mobile Communication	3	5
21	Capstone Project	2	3
22	Integrated Engineering Project	3	
23	Final year project Phase I	2	3
24	24 Final year project Phase II		7
Total		73	118

8.4. Major Elective Courses

Table 13: List of Major Elective Courses

No.	Course Title	Credit-hour	ECTS
01	Microelectronic devices & circuits	3	5
02	Optoelectronics	3	5
03	Object Oriented Programming	3	5
04	Introduction to Artificial Intelligence	3	5
05	Introduction to power system	3	5
06	Introduction to Electrical Machines	3	5
07	Introduction to control System	3	5
08	Electrical Measurement and Instrumentation	3	5
09	Microwave Devices and Systems	3	5
10	Integrated Circuit Technology	3	5
11	VLSI Design	3	5
12	Advanced Computer Networks	3	5
13	Embedded and real time systems	3	5
14	Programmable Logic Controllers and Robotics	3	5
15	Introduction to Mechatronics	3	5
16	Biomedical Instrumentation and Analysis	3	5
17	Power Electronics	3	5
18	Optics and Optical Communication	3	5
19	Satellite Communication	3	5
20	Analysis & design of Digital integrated circuit	3	5
21	Telecommunication Networks and Switching	3	5
22	Introduction to Computer Vision	3	5

23	Semiconductor Devices	3	5
24	Digital Image Processing	3	5
25	Digital Hardware Design	3	5
	Total	36	60

8.5. Free Elective

Table 14: List of Free Elective Courses

No.	Course Title	Credit- hour	ECTS
01	Free Elective I	3	5
	Total	3	5

9. Semester course breakdown (Scheduling)

		Year-I, Semester-I						
S/N	Course code	Course title	Cr.hr	ECTS	Lec	Tut	Lab	Pre-requisite
1	Math1101	Applied Mathematics I	4	7	3	3	0	None
2	Phys1101	General Physics	3	5	2	3	0	None
3	Chem1101	General Chemistry	3	5	2	3	0	None
4	CSEg1101	Introduction to Computing	3	5	2	0	3	None
5	EnLa1001	Communicative English Skill	3	5	2	3	0	None
6	LART1001	Introduction to Civics & Citizenship	3	5	3	0	0	None
		studies						
7	HPEd1011	Physical Fitness and Conditioning I	P/F	-	-	-	-	None
	Total			32	14	12	3	

	Year-I, Semester-II										
S/N	Course code	Course title	Cr.hr	ECTS	Lec.	Tut	Lab	Pre-			
1	Math1102	Applied Mathematics II	4	7	3	3	0	Math1101			
2	CSEg1102	Introduction to Emerging Technologies	3	5	2	0	3	None			
3	CSEg1104	Fundamentals of Programming	3	5	2	0	3	CSEg1101			
4	LART1002	Logic and Critical Thinking	3	5	3	0	0	None			
5	Meng1032	Engineering Drawing	3	5	2	0	3	None			
6	EnLa1002	Basic Writing Skill	3	5	3	0	0	ENG1011			
7	HPEd1022	Physical Fitness and Conditioning II	P/F		-	-	-	HPEd1011			
		19	32	15	3	9					

		Year-II, Semester-I						
S/N	Course code	Course title	Cr.hr	ECTS	Lec.	Tut	Lab	Pre-requisite
1	Math2101	Applied Mathematics III	4	7	3	3	0	Math1102
2	ECEg2201	Electronics Circuit I	4	7	2	3	3	Math1101, Phys1101, and Co- requisite EPCE2101
3	EPCE2101	Fundamentals of Electrical Engineering	4	7	2	3	3	Math1101 , Phys1101
4	CSEg2101	Data Structures & Algorithms	3	5	2	0	3	CSEg1104
5	LART1004	Geography of Ethiopia and the Horn	3	5	3	0	0	None
		Total	18	31	12	9	9	

	Y	Year-II, Semester-II						
S/N	Course code	Course title	Cr.hr	ECTS	Lec.	Tut	Lab	Pre-requisite
1	ECEg2202	Electronic Circuit II	4	7	2	3	3	ECEg2101
2	2 ECEg2204 Signals and System Analysis		3	5	2	3	0	Math2101
3	EPCE2202	Electromagnetic Field	3	5	2	3	0	Math2101
4	ECEg2208	Engineering Application	1	3	0	0	3	None
		Software						
5	Math-2103	Computational methods	3	5	2	0	3	Math2101
6	Math2201	Linear Algebra	3	5	2	3	0	None
		Total	17	30	10	12	9	

		Year-III, Semester-I						
S/N	Course	Course title	Cr.hr	ECTS	Lec.	Tut	Lab	Pre-requisite
	code							
1	ECEg3201	Digital Logic Design	4	7	2	3	3	ECEg2201
2	EPCE3201	Network Analysis & Synthesis	3	5	2	3	0	ECEg2204
3	ECEg3103	Probability and Random Processes	3	5	2	3	0	Math1102
4	ECEg3205	Digital Signal Processing	3	5	2	3	0	ECEg2204
5	LART2002	General Psychology and Life Skills	3	5	3	0	0	None
6	Phys2208	Applied Modern Physics	3	5	2	3	0	Phys1101
		Total	19	32	13	15	3	

		Year-III, Se	mester	-II				
S/N	Course code	Course title	Cr.hr	ECTS	Lec.	Tut	Lab	Pre-requisite
1	ECEg3202	Introduction to Communication Systems	4	7	2	3	3	ECEg2202
3	Phys3202	Solid State Physics	3	5	2	3	0	Phys2208
4	LART1003	History of Ethiopia and the Horn	3	5	3	0	0	None
5	Of selected course	Major Elective I	3	5	2	0	3	of selected course
6	of selected course	Major Elective II	3	5	2	0	3	of selected course
7	of selected course	Major Elective III	3	5	2	-	-	of selected course
		Total	19	32	13	6	9	

	Year-III, Semester-II: Major Elective										
Elective	Course code	Course title	Cr.hr	ECTS	Lec	Tut	Lab	Pre-requisite			
Major Elective I	ECEg3306	Microelectronic devices & circuits	3	5	2	0	3	ECEg2202			
	ECEg3318	Optoelectronics	3	5	2	3	0	ECEg2202			
Major Elective	CSEg2202	Object Oriented Programming	3	5	2	0	3	CSEg1104			
II	SEng4208	Introduction to Artificial Intelligence	3	5	2	0	3	None			
Major	EPCE3304	Introduction to control Systems	3	5	2	1	2	EPCE3201			
Elective III	EPCE3302	Introduction to Electrical Machines	3	7	2	3	3	EPCE2202			

Year-III: Summer Semester									
Course Code Course Title Cr.hr ECTS Duration Pre-requisite									
ECEg3200	Industry Internship – I	3	5	Two months	None				

	,	Year-IV, Semester-I							
S/N	Course code	Course title	Cr.hr	ECTS	Lec	Tut	Lab	Pre-requisite	
1	ECEg4201	Computer Architecture And Organization	3	5	2	3	0	ECEg3201	
2	777 1007		3	5	2	0	3	ECEg3202	
3	ECEg4205	EM Waves and Guide Structure	3	5	2	3	0	EPCE2202	
4	SOSC5003	Entrepreneurship and Business Development	3	5	3	0	0	None	
5	ECEg4206	Engineering Research and Development Methodology	2	3	1	3	0	Senior standing Course	
6	of selected course Major Elective IV			5	-	-	-	of selected course	
	Total 17 28 10 9 3								

	Year-IV, Semester-I: Major Elective										
Elective	Course code	Course title	Cr.hr	ECTS	Lec	Tut	Lab	Pre- requisite			
Major Elective IV	EPCE3206	Introduction to power systems	3	5	2	0	3	EPCE3205			
Elective IV	EPCE3207 Electrical Measurement and Instrumentation					0	3	ECEg2202			

	,	Year-IV, Semester-II						
S/N	Course code	Course title	Cr.hr	ECTS	Lec.	Tut	Lab	Pre-requisite
1	ECEg4202	Microprocessor & Interfacing	4	7	2	3	3	ECEg4201
2	ECEg4204	Antenna and Radio Wave Propagation	3	5	2	0	3	ECEg4205
3	ECEg4208	Data Communication and Computer Networks	3	5	2	0	3	ECEg4203
4	SOSC200 2	Introduction to Economics	3	5	3	0	0	None
5	IETP4203	Integrated Engineering Project	3					Senior standing Course
6	6 of selected Major Elective V course		3	5	-	-	-	of selected course
		19	30	10	6	9		

	Year-IV, Semester-II: Major Elective											
Elective	Course	Course	se title Cr.hr		ECTS	Lec	Tut	Lah	Pre-requisite			
Dicetive	code	dourse		LOIS	LCC	luc	Lab	Tre requisite				
Major	ECEg4310	Microwave	Devices	3	5	2	0	3	ECEg4205			
Elective V		and Systems										
	ECEg4312	Integrated		3	5	2	3	0	ECEg3306			
		Circuit										
		Technology										

	Year-IV: Summer Semester											
Course Code	Course Title	Cr.hr	ECTS	Duration (Days)	Pre- requisite							
ECEg4200	Industry Internship - II	3	5	Two months	ECEg3200							

		Year-V,	Semest	ter-I				
S/N	Course code	Course title	Cr.h	ECTS	Lec.	Tut	Lab	Pre-requisite
			r					
1	ECEg5201	Wireless and Mobile	3	5	2	0	3	ECEg4203
1		Communication						
2	of selected course	Major Elective VI	3	5	2	0	3	of selected course
3	of selected course	Major Elective VII	3	5	2	0	3	of selected course
4	of selected course	Major Elective VIII	3	5	2	0	3	of selected course
5	of selected course	Free Elective I	3	5	2	0	3	of selected course
6	ECEg5203	Capstone Project	2	3	0	0	6	Accomplishment
7	ECEg5207							of all major courses
	_	Final year project Phase- I	2	3	0	0	6	
	Т	'otal	19	31	10	-	27	

	Year-V, Sen	nester-I: Major Elective						
Elective	Course	Course title	Cr.hr	ECTS	Lec	Tut	Lab	Pre-
	code							requisite
Major	ECEg5307	VLSI Design	3	5	2	0	3	ECEg3201
Elective VI	CSEg5307	Advanced Network	3	5	2	0	3	ECEg4208
Major	ECEg5315	Embedded and real	3	5	2	0	3	ECEg4202
Elective VII		time systems						
	EPCE4302	Programmable Logic	3	5	2	0	3	EPCE3204
		Controllers and Robotics						
Major	EPCE4306	Introduction to Mechatronics	3	5	2	0	3	None
Elective VIII	ECEg5321	Biomedical Instrumentation	3	5	2	0	3	None
		and Analysis						
	EPCE3202	Power Electronics	3	5	2	0	3	ECEg2202

	Yea	nr-V, Semester-II						
S/N	Course code	Course title	Cr.hr	ECTS	Lec	Tut	Lab	Pre-requisite
1	SOSC5011	Project Management for Engineers	2	3	2	0	0	None
2	of selected course	Major Elective IX	3	5	-	-	-	of selected course
3	of selected course	Major Elective X	3	5	-	-	-	of selected course
4	of selected course	Major Elective XI	3	5	-	-	-	of selected course
5	of selected course	Major Elective XII	3	5	-	-	-	of selected
6	ECEg5202	Final year project phase II	4	10	0	0	30	Completion of all major courses
	7	Total	18	33	-	-	-	

	Year-V, S	emester-II: Major Elective						
Elective	Course code	Course title	Cr.hr	ECTS	Lec.	Tut	Lab	Pre-requisite
Major Elective IX	ECEg5302	Optics and Optical Communication	3	5	2	0	3	ECEg4203
	IEL EUS 3114	Analysis & design of Digital integrated circuit	3	5	2	3	0	ECE3206
Major Elective X	ECEg5306	Telecommunication Networks and Switching	3	5	2	0	3	ECEg4203
	ECEg5308	Introduction to Computer Vision	3	5	2	0	3	ECEg4302
Major	ECEg5310	Satellite Communication	3	5	2	0	3	ECEg4204
Elective XI	ECEg5312	Digital Hardware Design	3	5	2	0	3	ECEg4201
Major Elective XII	ECEg5314	Digital Image Processing	3	5	2	0	3	ECEg3205
	ECEg5316	Semiconductor Devices	3	5	2	3	0	ECEg2201

10. Course Syllabus

	_				ama S	Science	and Te					•						
1		Freshm						Depart	mei	nt: P	re-E	ngiı	neerir	ng				
2		Category				datory												
	Course l					athema	tics I											
	Course				1101													
3	Synopsi	S:				he Cour												
						ebra and											tains	
						of vector s & their											oir	
				1	cation		аррпса	110115, 11	neg	,1 a15,	mile	grai	ion te	CIIIII	ques a	iiiu iii	en	
4	Academ	ic Staff:		аррп	cation	15												
5		er and Ye	ar	Seme	ester	I		Year	: 1									
	offered:			:	:													
6	Credit H	lour:		4									•					
7	_	isite/Co	-	None)													
	requisit																	
8	Course	Learning	Outcor	ne (CL	،O): At	the end	of the o	course t	he s	stude	ent v	vill b	e able	e to:				
	CLO-1		Apply	the ha	sic nr	inciples	of vecto	ors to so	olve	the	nroh	lem	s that	need	ls con	cents	of	
	020 2			r opera	_	merpres	01 10000	715 65 56	,,,,		prob		o cirac	11000	10 0011	серев	01	
	CLO-2					of linear	equatio	ns by u	sing	g ma	trix a	and	deterr	nina	nt			
	CLO-3					it and co		_										
	CLO-4		_			mum va	lues of a	a given :	syst	em l	y us	sing	basic	rule	s and	princ	iples	of
				entiatio		1 .							, ,	,	1 .			
	CLO-5					chnique:										ermin	e the	
	CLO-6					-length, s rinciples										inton	ratio	n
	CLO-0					pplicatio							t, uerr	vativ	e anu	micg	latio	11
9	Mappin	g of the c								_		_	ng Me	thod	s and	Asses	smer	nt
		J						nts Out										
							Jude		COII	ie (3	U)				Assess	ment		
	8 (Tead	ching	ī			133033		· 	
	Course Learning Outcomes (CLO)										hods	,			Ι	п	int	
	ear s ((-Assignment I	Mid. Exam	Assignment	
	e L														uu	d. E	sigr	lal
	urs	7	-5	-3	4-	٦ċ	9-	-1					Test I	Test II	sigı	Mi	Ass	Final
		S0-1	SO-2	SO-3	S0-4	SO-5	9-0S	SO-7	L	T	P	0	Te	Te	As	r		
	CLO-1	$\sqrt{}$							1	√			√		<u>,</u>	√		√
	CLO-2	√ 1/							1	1/			V		√	√ /		√ /
	CLO-3 CLO-4	1							√	1/				1/		√	1/	$\sqrt{}$
	CLO-4	V							\ \ √	√ √				√ √			√ √	V
	CLO-6	V							\ \sqrt{\sqrt{\sqrt{\sqrt{\columbda}}}	v √				V			v √	$\sqrt{}$
		the rele	vancv h	etwee	n the (CLO and	SO by ti	cking "	√"o	n the	e apr	rop	riate ı	elev	ant bo)X	<u> </u>	
10		rable Ski				3	J - C	0				- P						
		earned in				which o	an be u	seful ar	ıd u	tiliz	ed in	oth	er set	tings)			
	•																	

	1 Mathematical skil	ls that used	d to so	lve d	iffere	nt pra	actical engine	eering problems	3
	2								
11	Distribution of Student Learning Ti	me (SLT)							
						_	d Learning A		Total
	Course Content Outline	CLO	Gu		learn 2F)	ing	Guided Learning	Independent Learning	(SLT)
			L	Т	P	0	(NF2F)	(NF2F)	
	Chapter 1:Vector	CLO-1, CLO-6	7	3			1	12	23
	1.1 Definition of vectors							1	1
	1.2 Vector operations		1	1				1	3
	1.3 Norm of a vector		1					2	3
	1.4 Scalar product		1					2	3
	1.5 Projection of Vectors		1					2	3
	1.6 Cross product		1	1			1	2	5
	1.7 Lines and planes in space		2	1				2	5
	Chapter 2: Matrix and determinant	CLO-2, CLO-5	10	8			1	10	29
	2.1 Definition of matrix and types of matrix		1	1				1	3
	2.2 Matrices Operations		1	1				1	3
	2.3 Transpose of matrix		1	1				2	4
	2.4 Elementary row Operations		1	1				1	3
	2.5 Echelon form and rank of a matrix		1	1			1	1	4
	2.6 Inverse of a matrix and its Properties		2	1				1	4
	2.7 Determinant of a matrix and its properties		1	1				1	3
	2.8Solving systems of linear Equations2.8.1 Cramer's rule2.8.2 Gaussian's method2.8.3 Inverse matrix method		2	1				2	5
	Chapter 3: Limit and Continuity	CLO-3, CLO-6	6	5			1	6	18
	3.1 Basic Concepts of limit		1	1				1	3
	3.2 Limit Theorems		1	1				1	3
	3.3 Asymptotes		1	1				1	3

	3.4 Formal definition of Limits		1	1		1	1		4
	3.5 Continuity		1	1			1		3
	3.6 Intermediate value Theorem	l	1				1		2
_	Chapter 4: Derivative and Its Applications	CLO-4, CLO-6	8	8		1	10		30
	4.1 Definition of derivatives and rules of differentiation		1	1			1		3
	4.2 Higher order Derivatives			1			1		3
	4.3 Implicit Differentiation		1	1			1		4
	4.4Derivatives of inverse Functions 4.4.1 Inverse trigonometric		2	1		1	2		7
	functions and their derivatives 4.4.2 Inverse hyperbolic								
	functions and their derivatives								
	4.5 Applications of derivative 4.5.1 L'Hopital's Rule		4	4		1	5		14
	4.5.2 Related rate								
	4.5.3 Extremum values of a function								
	4.5.4 First and second derivative								
	tests	,							
	4.5.5 Concavity and inflection								
	points								
	4.5.6 Curve Sketching								
	Chapter 5: Integration and Its	CLO-5, CLO-6	8	10		1	11		32
	Applications 5.1Anti-Derivatives; Indefinite	CLU-0	1	2			2		5
	Integrals		1	۷			2		3
F	5.2 Techniques of Integration		2	2			2		6
-	5.3 Definite Integrals;		2	2			2		7
	Fundamental Theorem of								
	Calculus								
	5.4 Improper Integrals		1	2			2		6
	5.5. Application of Integration		2	2		1	3		8
		Total	39	39		5	49		132
				essme	nt	T			T
	Continuous Assessment		ercen			F2F		NF2F	SLT
F	1 Topto (2)(E0/ coch)	T	otal-50 10%						2
	1 Tests (2)(5% each) 2 Mid Exam		20%			√ √			3
}	3 Assignments(2)		20%			V			20
}	4 Tota	1	207	J		25		v	
	Final Exam	Percentage	50		F2F	NF2	F		SLT
				1		ı		1	

			(%)			
	Final Exam		50%			3
					Grand Total SLT	160
	L = Lecture, T = Tutorial, P	BL =	Problem based lear	ning, GD = Gi	roup Discussion, F2F :	= Face to Face, NF2F
	= Non Face to Face					
	Note: indicates the CLO bas	sed c	on the CLO's number	ing in item 9).	
12	Special requirements and	1	Choose an item.			
	resources to deliver the	2	Choose an item.			
	course (e.g. software,					
	computer lab, simulation					
	roometc.)					
13	Text book and reference:	1	Robert Ellis and De	nny Gulick, (Calculus with analytic	geometry, 6 th ed,
	(note: ensure the latest		Harcourt Brace Jov	anovich, pub	olishers	
	edition /publication)	2			ear Algebra with App	
		3	Howard Anton, Cal	culus with A	nalytic Function, 5 th e	d.
		4	James Stewart, Cald	culus Early T	'ranscendental,6 th ed.	
		5	Robert Ellis and De	nny Gulick, (Calculus with analytic	geometry, 6 th ed,
			Harcourt Brace Jov	anovich, pub	olishers	

			A	Adama Science and	Technology	University						
1	College: A	Applied	Natural Scienc			pplied Physics						
2	Course		Basic Mandat	ory								
	Category											
	Course Na		General Phys	ics								
	Course Co		Phys1101									
3	Synopsis:						ncepts of physics that enable					
							omena. Emphasis is laid on					
							ents, mechanical and thermal					
						_	rillations and waves with					
							ting the students to voice and mmitment to individual study					
							s required at each phase. This					
			•	9			•					
		is done through questioning and answering, reflection, reporting, solving problems associated with the respective topics.										
4	Name(s)	of										
	Academic	: Staff:										
5	Semester		Semester:	ī	Year:	1						
	Year offer		beniester.	1	Tear.							
6	Credit Ho					3						
7	Prerequis			** 1		a 1 D1						
	Co-requis	site:		Knowle	dge in High	er Secondary Ph	nysics					
8	(if any)											
O	Course Le	earning	Outcome (CLC)): At the end of the	e course the	student will be	able to:					
				_	_	the previous pr	eparatory physics concepts					
				vanced physics cou								
		•	•	_	•		and two dimensions and to					
	GLOZ	explain	the basic cond	epts of charges, fie	lds and pote	entials.						

	CLO3			ate th		e and	the	work	ing s	yster	n o	f ce	lls (ba	atteri	es), re	esisto	rs, ge	nerat	ors,	moto	ors and	l
	CLO4	Un	ders	tand	the f	irst la	aw o	f ther	mod	ynan	nics	fo	r a clo	sed s	ystem	and	apply	it to	solv	e pro	blems.	
	CLO5	Int	erpr	et sy:	stem	s tha	t osc	illate	with	sim	ple	har	moni	c mot	tion.							
	CL06	Ex	plain	the a	appli	catio	n of _J	physi	cs in	diffe	ren	ıt s	cience	es and	l tech	nolog	gy field	ds.				
9	Mapping	g of	the c	ourse	e Lea	rning	g Out	come	es to							ching	Meth	ods a	nd A	ssess	ment:	
				1		1				Stuc	den	t 0	utcom	ies (P	90)		A					
	1g ((Tea	achin	σN	letk	nods				ASSE	essme	ent			
	Course Learning Outcomes (CLO)	S01	S02	S03	S04	S05	90S	S07	100	aciiiii	Б ¹	icu	ious	Test	Quiz	Assign	ment	Project	Lab-	report		
	ourse								L	T	P		0									
	CL01	V	_	_	_	_	_	_	√	√				V				_			_	
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	Indicate	the	rele	vancy	y bet	ween	the	CLO	and S	60 by	tic	kin	g "√"	on th	e app	ropri	ate re	levan	t box	ζ		
1 0	Transfer (Skills le							y whi	ch ca	an be	us	efu]	and ı	utilize	ed in c	other	settin	ıgs)				
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	Chapter	r 1 : Î	Preli	imina	aries	;			2	3	3	•	-		4			-			9	
	1.1 Phys Units of	Mea	asure	men		d	CL	01				-	-		1			-			-	
	1.2 Unce measure Digits		-		nifica	ant	CL	01	2	2		-	-		1			-			9	

1.3 Vectors: composition and resolution	CLO1		1	-	-	1	-	
1.4 Unit Vectors	CLO1		1	-	-	1	-	
Chapter 2: Kinematics and Dynamics of Particle		4	6	-	-	9	-	19
2.1 Displacement, Velocity and Acceleration in 1D and 2D	CLO2		2	-	-	2	-	8
2.2 Motion with Constant Acceleration	CLO2	2		-	-	1	-	
2.3 Free Fall Motion & Projectile motion	CLO2		1	-	-	2	-	6
2.4 Particle Dynamics	CLO2		2	-	-	2	-	10
2.5 Planetary Motion	CLO2	2	2	-	-	1	-	10
2.6 Work, Energy and Linear Momentum	CLO2		1	-	-	1	-	5
Chapter 3: Fluids Mechanics		4	6	-	-	4	-	14
3.1 Properties of Bulk Matter /Stress, Strain	CLO3	2	3	-	-	1	-	7
3.2 Density and Pressure in Static Fluids	CLO3	2	3	-	-	1	-	7
3.3 Buoyant Forces, Archimedes' principle	CLO3	2	3	-	-	1	-	7
3.4 Moving Fluids and Bernoulli's Equation	CLO3		3	-	-	1	-	,
Chapter 4: Heat and Thermodynamics		4	6	-	-	8	-	18
4.1 The Concept of Temperature: Zeroth Law of Thermodynamics	CLO4			-	-	1	-	
4.2 The Concept Heat and Work	CLO4	2	3	-	-	1	-	9
4.3 Specific Heat and Latent Heat	CLO4			-	-	2	-	
4.4 Heat Transfer Mechanism	CLO4			_	-	1	-	
4.5 Thermal Expansion	CLO4			-	-	1	-	
4.6 Energy Conservation: First Law of Thermodynamics	CLO4	2	3	-	-	2	-	9
Chapter 5: Oscillations, Waves and Optics		4	6	-	-	7	-	17
5.1 Simple Harmonic Motion	CLO5	2	3	-	-	1	-	9
5.2 The Simple Pendulum	CLO5		<i>J</i>	_	-	1	-	

	al Exam	50						3 h	rc
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	Application in Power neration	CLO6	26	200	-	-	1	-	444
Spa	Application in Earth and ace Sciences	CLO6	2	3	-	-	1	-	8
7.4	Physics and Archaeology	CLO6			-	-	1	-	
	Physics in Health Science I Medical Imaging	s CLO6		J	-	-	1	-	U
	Physics and Industries	CLO6	2	3	-	-	1	-	8
	Application in Agriculture	e CLO6			-	-	1		
	plications of Physics		4	6	-		6	-	16
Cur	ve & Transistors apter 7: Cross Cutting	CLO2	_	_	-	-	2	-	
Sen	Insulators, Conductors & niconductors Diodes Characteristics	CLO2	2	3	-	-	1	-	9
Flu Ind	Magnetic Field, Magnetic x & Electromagnetic uction	CLO2			-	-	1	-	
Equ Kir	Electrical Power, uivalent Resistance and chhoff's Law	CLO2			-	-	2	-	
Ohi	Current, Resistance and m's Law	CLO2	2	3	-	-	1	-	9
	Coulomb's Law, Electric lds & Electric Potential	CLO2			-	-	1	-	
Ele	apter 6: ectromagnetism and ectronics		4	6	-	-	8	-	18
len	Image formation by thin ses and mirrors	CLO5		3			2		0
5.4	Resonance, Doppler Effec	ct CLO5	2	3	-	-	1	-	8
Cha	Wave and Its aracteristics	CLO5			-	-	2	-	

			Grand Total SLT 120 hrs.
			ractical, O = Others, F2F = Face to Face, NF2F = Non-Face to Face on the CLO's numbering in item 9.
1 2	Special requirements and resources to	1	White Board and Marker
	deliver the course (e.g., software, computer lab, simulation roometc.)	2	Power Point Projector
1 3	Text book and reference:	1	Physics for Scientists and Engineers with modern Physics, Ninth Edition Raymond A.Serway and John
	(note: ensure the latest edition / publication)	2	University Physics with Modern Physics by Young, freedman and Lewis Ford
		3	Tayal D.C. Basic Electronics. 2 nd ed. Himalaya Publishing House Mumbai, (1998).
		4	Fundamentals of physics by David Halliday, Robert Resnick and Gearl Walker

		Ac	lama Science and	d Techno	logy Un	niversity	
1	School: Applied So	cience			De	partment: Applied	l Chemistry
2	Course Category	Basi	c Mandatory				
	Course Name		eral Chemistry				
	Course Code:	Chei	m1101				
3	Synopsis:	com stru prop and	position of mat cture and the po perties of solutio their typical read	ter, cher eriodic t ns, chem ctions.	nical re able, th ical equ	eactions, reaction le chemical bond, uilibria, introducti	and measurements; the s stoichiometry, atomic structure of molecules, on to functional groups
4	Name(s) of Acade Staff:	mic All a	academic staffs o	f Applied		istry department	
5	Semester and Year		I		Year:	1	
	offered:	me					
		ste r:					
6	Credit Hour:	3					
7	Prerequisite/Co-requisite: (if any)	Non	e				
8	Course Learning (Outcome (CL()): At the end of	the cours	se the st	tudent will be able	e to do:
	CLO-1	Apply comm	non SI units of m	easurem	ent to ii	nterconvert units	of measurement.
	CLO-2	Categorize e	elements based o	n electro	nic con	figuration.	
	CLO-3	Identify the	chemical reactio	n types			
	CLO-4	Determine r	-	tion, emp	oirical a	and molecular form	nulas by applying the
	CLO-5	Predict aton models.	nic structure, che	emical bo	onding o	or molecular geom	netry based on various
	CLO-6	Describe ch	emical equilibria	, colligat	ive pro	perties of solution	s and functional groups
	1	1					44

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9	Mapping of the co	urse	Lea	ırnıng	Out	con	ies i	to tn					Outco			ng Metnod	is and A	ssess	sment:
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	Learr nes (C	S0-1	S0-2	SO-3	S0-4	S0-5	9-0S	1.1	Ctir	ous		Test		Quiz		Assi gnm ent	Proj ect	Fiel	d- repo rt
	Course Learning Outcomes (CLO)							L	Т	P	O								
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	CLO-5	\int																	
	CLO-6							$\sqrt{}$											
	Indicate the releva	_				CLC	an	d SO	by	ticl	kin	g "۱	√"on t	he ap	prop	riate relev	ant box		
10	Transferable Skill (Skills learned in t					v wł	nich	can	be	use	efu]	l an	d utili	zed i	n oth	er settings)		
	1					<u>/</u>										<u> </u>	<u>, </u>		
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11	Distribution of Stu	ıden	t Le	arnin	g Tir	ne (SLT)											
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								CLO)		(Guic	ded lea	arnin	g	Guided	Indep	en	(SLT)
	Course Content O	utlin	e										(F2F)		Learnin	den	ıt	
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	1 December 1	Maa			la .	an d		LO-1		2	2hr		1h				3hr		6hr
	1. Properties, I Units	viea	Suit	emem	15	and							r						
	1.1. The Proper	rties	of S	Substa	nces	:													
	1.1.1. Phy	sical	a																
	1.1.2. Sub	perti		and M	[;;; t ;;	roc													
	1.1.2. Sub					168													
	1.2. Measureing 1.2.1. The					tem													
		nits	1114	iiul	Jys	111													
	1.2.2. Exte		ле а	nd In	tens	ive													
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	1.2.3. Con			Facto	rs					\perp									
	1.2.4. The			iabilit	-	of		LO-1			lhr						3hr		4
		sure				and	1												

1.2.5. Significant Figures in Calculations						
2. The Composition of Matter 2.1 Elements 2.1.1 The Names and Symbols of the Elements 2.1.2 The Periodic Table 2.2 Atoms 2.2.1 The Nuclear Atom 2.2.2 The Masses of Atoms 2.2.3 Moles and Molar Mass	CLO-2	2hr			3	5
2.1 Compounds 2.1.1 Molecules and Molecular Compounds 2.1.2 Ions and Ionic Compounds	CLO-2	1hr			3	4
3. Chemical Reactions 3.1. Chemical Equations 3.1.1. Symbolizing Reactions 3.1.2. Balancing Equations 3.2. Precipitation Reactions 3.2.1. Net Ionic Equations 3.2.2. Using Precipitation Reactions in Chemistry	CLO-3	2hr			3	5
3.3. Acid-Base Reactions 3.3.1.Arrhenius Acids and Bases 3.3.2.Neutralization 3.3.3TheBrönsted Definition. 3.3.4.Lewis Acid. 3.4.Redox Reactions 3.4.1. Electron Transfer 3.4.2. The activity series Balancing reactions by using half-reactions	CLO-3	2hr			3	5
4. Reactions Stoichiometry 4.1. Interpreting Stoichiometric Coefficients 4.1.1. Mole Calculations 4.1.2. Empirical & molecular formula Limiting Reactans 4.1.3. Chemical Compositions from Measurements of Mass	CLO-4	2hr	1h r		4	7

	1.1. The Stoichiometry of Reactions in Solution	CLO-4	2hr	1h r		4	8
	1.1.1. Molar Concentration1.1.2. The Volume of SolutionRequired for Reaction						
T	itrations						
5.	. Atomic structure and the periodic table	CLO-2	3hr			3	6
	5.1. Light and Spectroscopy 5.1.1. The Characteristics of Light 5.1.2. Quantization and Photons 5.3. The Structure of the Hydrogen						
	 5.2. The Structure of the Hydrogen Atom 5.2.1. The Spectrum of Atomic Hydrogen 5.2.2. Particles and Waves 						
	5.3. The Structure of Many-Electron	CLO-2	1hr	1h		3	5
	Atoms			r			
	5.3.1. Orbital Energies 5.3.2. The Building –up						
	Principle						
	5.4 A survey of Periodic Table						
	5.4.1 Blocks , Periods, and Groups						
	5.4.2 Periodicity of Physical Properties						
T	rroperdes 'rends in Chemical Properties						
	The chemical bond	CLO-6	1hr			3	4
	1.1. Ionic Bonds						
	1.1.1. The Energetics of ionic						
	Bond Formation						
	1.1.2. Ionic Bond and the Periodic Table						
	renoute rubic						
	1.1. Covalent Bonds	CLO-5	1hr			4	5
	1.1.1. VSPER theory& Lewis						
	Structures of Polyatomic Molecules						
	4.2.2 Resonance						
	4.2.3 Molecules with Multiple						
	Bonds						
7	. The Structures of Molecules	CLO-5	2hr			3	5
•	Bond Parameters						
•	Charge Distributions in Compounds						

		1	1				
•	Ionic versus Covalent Bonding						
•	Assessing the Charge Distribution						
•	The Valence-Bond Model of Bonding						
•	Bonding in Diatomic Molecules						
•	Hybridization						
•	Molecular Orbital Theory						
	Molecular Orbitals Inding in Period 2 Diatomic Dlecules						
	The Properties of Solutions	CLO-6	2hr			4	6
•	Measures of Concentration						
•	Emphasizing the Amounts of Solute in Solution						
•	Emphasizing Relative Amounts of Solute and Solvent Molecules						
•	Solubility						
•	Saturation and Solubility						
•	The Effect of Pressure on Gas Solubility						
•	The Effect of Temperature on Solubility						
•	Colligative Properties	CLO-6	2hr			5	7
•	Changes in Vapor Pressure, Boiling Points, and Freezing Points						
•	Mixtures of Liquids						
• Th	Raoult's Law for Mixtures of Liquids e Distillation of Mixtures of Liquids						
	Chemical Equilibrium	CLO-6	3hr			4	7
•	The Description of Chemical Equilibrium Reactions at Equilibrium The Equilibrium Constant						
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	•	eneous Equilibr												
	_	um Calculation												
	_	nitial Concentr Initial Concen												
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	• The Resr	onse of Equil	ihria	to the	CLO-6	1h	r						3	4
		Conditions	ibria	to the	die o								Ü	
	• The Effec	t of Added Rea	gent											
		ct of Pressure	O											
	The Effect of	Temperature												
	10. Intrducti	on to Function	nal G	roups	CLO-6	3h	r						6	9
		pical Reaction												
		es, Alkenes and	-	ynes										
		atic compound	S											
	• Alcoh													
		ydes and ketor		.1 .										
	 Carbo deriva 	xylic acids	and	their										
	• Ethers													
	Amines	5												
	7 Hillings			Total			33	4					64	111
					Asse	essm	ent		l	<u> </u>				
	Continuous A	Assessment		I	Percentage			F2F		1	NF2F		SLT	1
					otal-50(%)									
	1	Tests		10			30n	nin					0min	
	2	Assignments		10			0.0			3hr	•	31		
	3	Quiz		5			30n			_			0min	
	4	Mid-Exam		20			1nr 30n	and		2		11	hr 30min	
	5	Quiz		5			30n					3(0min	
		Quiz					0011				Total			
	Final Exam			Percei	ntage 50 (%	ó)		F2F		ľ	NF2F		SLT	1
	Final Exam				50		3					3		
									Gra	nd To	otal SLT	12	20	
	•	$\Gamma = Tutorial, P =$		•	•				ace, l	VF2F	= Non Fa	ace	to Face	
	Note: indicat	es the CLO bas	ed or	the CLO	O's number	ing i	n ite	m 9.						
12	Special requi	rements and	1	Choose	an item.									
	resources to		2		an item.									
	course (e.g. s		3	-										
	computer lab), Simulation	4											
	100111 0001		5											
13	Text book an		1	R. Chan	g, General	Cher	nistr	y: Th	ne Ess	entia	l Concep	ts,	8th Ed, 20	08
	(note: ensure		2	J.E. Bra	dy, J. W. Ru	ıssel	and	J. R. 1	Holur	n, Ge	neral Ch	em	istry Princ	iples
	edition /pub	iication)			ucture 5th								-	-
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			3	$S S S Z_{111}$	mdahl and	SAZ	/ıım	dahl	('hen	nistra	7th ed	20	107	

						4	J.W. 1 2nd				Petru	cci, G	enera	al Cl	nem	istr	y: An	Inte	grate	ed Ap	proach,
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1	College	: CoE	EC								ARTI										
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6	Credit I	lour:		3(2	hr Le	ec, 21	Ir Lal	ວ)													
7	Prerequ	iisite:		Nor	ie																
8	Course	Learn	ing (Outco	me (CLO)	: At t	he e	nd o	of the	cours	se the	stuc	lent	will	l be	able	to:			
	CLO1		_	_	_					itural ing co	_					crip	tion,	henc	ce, ex	press	s the art
	CLO2	Apply using		-	ciple	s of t	op-de	own	des	sign a _l	pproa	ich to	tran	slat	e al	gori	thms	s to p	ytho	n pro	gram
	CLO3									ınctio											
	CLO4	Use p		stent	data	, bas	ic sea	rchi	ing a	and so	orting	algo	rithn	1s, a	nd o	data	stru	cture	e to s	olve	a given
	CLO5	Pract	ice c	liffer	ent c	omp	utatio	nal	pro	blem	solvir	ng tec	hniq	ues							
	CLO- 6	Discu	ıss tl	ne ba	sic co	once	ots of	obj	ect-	orient	ed pr	ogra	mmir	ıg.							
9	Mappin Assessr		ie co	urse	learı	ning	outco	mes	to 1	the pr	ograi	n Lea	rnin	g 0ı	ıtco	mes	, Tea	chin	g Me	thod	s, and
	ng 0)	Stu	den	t Out	com	es (S	0)	1	1	ı	ı				1						
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	Course Learning Outcomes (CLO)	S01	S02	S03	S04	S05	90S	S07	808	60S		Meth T		0	Test	Quiz	Assignment	Project	Lab report		Final exam
	CLO1	1											1				\				$\sqrt{}$
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	CLO3	√														$\sqrt{}$		$\sqrt{}$			V

	CLO4	√									$\sqrt{}$									
	CLO5										$\sqrt{}$								$\sqrt{}$	
	CLO6		$\sqrt{}$														$\sqrt{}$			
	Indicate the relevancy between the CLO and PO by ticking " $$ " on the appropriate relevant box																			
10	Transferable Skills; (Skills learned in the course of study which can be useful and utilized in other																			
	settings)																		
11						Dis	tribu	tion	of	Stude	ent L	earni	ng T	ime	(SL	(T)				

Distribution of Stud	<u>lent Le</u>							
			Teac	ching a	and L	earning Ac		
	CLO	Gu		learni	ing _	Guided	Independe	Tot
Course Content Outline			(F	⁵ 2F)		Learni	nt	100
						ng (NF2F)	Learning	
		L	Т	Р	0	(NFZF)	(NF2F)	
1. Chapter One: Introduction to	+		1	1				
computational thinking and	CLO	2		3		1	2	
programming	-1						<u> </u>	
1.1. Introduction								
1.2. What is computation?								
1.3. Computational thinking								
1.4. About python								
1.5.Case study: 2D robot control								
	CLO	3		5		3	3	14
2. Chapter Two: Control structure	-2			<u> </u>				1
2.1. Conditionals	1			<u> </u>				
2.2. Iterations								
2.3. Case study: 2D robot control								
3. Chapter Three: Working with	CLO	2		4			2	10
objects, operators and expressions	-6	<u> </u>		<u> </u>			_	
3.1. Objects: values and types								
3.2. Variables								
3.3. Operators and operands	1							
3.4. Expressions	1			<u> </u>				
3.5. Case study: photo processing				<u> </u>				
A Change For For	CLO	2		4			3	10
4. Chapter Four: Functions	-2, 3	<u> </u>		<u> </u>	<u> </u>	<u> </u>	-	
4.1. Basics of functions					<u> </u>			
4.2. Built-in functions and modules				-		ļ		
4.3. User-defined functions	1							
4.4. Case study: adding beeper to								
robot	+	 	<u> </u>	<u> </u>	 	<u> </u>	<u> </u>	
4.5. Case study: triangular inequality	+				<u> </u>			
4.6. Case study: drawing different								
graphs 5. Chapter Five: Scope of variables	CLO		 	-	 	 		
and modules and, higher order	-2, 3	2		4			4	12

functions						
5.1. Scope of a variable						
5.2. More on module						
5.3. Working with shapes						
5.4. Working with higher order						
functions						
5.5. Mutability of objects						
5.6. Case study: sun animation						
· ·	CLO		_		2	
6. Chapter Six: Data structures	-4	3	4		3	
6.1. Working with tuples, strings, lists						
and dictionaries						
7. Chapter Seven: Parameters, files, fo	CLO	3	3	2	3	11
rmatting and more on strings	-4	3	3	2	3	11
7.1. More on dictionaries						
7.2. Named parameters						
7.3. Files						
7.4. String formatting						
7.5. String methods						
7.6. Case study: photo processing						
7.6. Case study: photo processing						
8. Chapter Eight: Sorting and Recursio	CLO	3	4	2	2	11
n	-4	3	4	<u>L</u>	2	11
8.1. Sorting in python						
- Selection sort						
- Bubble sort						
8.2. Recursion						
8.3. Case study: comparisons function						
s, palindromes, vegetable and fruit sto						
re						
9. Chapter Nine: Searching and merge	CLO	2	4		2	9
sort	-4	_			_	
9.1. Divide and conquer						
9.2. Binary search						
9.3. Merge sort						
9.4. Case study: data analysis and data						
plotting						
10. Chapter Ten: Problem solving tech	CLO	2	3		2	9
niques	-5				_	
10.1. Maximum subsequence problem						
10.2. Brute force enumeration						
10.3. Incremental computation						
10.4. Divide and conquer						
10.5. Case study: programming with g						
lobal coordinate data, temperature d						
ata and HTML files	CY C					
11. Chapter Eleven: Dynamic program	CLO	2	2		2	7
ming	-5	1				

				c programming?								
	11.2	. Fibonacci nu	ımbe	ers revisited			<u>T</u>	T_{L}	$T_{\underline{}}$			
				g decision node			\top					
	s and	d function call	ls									
		•		bject-oriented	CLC		T	2	T		2	8
	_	gramming con			-6		\perp		\perp			
		. Object-orien		programming					<u> </u>			
		. Encapsulatio	n		<u> </u>		\perp		\perp			<u> </u>
		. Inheritance			<u> </u>		\perp					
		-	:hick	ken family anim								
	ation	<u>L</u>			<u> </u>		Ш					10
											Total	12
					— т		essm					<u> </u>
	Cont	tinuous Assess	smer	ıt			60(%		al-	F2F	NF2F	
	1	Quiz					5%			1	1	
	2	Assignment					5%	6	\Box	1	3	<u> </u>
	3	Project					15%			1	4	†
		Mid Exam					25%	%		2	4	
											Total	
	Final	l Exam	_			Per	rcent (%	itage 40 %)	0	F2F	NF2F	
	Fina'	l Exam				†	4			3	10	
											Grand Total SLT	150h
	L = I	Δ ecture, $T = T_1$	uto <u>r</u> i	ial, P = Practical, (0 = 0	thers,	F2 <u>F</u> :	<u>= Fac</u> ε	o to F	ace, NF2	2F = Non-Face tc	Face
12	Spec		1	Computer Lab								
	_	irements		Pvthon 3, PyCh	arm I	DE. Py	thor	ı Imag	ring I	ibrary (Pillow), cs1grap	hics.py
		resources to	2	cs1robots.py, an				_	0		, <u>, , , , , , , , , , , , , , , , , , </u>	1.0
		er the	3			-						
	course (e.g.											
	softw	· ·										
		puter lab, ılation room										
	simu etc											
13		.)	 	Allan Dawnay I	offror	- Ellme	- Ц	2747 to '	Thin'	l. Lilzo a	Computer Scien	tiot. I
15		ļ		Allen Downey, Je with Python, Bio	-			IW to 1	l IIII11	₹ LIKE a v	computer scient	tist: L
	Тех	kt book and	-	Paul Gries, Jen				l. Ias	on l	Montojo	Practical Pro	gramm
	_	eference:	1 1	Introduction to			•			, .	•	0
		1		Bookshelf, 2017		P		/== -		, -,	1 3.2,	10-,
		ŀ		Online tutorials:		nttp://	tuto	rialsp	oint.	com/pyt	hon	
												-

	Adama Science and Technology University								
1	School: Humanities	and Social Science	Department : Humanities Unit						
2	Course Category	General Course							
	Course Name	Communicative English	Skills						
	Course Code:	ourse Code: EnLa1001							

3	Synopsis:		no in th co al si in	Communicative English Skills is a course where students learn what they need to know for a career in Science. The course gives students the language, information, and skills they need to study science. It also provides students the language appropriate for studying science and real work situations as it comprises unique sections such as: 'it's my job' wherein real people talk about their work in Science, 'listening' whereby students are exposed to situations related to science dialogues, technical explanations, and interviews, 'reading' whereby students meet a variety of science based texts, and the 'writing section' which is designed to let students compose short reports on different activities.												
4	Name(s) of Academic St		_	BA												
5	Semester ar offered:		Se	Semester I Year: 1												
6	Credit Hour	:	3													
7	Prerequisite requisite: (i	-	_	None												
8	_ `		ing Outcome (CLO): At the end of the course the student will be able to do:													
	CLO-1	Make 10)	Make presentations on a wide variety of natural science fields and situations. (PLO-10)													
	CLO-2			dialog PLO-1).		chnical (explana	ations	an	d in	terv	viev	vs a	nd i	dentify tl	ne central
	CLO-3	Com	preh	iend va	rieties	of texts	relate	d to s	cier	ıce.	(PI	. 0-1	10)			
	CLO-4	Reco (PLC			us asp	ects of v	words.(mear	ning	, col	loc	atio	ons,	pro	nunciatio	on, etc.)
	CLO-5					eports,										
	CLO-6	Appl	y gra	ammat	ical ite	ms for c	commu	nicati	ions	s in s	scie	nce	co	ntex	t. (PLO-1	0)
9	Mapping of Assessment		ırse	Learni	ng Out	comes t	o the St	tuden	its c	outco	om	e, T	eac	hing	Methods	s and
							Stude	nts o	ıtco	me	(SC))				
	b0 C							To	eacl	ning				A	ssessmei	nt
	LO							M	eth	ods		S			ө	
	arr s (C	1	2	3	4	LC C1	9					Tes		nt	res	ب ا
	. Le	S0-1	S0-2	SO-3	S0-4	SO-5	9-0S	L	T	P	0			me	./b	por
	rse		0,		J								.,	gnı	ect ion	·rej
	Course Learning Outcomes (CLO)												Quiz	Assignment	Project/prese ntation	Lab-report
)	P	T U	
	CLO-1 CLO-2															
	CLO-2															
	CLO-4															
	CLO-5									П					П	
	CLO-6									Ħ		П]		
	Indicate the	releva	ncv	betwee	en the (CLO and	l SO by	tickir	1g ".	√"or	ı th	ie a	ppr	opri	ate relev	ant box
10	Transferabl						5		J				. r.	1		+
-	(Skills learn					which	can be	usefu	ıl ar	nd ut	tiliz	zed	in c	ther	settings)
	1	Study														-
	2 Listening skill															

	3	Presentation skill								
	4	Writing skill								
11	Distributio	on of Student Learning	g Time (SLT)						
	Course Cor	ntent Outline	CLO			ning and arning (ng Activit Guided Learni	Indepe ndent	
							ng (NF2F)	Learnin g (NF	Total (SLT)	
				L	Т	Р	0		2F) `	
	Society	: Technology and			1					
	works	ng: Technology &	2			30'			2 hrs	2:30
	and adverl	on with adjectives os	6	1 hr		1hr			2 hrs	4 hrs
	1.3 Reading technology	g: Branches of	3			1 hr			2 hrs	3 hrs
	1.4 Speakii system	ng: satellite launch	1			30'			2 hrs	2:30
		llary: Recording s and word stress	4	1 hr		1 hr			2 hrs	4 hrs
	Technolog		2			201			1 1	1 20
		g: Civil Engineering	3			30'			1 hr 1:30	1:30 2 hrs
	2.3 Langua	ng: The course age Spot: Present resent continuous	6	30'		30'			2 hrs	3 hrs
	2.4 Pronun	nciation: Strong and as of auxiliary verbs	4	30'		30'	1 hr		1:30	3:30
	process	ng :The design	2			30'			1 hr	1:30
	3.2 Langua types	ige Spot: Question	6	1 hr		30'			2 hrs	3:30
		ng: Using Non- anguage	1			30'			2 hrs	3 hrs
		ng: Working with I problem solving	2			1 hr			2 hrs	3 hrs
	Technolog		2			202			1	1.20
		g: The inventor	3			30'			1 hr	1:30
	clauses	ige Spot: Time	6	30'		30'			3 hrs	4 hrs
	4.3 Pronur and quanti	nciation: Number ties	4			1 hr	1 hr		2 hr	4 hrs

Chapter 5: Manufacturing 5.1 Listening: Manufacturing							
process	2		30'			1 hr	1:30
5.2 Language Spot : Present passive	6	1 hr	30'			1:30	3 hrs
5.3 Writing: Short sequence	5	30'	1 hr			2:30	4 hrs
5.4 Vocabulary: Compound nouns	4	30'	30'			2 hrs	3 hrs
Chapter 6: Transport							
6.1 Reading: The car of the							
future	3		30'			1 hr	1:30
6.2 Language Spot :Prediction will, may, might	6	30'	30'			1 hr	2 hrs
6.3 Speaking: Making and							
acknowledging apologies	1		30'			2 hrs	3 :30
6.4 Vocabulary :Recording new	4	30'	1 hr			1 hr	2:30
expressions	4	30	1 111			1 111	2:30
Chapter 7: Information							
Technology:							
7.1 Reading :Computer use in the car industry	3		30'			1 hr	1:30
7.2 Language Spot Past passive	6	30'	30'			1 hr	2 hrs
7.3 Speaking :Working on a							
help desk	1		1 hr			2 hrs	3 hrs
7.4 Vocabulary :Collocations	4	30'	1 hr			2 hrs	3:30
and words ends with -ed	T	30	1 111			2 1113	3.30
Chapter 8: The future of							
Technology:							
8.1 Listening: The prediction about technology	2		30'			1 hr	1:30
8.2 Language Spot : Phrasal							
verbs	6	30'	1 hr			3 hrs	4:30
8.3Vocabulary :Affixes	4	30'	1 hr			2 hrs	3:30
8.4 Speaking :Saying goodbye	1		30'			2 hrs	3:30
		10hr	22:30	2hrs		57 hrs	91:30
Total		S		21113		57 1113	71.30
Combinuous Assessment		Assess		aka = -	POP	NEO	CIT
Continuous Assessment			Percei Total	_	F2F	NF2 F	SLT
			(%			Г	
Tests: (Vocabulary 5%, 5%)	and W	riting (1)	10	<i>.</i>	30'		30'
2 Assignments: (Reading 5 5%)	5% and	d Writing	10	10		15 hrs	15 hrs
3 Quizzes: (Listening (2) 1		10 1 hr				1hr	
4 Presentation			10		3 hrs		3hrs
5 Mid Exam (Reading 10%	and (Trammar	20		3 hrs		3 hrs

	10%)											
				1	<u>'</u>	Total	22:30 hrs					
	Final Exam		Percentage 40 F2F (%)		NF2F		SLT					
	Final Exam		40	6 hrs			6 hrs					
			Grand Total SLT 120 hrs									
	L = Lecture, T = Tutori Note: indicates the CLO	O ba	sed on the CLO's nu			Non Fac	ce to Face					
12	Special requirements	1	Computer Lab	Computer Lab								
	and resources to	2	Software									
	deliver the course (e.g. software, computer lab, simulation roometc.)	3	Choose an item.									
13	Text book and reference:	1		Burns , Anne & Joseph S. 2018, International Perspectives on Teaching the Four Skills in ELT. Palgrave Macmillan. UK.								
	(note: ensure the latest edition	2		ystal, D. (1997). <i>English as a Global Language</i> : Cambridge University								
	/publication)	3	Hewings, Martin & Vocabulary fo	Simon H. 2015, or Advanced. Can	•	_						
		4	Gideon (2015). Eng United Kingdom.									
		5	Palmer, Eric.2014, Teaching the Core Skills of Listening and Speaking ASCD.USA.									

	Adama Science and Technology University										
1	College: Humanities ar	nd Social Science	Department: Humanities Unit								
	Course Category	General Course									
2	Course Name	Introduction to Eth	ics & Citizenship studies								
	Course Code:	LART 1001									
3	Synopsis	familiarizinglearners to responsibilities. It will hand civic competences we levels, country and hum notions, principles and action and behavior in nelearners to the nature, society, state, government pertaining to political human rights in some depolitical, economic and globalized world, the conforeign policy and other	the essence of ethics and citizenship rights and elpstudents to acquire a necessary ethical qualities thile dealingwith issues that affect their society at all an in general. The course starts with unfolding the theories of ethics which can shape our attitude, naking moral judgment. Next, the course introduces mutual interactions and historical evolutions of nent and citizenship. It also elucidates issues governance such as constitution, democracy, and etails. To enable learners grasp basic knowledge of social dynamics of international system in today's ourse also introduces international relations and major contemporary global issues. In light of this, sent mere theoretical knowledge, but also practical								

	knowledge of accentuating art of governing and protecting national interest in today's complex world.																	
4	Name(s) of	f Acader	nic S	1														
5	Semester/					Sen	neste	er:	I		Year	1						
6	Credit Hou					3			_									
7	Prerequisit	e:				Nor	ne											
8	Course Lea		utco	me (CLO): At	the	end o	of th	ie cou	irse th	ne stud	ent w	ill be a	able to	:		
	CLO1	Gain l							and	live ı	up to e	expecta	itions	of eth	ical pr	incipl	es wl	nile
	CLO2		Be equipped with ethical qualities and apply ethical values in making moral judgments and any other decisions that affect their day-to-day activities.															
	CLO3	mutu	Understand theoretical discourses and practices of state and government, and their mutual interplay for building the best political order in today's complex international system															
	CLO4	prior	Develop analytical and reflective skills of identifying national and global development priorities in complement with human rights and democracy															
	CLO5	know	Elucidate the rights and responsibilities attributed to citizens, and possess desirable knowledge, skills and commitment to exercise entitlements and discharge obligations in the realm of citizenship.															
	CLO6	Develop intellectual and practical skills of foreign policy, diplomacy, and global trands to																
9	Mapping of Assessmen	t:						s to	the	progr	am Le	earning	Outc	omes,	Teach	ing M	ethoo	ls, and
	ng (0)	Stu	dent	t Ou	tcon	nes ((SO)	1										
	urni (CL								Tea	aching	2		1		ssessm			
	Lea	11	S02)3	S04	S05	90S			thods	-	<u>د د</u>	N	nen	ಕ	Lab report	exam	кат
	ırse	S01	SC	S03	SC	SC	SC					Test	Quiz	guu	Project	rel	d ex	al ex
	Course Learning Outcomes (CLO)							L	T	P	0	•		Assignment	P	Lab	Mid	Final exam
	CLO1													$\sqrt{}$				√
	CLO2																	$\sqrt{}$
	CLO3								,		,	√	√					√
	CLO4							1	1		√	√		r				√
								1	1		1	7		√				√
	CLO5						. /	. /	. /					• •/		1		
	CLO6	o rolova	ncu l	20tr	zoon.	tho		$\frac{1}{2nd}$	ا DO	ov tiel	√ zing":	$\sqrt{"}$ on $+1$	10 201	ropri	ato rol	ovant	hov	٧
10	CLO6 Indicate th		_							_								√ ner
10	CLO6 Indicate the Transferab		_							_								v ner
10	CLO6 Indicate th Transferab settings)	le Skills To have	; (Sk	ills l ense	earn of b	elon	n the	to a	rse con	of stu	dy wh	nich car anity, s	n be u	seful a	and ut	ilized	in otł	
10	CLO6 Indicate th Transferab settings)	le Skills To have empath	; (Sk e a se ny, so	ills l ense olida	earn of b rity	ed in elon and	n the ging resp	to a	rse con or d	of stu nmon iffere	dy wh	nich can anity, sl and div	n be u naring ersity	seful a	and ut	ilized respo	in otł nsibi	lities,
10	CLO6 Indicate th Transferab settings)	le Skills To have	; (Sk e a se ny, so nire l	ills l ense olida knov	of b	elongand i	n the ging resp nder	to a ect for	rse con or d	of stu nmon iffere g and	dy wh	nich car anity, sl and div al thinl	n be unaring ersity	seful a	and ut es and lobal,	ilized respo regior	in oth nsibi nal, na	lities,
10	CLO6 Indicate th Transferab settings)	le Skills To have empath To acqu	; (Sk e a se ny, so nire l al iss	ills l ense olida knov sues	of b rity vled and	elongand i	n the ging resp nder	to a ect for	rse con or d	of stu nmon iffere g and	dy wh	nich car anity, sl and div al thinl	n be unaring ersity	seful a	and ut es and lobal,	ilized respo regior	in oth nsibi nal, na	lities,
10	CLO6 Indicate th Transferab settings)	le Skills To have empath To acquand loc	; (Sk e a se ny, so uire l al iss pulat	ense olida knov sues	of b rity vled; and	elon and ge, u the	n the ging resp nder inter	to a ect for estan	con or d din nect	of stunmon iffere g and eednes	huma nces a critic	nich can nnity, sl and div al think l interd	n be u haring ersity king al epend	seful a y value y. bout g dency	es and lobal, of diff	respo region erent	in oth nsibi nal, na coun	lities, ational tries
10	CLO6 Indicate th Transferab settings) 1	To have empath To acquand loc and loc	; (Sk e a se ny, so uire l al iss pulat	ense olida knov sues tions	of b rity vled and s. lyna	elon elon and ge, u the i	ging resp nder inter	to a ect for stan	con or d din nect	of stunmon iffere g and ednes	humances a critic ss and c and	nich can nnity, sl and div al think l interd	n be unaring ersity king al ependal tran	y value y value out g dency nsform	and ut es and lobal, of diff	respo region erent of the	in oth nsibi nal, na coun	lities, ational tries

	Course Content Outline	CLO	Guided learning (F2F)				Guided Learning (NF2F)	Independent Learning (NF2F)	(SLT)
			L	T		0	()	()	
	Chapter one: Understanding Ethics and Morality 1.1. Defining Civics, Ethics, Morality and amorality Origin and Development of Civics and Ethical Education	1 &2	1 h r					1 hr	2 hr
-	1.2. Approach to Ethics 1.2.1. Normative ethics • Teleological Ethics (Consequentialist) 1.1. Deontological Ethics (Non-Consequentialist)	1&2	2 h r	2 h r		1 h r		2 hr	7 hr
	 1.2.2. Non-Normative Ethics Meta Ethics Absolutism/Objectivism 1.2.3. Issues in Applied Ethics Development Ethics Environmental Ethics 1.2. Professional Ethics 	1&2	2 h r	2 h r		1 h r		3 hr	8 hr
-	1.4 Ethical Principles and Values of Moral Judgments 1.3. Why Should I act ethically?	1&2	1 h r					1 hr	2 hr
	 Chapter Two: State and Government 2.1 Understanding State Meaning and Attributes of State 1.4. Theories on the Origin and development of state 	3	1 h r					2 hr	3 hr
-	2.2. State Structures: Unitary; Federal and Con-federal	3	1 h r					2 hr	3 hr
	2.3. Understanding Government Major Function and Purpose of Government	3	1 h r					1 hr	2 hr
	2.4. Types of Government: Limited and Unlimited	3	1 h r					1 hr	2 hr
	3.1. 2.4. Systems of Government: Parliamentary, Presidential and Hybrid	3	1 h r					1 hr	2 hr
	Chapter Three: Citizen and Citizenship 3.1. Understanding Citizenship Citizen and citizenship: right and responsibilities	3&4	1 h r	1 h r				1 hr	3 hr
	3.2. Competencies of Good Citizen								

3.3. 3.2 The Genesis of Citizenship: Normative and Historical Evolution of Citizenship	3&4	1 h r			2 hr	3 hr
3.3. Approaches to citizenship: Liberal, Republican, Communitarian and Radical Democratic Ancient, Medieval, Modern and Cosmopolitan Citizenship	3&4	1 h r	1 h r		3 hr	5 hr
3.4 Ways of Acquiring and Losing citizenship	3&4	1 h r			2 hr	3 hr
4.2. 3.5 Citizenship in Ethiopia's Politico- Legal Context	3&4	1 h r			2 hr	3 hr
Chapter Four: Constitution, Democracy and Human Rights 4.1. Constitution and Constitutionalism Peculiar features of Constitution Major Purpose and Functions of Constitution Classification of Constitutions	1,2,3 & 4	2 h r			2 hr	4 hr
4.3. The Constitutional Experience of Ethio pia: pre and post 1931						
 4.2. Democracy and Democratization Definitions and Forms of Democracy Views on Democracy: Substantive and Procedural Views Fundamental Values and Principles of Democracy Democratization and Its Waves Major actors in Democratization Process 	1,2,3 & 4	2 h r		1 h r	3 hr	6hr
 4.3. Human Rights Definitions and Nature of Human Rights Basic Characteristics of Human Rights Dimensions of Human Rights The Protection and Promotion of Human Rights 	1,2,3, 4,6	1 h r	1 h r	1 h r	2 hr	5 hr
Chapter Five: Understanding International Relations and Foreign Policy 5.1. 5.1.The Nature and Evolution of Int ernational Relations	1,3,4 5&6	1 h r		1 h r	2 hr	4 hr
5.2. 5.2.Actors of International Relation s: State and Non-State Actors	1,3,4 5&6	1 h r			1 hr	2 hr
5.3. 5.3.Levels of Analysis in the Interna	1,3,4	1			2 hr	3 hr

tional Relation	5&6	h r				
 5.4.Contending Theories of International Relations Realism and Neo-Realism Liberalism and Neo-Liberalism Marxism and Neo-Marxism Critical Theory Constructivism Modernism and Post-Modernism 	1,3,4 5&6	2 h r	2 h r	1 h r	4 hr	9 hr
 5.5 National Interest, Foreign Policy and Diplomacy Determinants of National Interest and Foreign Policy Objectives of Foreign Policy Foreign Policy Orientations Instruments of Foreign Policy 	1,3,4 5&6	2 h r	1 h r	1 h r	3 hr	7 hr
5.6 A Survey of Foreign Policy and Diplom acy of Ethiopia: Past and present	1,3,4 5&6	1 h			2 hr	3hr
Chapter Six: Major Contemporary Global Issues Globalization and Regionalism The Convergence, Divergence and Overlapping relations of Regionaliz ation and Globalization	1,3,4 5&6	r 2 h r			2 hr	4 hr
Survey of Contemporary Global Issues ■ Security Issues ✓ Terrorism, Religious Fundamentalism and political Extremism ✓ Weapons of Mass Destruction and The Nuclear Power paradox Illicit Human Trafficking, Drug Traf ficking, Firearms Trafficking	1,3,4 5&6	2 h r			2 hr	4 hr
 Environmental Issues Climate Change and Global warmin g 	1,3,4 5&6	1 h r			1 hr	2 hr
 Technology Related Issues Cyber Crime and Cyber Security 	1,3,4 5&6	1 h r			1 hr	2 hr
 Other Emerging Social, Economic and Political Issues ✓ Migration and Refugee ✓ Trade War Epidemic and Pandemic Diseases C OVID 19, 	1,3,4 5&6,	1 h r			1 hr	2 hr

								Total	48 hrs.		
				Asse	ssmen	t					
	Continuous Asses	ssment		Percentage '	Total-5	50(%)	F2F	NF2F	SLT		
	1	Tests	(2)	1	.0		$\sqrt{}$		1hr		
	2	Group		1	10				8 hr		
)	nments					ſ	,		
	3	Indiv		1	.0			V	7 hr		
	4	Mid e	nment	7	20		√		1 hr		
		1 III C	AUIII				V	Total	1111		
									17hr		
	Final Exam			Percentage	50 (%)		F2F	NF2F	SLT		
	Final Exam			50			√		2 hrs.		
			l D D		поп			rand Total SLT	120hrs.		
12	L = Lecture, T = T				FZF =						
12	Special requirement the course (e.g. so				1			Technology unities (I	-		
	simulation room			er iab,	1	LAR 101		ics and Edites (1	viouulej		
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13		1	Alexande	er, Larry (eds.).(1998).	Constitutio	nalism: Phil	osophical		
				ions. Cambridge:							
		2	_	Hakan (2011)			-	_	s in an		
		3		endent World. Th				Washington Jniversity of Minnesota			
		3	Press.	, J.M. (1986) CI	uzensi	nip. Minine	eapons: on	iiversity of Milli	nesota		
		4		Benjamin (1990)	Serv	ice. Citizer	ship, and I	Democracy, Civi	l Duty as		
				ment of Civil Rig							
			and Con.	Stanford: Hoove	er Insti	tution Pre	ss, pp. 27-	43.			
		5	_	R.2008. Citizen	ship: .	A Very Sh	ort Introd	uction. Oxford:	Oxford		
			Universi) []	1: 1	Da <i>aliana in</i>	International D	alations		
		6		d, Robert (2000 <i>he Discipline.</i> Ro	-		keaiism in	international R	elations:		
	Text book and	7	_	hum. 1997. Con			Nation of	Nations: The 1	Ethiopian		
	Reference:			. Lawrenceville,		-	-				
		8	Fishkin,	James (1993) D	emoci	acy and I	Deliberatio	n. New Haven,	CN: Yale		
			Universi								
		9		Snare (1992). T	he Nat	ture of Mo	oral Thinki	ng. Rutledge, I	J.S.A and		
		10	Canada	Mark A (1006)	Confl	ist and Ca	on oration.	Evolving Theo	rica of		
		10	Genest, Mark A. (1996). Conflict and Cooperation: Evolving Theories of International Relations. Fourth Worth: Harcourt Brace and Co.								
		11									
				Education Press					- 		
		12		Martin (Ed.)	•			•	for the		
				First Century:An							
		13		Rist Real Eth				g the Founda	itions of		
			morality	Cambridgeunive	ersity p	ress U.K a	110 U.S.A				

14	Kymlicka, W. & Norman, W. (eds).2000. Citizenship in Diverse
	Societies.Oxford UniversityPress.
15	Kymlicka, W. (1995) Multicultural Citizenship: A Liberal Theory of Rights.
	Oxford: Clarendon Press.
16	Macedo, S. (2000). Diversity and distrust: civic education in a multicultural
	democracy. Cambridge, Mass: Harvard University Press.
17	Mintz, Alex and Karl De Rouen (2010) Understanding Foreign Policy Decision
	Making, Cambridge University Pres: Cambridge
18	Mouritzen, Poul (1987): The Demanding Citizen: Driven by Policy, Self-
	Interest, or Ideology? ', European Journal of Political Research 15 (4): 417-
	35.
19	Munitz, Milton K., (ed.) (1961). A Modern Introduction to Ethics, The Free
	Press of Clencoe

			Adama Sci	ence and Technology	University						
1	College: I	lumanitie	s and Social Science		Department	t: Humanit	ries Unit				
2	Course Ca	ategory	General Course								
	Course N	ame	Physical fitness ar	nd conditioning I							
	Course Co	ode:	HPEd1011								
3	Synopsis:		This course will provide the students with basic concepts of the five components of health related physical fitness (cardiovascular, muscular strength and endurance, flexibility, and body composition), hypokinetic disease and general principles of training. It is mainly practical oriented. As a result, the students will be exposed to various exercise modalities, sport activities, minor and major games, and various training techniques as a means to enhance health related physical fitness components. In addition, they will develop the skills to assess each component of fitness and will practice designing cardiovascular, muscular strength and endurance, and flexibility programs based on the fitness assessment. The course serves as an introduction to the role of exercise in health promotion, fitness, performance including the acute and chronic responses of the body to exercise								
4	Name(s) Academic		-								
5	Semester offered:	and Year	Semester:	Ι	Year:	1					
6	Credit Ho	ur:	0 cr.hr		•	•					
7	Prerequis	site/Co-	None								
	requisite	. ,									
8	Course Le	earning Ou	tcome (CLO): At the	end of the course the	student wi	ll be able t	o do:				
	CLO-1	Understa	nd the knowledge of	physical fitness and i	te hanafite						
	CLO-2			and wellness for bet		ife					
	CLO-3		1 1	activity for their regul	<u> </u>		ogram.				
	CLO-4			ards physical activity							
	CLO-5			onship and work coop							
	CLO-6	_	•	related physical fitn	· •						
9		•		es to the Students Ou			ods and Assessment:				
			<u> </u>		•						

							Stı	ude	nts ()utco	me	(SO)							
	g ()									hing				Ass	sessn	nent			
	Course Learning Outcomes (CLO)	S0-1	SO-2	80-3	SO-4	SO-5	9-08	L	Met	nods P		Test		.!	Zinò	Assig	nmen	Proje ct	Lab-
	Cour							,											
	CLO-1	√					<i>T</i>	√				Г							
	CLO-2 CLO-3				1	./	٧			1/	1	,							
	CLO-3				<u> </u>	√				√ √	1	T							
	CLO-4				1					$\frac{}{}$	1	<u>'</u>							
	CLO-5	1/			<u> </u>					<u>√</u>	1	<u>' </u>							
	Indicate	the rel	-vancv	hetwe	en the (L CLO an	d SO by	v tic	kino	·"√"∩	n th	e ar	nronria	te rel	evan	t hox	 •		
10	Transfer (Skills le	able Sk	ills (if a	applica	ble)											 	-		
	1	How to	o warm	up the	eir body	y befor	e main	exe	ercis	Э.									
	2	How to	perfo	rm maj	or fitne	ess wo	rkout.												
	3etc.	How to	o cool d	lown th	neir bo	dy afte	r main	exe	rcise										
11	Distribu	tion of Student Learning Time (SLT)																	
	Course Content Outline						CLO						Learnir				Т	otal (S	LT)
	Course C	ontent	Outline	2					Guided learning (F2F)			Guided Learning (NF2F)		Le	pend arnin NF2F)	g			
									L	Т		P	0						
	Chapter fitness	One: C	oncep	ts of pl	hysical	l CL	0 1												
	1.1 Mear terms	nings ar	nd defin	itions	of				1h						3h		4h	1	
	1.2 Gene training								1h						3h		4h		
	Chapter of Physi			alth Be	enefits		CLO 1 to 0 6	0	2h								2h	1	
	2.1 Phys Hypokin				ions										4h		4h	1	
	2.2 Phys	sical Act	tivity ar	nd											4h		4h	1	
	2.3 Physical deformition of the control of the cont	sical act		-	ural										4h		4h	1	
	Chapter `Inform	Three			11-	(CLO 1 to	0	2h								2h	1	

	3.1 Sound Eating Practices							2h	2h				
	3.2Nutrition and Physical							2h	2h				
	Performance												
Ī	3.2.1 Nutrition Before Exer	cise						2h	2h				
Ī	Chapter Four: Health rela	ated		CLO 1 to									
	components of fitness an			CLO 6									
	principles of exercise pre		ion										
Ī	4.1 Health Related Compo				2h			4h	6h				
	Fitness												
=	4.2 Principles of exercise				1h			3h	4h				
	prescription for health and	fitness											
	4.3 Individualizing worko	ut			1h			2h	3h				
	4.4 Means and methods of					4h		6h	10h				
	developing cardiorespirate	ory fitne	ess										
	4.5 Means and methods of					6h		10h	16h				
Į	developing muscle fitness												
	4.6 Means and methods of					4h		6h	10h				
	developing flexibility												
	Unit Five: Assessment of	fitness	3	CLO 2 to	2h				2h				
	component			CLO 6									
	5.1 Evaluating Health Stat												
	5.2 Assessment of cardiore	espirato	ory					2h	2h				
	fitness												
	5.3 Assessment of Muscle							3h	3h				
-	5.4 Assessment of flexibilit	_						2h	2h				
-	5.5 Assessment of body con							2h	2h				
		Т	otal		12h	14h			90h				
-				Asses	sment				7011				
Ī	Continuous Assessment			Percentage To	otal-	F2F	NF2F		SLT				
				60(%)									
	1 Assignments			20%			6h		6h				
	2 Tests			10%		1h			1h				
Ī	3 Tests			30%		1h			1h				
Ī								Total	8h				
Ī	Final Exam		P	ercentage 40 (%)	F2F	NF2F		SLT				
	Final Exam(practical)			40%		4h			4h				
							Grand To		102h				
	L = Lecture, T = Tutorial, P	= Pract	ical,	O = Others, F2	F = Face	to Face, NF	2F = Non Fac	ce to Fac	ce				
	Note: indicates the CLO ba	sed on	the C	LO's numberin	ng in ite	m 9.							
12	Special requirements	1	Char	ose an item.									
14	and resources to deliver	1	C110(ost all Itelli.									
	the course												
13	Text book and reference:	1	Dale	B. Hahn (1990	9). Focus	s on health ?	2nd ed						
10				Oale B, Hahn (1999). Focus on health 2nd ed.									
	(note: ensure the latest 2 Frank Gallugna (2000). Advanced PE for Edexcel.												

	Thomas D, Paul M, Walton T (2007). Fit & Well; Core Concepts and Labs in physical Fitness and Wellness 7th Edition
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			Δ	Adama Scier	nce and Te	echnolo	ogy Universit	v				
1	College:	Freshn	nan Division				<u> </u>	nt: Pre-Engin	eering			
2	Course Category	7	Basic					5	9			
4	Course N		Applied Ma	thematics	II							
	Course C	Code:	Math 1102									
3	Synopsis	3:	integrals cal aims to deve Taylor serie maxima and functions of from single differentiab to apply ma computing so of changes	lculus of fuelop the bases of function of minima was everal variable ility and internation of quantitical some important of quantitical some important in the matical some important in th	nctions o sic ideas ion, Four ising Lagi riables. It to severa tegration. concepts tant quar	f sever and meder sericange raims to all variation between the partities veral	al variables at thods of multipliers and enable stude ables of basever, the courtial different which will ap	and their app Iti variable ca the examina Ind the integrate Item integrate	ies. Differential and blications. The course bliculus, including the ation of constrained ration of elementary restand the extension such as continuity, trengthen the ability multiple integrals in eering, such as rates volume of physical			
4	Name(s) Academi Staff:	demic										
5	Semeste: Year offe		Semes	ster:	II		Year:	1				
6	Credit Ho	our:	4									
7	Prerequi Co-requi		Applied Ma	thematics	I (Math 1	.101)						
			•	-				t will be able				
								l their propert				
0								aylor's series.				
8	CLO-3		about Fourie									
	CLO-4		lifferent limit		•							
	CLO-5		late and solve		_							
	CLO-6		te multiple ir						1 1			
	Mapping of the course Learning Outcomes to the Students Outcome, Teaching Methods and											
9	Assessm	ent:			Ctud	ante O	utcome (SO)					
	Course											
	Learni	S0 -1	SO -2	SO SO -4	SO -5	9- 0S	S0 -7		Assessment			

ng									Teaching Methods								
Outco									M	leth	ods	S					
														int		ш	
(CLO)														me		хаі	
													t	ign	J-e	al E	
									L	T	P	0	Tes	Ass	Mic	Final Exam	
CLO-	1 √								$\sqrt{}$	$\sqrt{}$				V	V	V	
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									√	√,			,	√		√ /	
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	-		la CLO a c	1 00 1	1	•	<i>u p</i>		٧	٧			1	1 1		√	
					_												
		is (Skills learne	d in the co	urse c	of Stu	ay w	nich (can be	use	ful	anc	ut	ilizea	in oti	ier		
	T																
1																	
2	Problem Sc	olving Skill															
Distril	bution of Sti	udent Learning	Time (SLT	")													
Teaching and Learning Activities													Total				
				Gui	ided l	earn	ing	Gu	ided	ł	I	nde	nend	ent	(SL	T)	
C	C O	.1:	CLO		(F2	2F)					Learning						
Cours	e Content O	utline		ī	Т	р	0			_				_			
					1	1											
Chapt	t er 1: Seque	nce and Series	CLO-5	7	7				2				9		25	5	
	_																
1 1	Definition	of Infinite															
		oi illillille		1													
	•	nce and			2												
	_	ice and		1	_												
		es															
1.3.																	
				2													
		Ratio and Root			2												
		a a a sui a a a n d															
		_		1													
				1	2												
1.6.	Generalize	ed		4													
	Generalize nvergence T			1	1												
CO		est	CLO-5	8	8				2				8		26	6	
	CLO- CLO- CLO- CLO- CLO- Indica Trans setting 1 2 Distri Chapt 1.1. sec 1.2. disprope 1.3. an tests of tests 1.4. alt 1.5. co	Outcomes (CLO) CLO-1	Outco mes (CLO) CLO-1 CLO-2 CLO-3 CLO-4 CLO-5 CLO-6 Indicate the relevancy between to the transferable Skills (Skills learned settings) 1 Computational Skill 2 Problem Solving Skill Distribution of Student Learning Course Content Outline Chapter 1: Sequence and Series 1.1. Definition of Infinite sequence 1.2. Convergence and divergence properties of series 1.3. Nonnegative term series and tests of convergence (integral, Comparison, Ratio and Root test) 1.4. Alternating series and alternating series test 1.5. Absolute and conditional convergence	Outco mes (CLO) CLO-1	Outco mes (CLO) CLO-1	Outcomes (CLO) CLO-1	Outco mes (CLO) CLO-1	Outcomes (CLO)	Outcomes (CLO)	Outcomes (CLO) Methods Methods	Outco mes (CLO)	CLO-1					

series at any point							
2.2. Convergence and divergence, radius and interval of convergence of power series		2					
2.3. Algebraic operation on convergent power series		1					
2.4. Differentiation and integration of power series		2	5				
2.5. Taylor series, Taylor polynomial and application		2					
Chapter 3: Fourier Series	CLO-4	7	7		2	9	25
3.1 Introduction to orthogonal							
functions		1	1				
3.2. Fourier Series		1					
3.3. Fourier series of odd and even functions		2	3				
3.4. Half-range expansion		1	1				
3.5. Fourier integral		2	2				
Chapter 4: Differential							
Calculus of Functions of Several Variables	CLO-4	10	10		2	9	31
4.1 Notations, Examples, level		1	1				
curves and graphs							
4.2 Limit and continuity		1	1				
4.3 Partial Derivatives, tangent lines, higher order partial derivatives		1	1				
4.4 Directional derivatives and gradients		1					
4.5 Total differential and tangent planes		1	2				
4.6 Applications: Tangent plane approximation of values of functions		1	1				
4.7 The chain rule, implicit differentiation		1	1				
4.8 Relative extrema of functions of two variables		1	1				
4.9 Largest and smallest values of a function on a given set		1	1				
4.10 Extreme values under constraint condition: Lagrange's method		1	1				
Chapter 5: Multiple Integrals	CLO-1	7	7		3	8	25
5.1 Double integrals and their evaluations by iterated		1	2				

	integrals										
	5.2 Double integrals in polar coordinates			1							
	5.3 Applications: Area, center mass of plane region	of		2	2						
	5.4 Triple integrals in cylindrical and spherical coordinates	CI	LO-3	1	1						
	5.5 Application: Volume, Cent of mass of solid region	er		1							
	5.6 Change of variables in multiple integrals			1	2						
	To	otal		39	39			11	43	132	
		Jean			sessme	nt				102	
	Continuous Assessment				ntage 50(%)			F2F	NF2F	SLT	
	1 Test-1			5%				$\sqrt{}$		1	
	2 Test-2			5%						1	
	3 Assignment-1			100					√	10	
	4 Assessment-2			100				r	V	10	
	5 Mid-Exam			200	<u>%</u>			√		3	
	P'al Para	D -		otal	(0/)			FOF	MESE	25	
	Final Exam Final Exam	Pe	rcenta	ge 50)%	(%)			F2F √	NF2F	SLT 3	
	Filial Exam		30	770				· · · · · · · · · · · · · · · · · · ·	d Total SLT	160	
	L = Lecture, T = Tutorial, P = Practical, O = Others, F2F = Face to Face, NF2F = Non Face to Face Note: indicates the CLO based on the CLO's numbering in item 9.										
12	2 Special requirements and resources to deliver the course (e.g. software, computer lab, simulation roometc.)										
		1 edi	tion						h analytic geo	metry, 6 th	
	Text book and reference:	2 Lei	thold, '	The c	alculus	with	ana	alytic geome	tric, 3 rd ed.		
13	(note: ensure the latest	∢ ।							epts and conn	ections, Mc	
	edition /publication)	Gra	am-Hill								
								s, Prentice-H			
		5 Jan	nes Ste	wart,	, Calcul	us w	ith a	nalytic geom	netry, 7 th ed.		

		Adama Science and Technology University						
1	College: CoEEC	DEPARTMENT: CSE						
	Course							
	Category:	Basic Mandatory						
2	Course Title:	ntroduction to Emerging Technologies						
	Course Code:	CSEg1102						

3	Synopsis				the Scie hel	area ence a ping	s of and ole learn	Artifi other iers b	cial tecl eco	Inte hnol me	ellige logies litera	nce, s tha ate ir	Inte t hav 1 em	rnet (ve em	of Therge	ning d ov chno	s ar er t olog	nd Au the p ies, 1	agmo ast f the c	ente ew y ours	d Rea zears. se wil	ologies in lity, Data Besides l prepare
4	Name(s) Academi		aff																			
5	Semeste				Sen	neste	r:						I	Yea	ar	1						
6	offered: Credit H	Our			3																	
7	Prerequi				Nor	1e																
8	Course I			1g ()			CLO)	: At tl	1e e	nd c	of the	COIII	se t	he sti	ıden	t wi	l be	able	e to:			
Ü	CLO1							ging t										- abi				
	CLO2			_				rging			_	and	too	ls.								
	CLO3													g tec	hnol	ogie	S					
	CLO4							merg						<u> </u>		<u> </u>						
	CLO5	Sel	lect	t ap	prop	riate	tech	nolog	gy a	nd t	ools f	or a	give	n tasl	ζ							
9	Mapping	gof	the	cou	ırse	learn	ing o	utco	mes	to t	he pr	ogra	m L	earni	ng O	utco	me	s, Te	achi	ng N	letho	ds, and
	Assessm	ent:	<u> </u>																			
		ໝ ຼ Student Outcomes (SO)																				
	ing 10)	F	SU	uae	nt O	utco	mes	(30)											Asse	ncem	ont	
	arn (CI												Tea	ching				ıt	ЛЭЭС			
	. Le		S01	S02	S03	S04	S05	90S	S07	808	60S		Met	hods		ىد	st Z		ct	oc	am	хап
	ırse		S	S	SC	SC	S	S(SC	SC)S					Test	Quiz	gnr	Project	Lab report	Mid exam	al e
	Course Learning Outcomes (CLO)											L	T	P	0	٠)	Assignment	Pı	Lab	Mic	Final exam
	CLO1											V			1			/				$\sqrt{}$
	CLO2		V									V			V		V				V	V
	CLO3		-			V						V			V			V			V	V
	CLO4																					
	CLO5																					
	Indicate	the	rel	leva	ncy l	betw	een t	he CI	ړO a	nd I	20 by	tick	ing "	√"on	the	appi	opi	riate	rele	vant	box	
10	Transfera	able	Ski	lls; ((Skill	s lear	ned i	n the	cour	se o	f stud	y wh	ich c	an be	usef	ıl an	d ut	ilize	d in c	ther	settin	gs)
11	l						Dist	ribut	tion	of S	Stude	ent L	earı	ning '	Гimе	e (SI	T)					
														and			, Ac	tiviti	es			
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	Course Content Outline						0		(F2	F)		Lea			_	ende		Tot	al (SLT)			
													n (NF	_			ning	3				
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											L	Т	P	0		·						
									(CL												
	1. Chapter One:Introduction to									0- 1,	5				1	L	3					9

		,	,	•		
1.1 Evolution of technologies						
Introduction to Industrial revolution						
o Historical background (IR 1.0, IR						
2.0, IR 3.0)						
1.5. o Fourth industrial revolution (IR						
4.0)						
1.6. 1.2 Role of data for Emerging						
technologies						
1.7. 1.3 Enabling devices and						
networks for emerging						
technologies (programmable						
devices)						
1.8. 1.4 Human to Machine Interaction						
1.9. 1.5 Future trends in emerging						
technologies						
1.10. Chapter 2: Introduction to						
Data Science						
2.1 Overview for Data Science	CL					
	_			1	2	
o Definition of data and information	0-	6		1	2	9
o Data types and representation	2					
2.2 Data Value Chain						
o Data Acquisition						
o Data Analysis						
o Data Curating						
o Data Storage						
1.11. o Data Usage						
2.3 Basic concepts of Big data						
Chapter 3: Artificial Intelligence(AI)	CL					
	0-	6		1	3	10
	2					
3.1 Introduction to AI						
o What is AI						
o History of AI						
o Levels of AI						
1.12. o Types of AI						
3.2 Applications of AI						
o Agriculture						
o Health						
o Business (Emerging market)						
1.13. o Education						
1.14. 3.3 AI tools and platforms (eg:						
scratch/object tracking)						
1.15. 3.4 Sample application with						
hands on activity (simulation						
based)	67			0		
	CL	6		0	3	9
	0-					
Chapter 4: Internet of Things(IoT)	2					
4.1 Overview of IOT						
			 .	 ı	<u> </u>	i

		•						
	o What is IOT?							
	o History of IOT							
	o Advantages of IOT							
	o Challenges of IOT							
	4.2 How IOT works							
	o Architecture of IOT							
	o Devices and network							
	4.3 Applications of IOT							
	o Smart home							
	o Smart grid							
	o Smart city							
	o Wearable devices							
	o Smart farming							
	4.4 IOT tools and platforms (eg: KAA							
	IoT /Device Hive/Zetta/Things							
	Board)							
	4.5 Sample application with hands on							
	activity (eg IOT based smart farming)							
	5.1 Introduction to AR							
	3.1 Illifoduction to Aix							
		CI	6			1	3	10
		CL						
		0-						
		2						
	5.2 Virtual reality (VR), Augmented							
	Reality(AR) vs mixed reality (MR)							
•	5.3 Architecture of AR systems.							
	5.4 Application of AR systems							
	(education, medical, assistance,							
	entertainment) workshop oriented							
	hands demo							
	Chapter 6: Ethics and professionalism	CL						
	of emerging technologies	0-	5				1	6
		3						
	6.1 Technology and ethics	_						
	Digital privacy							
	6.3 Accountability and trust							
	6.4 Treats and challenges							
	Chapter 7 Other emerging	CL						
	technologies	0-	0			2	_	15
	•	4,	8			2	5	15
		5						
	7.1 Nanotechnology							
	7.2 Biotechnology							
	7.3 Block chain technology							
	7.4 Cloud and quantum computing							
	7.5 Autonomic computing							
	7.6 Computer vision							
•	7.7 Embedded systems							
		1	1	1		1	I .	

7.8 Cyber security 7.9 Additive manufacturing (3D Printi ng) Total	(0)											
Total	(0)											
	(0.1											
A	68 hrs.											
Assessment												
Continuous Assessment Percentage Total- 60(%) F2F NF2F	SLT											
1 test 10 1 6	7											
2 Quize 05 1 3	4											
3 assignment I 10 2 6	8											
4 assignment II 10 2 6	8											
5 Mid exam 25 2 8	10											
Total	37hr											
Final Exam Percentage 40 F2F NF2F (%)	SLT											
Final Exam 40 3 12	15											
L = Lecture, T = Tutorial, P = Practical, O = Others, F2F = Face to Face, NF2F = Non-Face to	Face											
12 Special requirements 1 Adama Science and Technology university: Introduction to Civics (Module) LAR 1011.	Adama Science and Technology university: Introduction to Civics and Ethics (Module) LAR 1011.											
and resources to 2 Introduction to Global Trends module IRGI 1021												
deliver the 3												
course (e.g.												
software,												
computer lab,												
simulation roometc.)												
13 Follett I (2014) Designing for Emerging Technologies: IIV f	for Genomics											
Robotics, and the Internet of Things: O'Reilly Media.	ioi denomics,											
Jung T. & Diock M. C. t. (Eds.) (2018). Augmented Poplity and Vir	tual Reality:											
Empowering Human, Place and Business												
Toythook and Vong I & Song I (2014) Emerging Technologies for Emerging	ing Markets:											
Reference: 3 Springer Singapore	, 5											
Del Rosal, V. (2015).Disruption: Emerging Technologies and the Fu	uture of Work.											
Mohamed Anis Rach Tohii Rim Jallouli Vamen Kouhaa Anton M	Nijholt Digital											
5 Economy. Emerging Technologies and Business Innovation, 2018	,											

	Adama Science and Technology University											
1	College: CoEEC	DEPARTMENT: CSE										
	Course											
•	Category:	Basic Mandatory										
2	Course Title:	Fundamentals of Programming										
	Course Code:	CSEg1104										
3	Synopsis	The course is designed to introduce structured programming in C++ by providing an overview of programming concepts, on creating and working computer programs in C++. It will address fundamental concepts of program analysis, design										

	coding, testing and development. It includes introduction to comput programming; programming paradigms; algorithms and problem-solvin introduction to data structures and Programming constructs. The course designed on how to solve business and scientific problems through the technique structured programming. It will prepare students for focused studies in an programming language. Name(s) of												n-solving; course is hnique of								
4	Name(s Acaden		ıff:	•	<u> </u>	•		,													
5	Semest offered	:	ar		Semester: II										1						
6	Credit I			3																	
7	Prerequ						to Co														
8	Course						-									rill k	e ab	le to	:		
	CLO1	Desc		_											_						
	CLO2										-							of t	he p	rogra	mming.
	CLO3				ntrol flow structures and functions to solve a given problem.																
	CLO4	prim	itive	S	t the basic data structure elements in C++ that serve as holding heterogeneous data																
	CLO5		_		C++ program to implement file and stream objects using object oriented ing concepts. nini application that solves a real world problem using C++.																
	CLO6	Deve	lop	a mir	ii app	olicat	ion t	hat	solv	es a r	eal w	orld	prob	lem	usi	ng (C++.				
9	Mappin Assessr	_	ne co	ourse	urse learning outcomes to the program Learning Outcomes, Teaching Methods, and																
		10.				-	10)														
	ng (0)	Stu	den	t Ou	Outcomes (SO) Assessment																
	ırni (CL										,	Геас	hing					ASS		ent	
	Lea	\vdash	2	3	4	2	9	7	8	6		Meth	_				ıen	ct	ort	am	am
	Course Learning Outcomes (CLO)	S01	S 02	S03	S04	SO 5	90S	S07	808	S09					Test	Quiz	Assignment	Project	Lab report	Mid exam	Final exam
	oui utc										L	Т	P	0	L	O	ssig	Pr	ab	/Iid	ina
		,									,		,	,			A			,	1
	CLO1 CLO2	√	√								1/		1/	1			•			$\sqrt{}$	1/
	CLO2	1	V										√ √	√ √		1/	√ √			$\sqrt{}$	V 1/
	CLO4	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1								V		1	\ \ \		V	$\frac{v}{}$	$\sqrt{}$		v	
	CLO5		<u> </u>								V		$\frac{1}{}$	1			$\overline{}$	V			V
	CLO6										-		V				-				V
	Indicat	e the r	elev	ancy	, hets	ween	the (LO	and	PO h	v tick	ing '	″√"or	the	anı	oroi	nriat	e rel	evar	nt hox	•
10	Transfe																				
11						Dis	tribu	tio	n of		ent L										
									a -		Teacl					g Ac	tivit	ies			
		C -	- C		٠, ٢	12			CL	Gui	ded le F2]		ng		ided				m ·	-1 (CT III)	
	·	Cours	e Co	nten	t Out	iine			0			Learni			ni Independent Total (SLT) Learning		ai (SLT)				
														n	_			_	•		
														(NF	フド		(NF	じんじし	J.		

		L	Т	P	0			
	CL							
1. Chapter One: Problem Solving and	0-	6		3		3	4	16
Computer Programming	1, 2							
1.1. Problem solving life cycle								
1.2. Basics of programming language								
	CL							
2. Chapter Two: Basics of C++	02,	3		3		3	3	12
programming	4							
2.1. Modular program								
2.2. The main function								
2.3. Identifiers								
2.4 Program output using cout ,Data								
types, Arithmetic operations,								
variables ,Assignment operations								
2 Chanton Three Innut /tt	CL	2		_				12
3. Chapter Three: Input/output and Functions	03,	3		3		3	3	12
	4							
3.1. Using library functions								
3.2. Input using the cin Object, Symbolic Constants								
3.3. Writing Functions ,Variable								
Scope and life time								
•	CL							
	04,	3		3		3	3	12
4. Chapter Four: Control Statements	5							
4.1. Branching structure								
4.2. Looping Structure								
	CL	3		3		3	3	12
	04,							
5. Chapter Five: Arrays and Pointers	5							
5.1. Arrays								
5.2. Pointers								
	CL	6		3		3	3	15
6. Chapter Six: Files and Streams	0							
6.1. I/O File stream objects and								
functions								
6.2 Reading and writing Character								
based files , Random file access 6.3. File Streams as function								
arguments								
7. Chapter Seven: Structure and	CL	3		3		3	3	12
Object oriented programming	04,	5						12
Jose Granda Programming	5							
7.1. Structure								
7.2. Object Oriented programming								
7.3. Representation of Graphs								
7.4. Types of Graphs (cyclic and								

	_				T	1	1	ı			1	
	_	lic, directed a										
		plete and bal										
		Operation on		A								
		Graph Travei										
				ms Algorithms								
			Adv	anced Sorting	CL	- - -		3		3	3	12
		rithms			05	3					3	12
		Quick Sort										
		Merge Sort										
		Shell Sort										
	8.4. I	Heap Sort										
											Total	103 hrs.
								nent				
	Cont	inuous Asses	sme	ent		Perce		_	otal-	F2F	NF2F	SLT
							50(
	1	Quiz					59			1	1	2
	2	Assignmen Mid Exam	t				10			1	1	2
	3			25			2	1	3			
	4	Project				10	%		1	3	4	
											Total	11hr
	Final	l Exam				Pe		ntage	e 40	F2F	NF2F	SLT
								%)				
	Final	l Exam					ļ	50		3	7	10
											Grand Total SLT	120hrs.
			utor	ial, P = Practical,			, F2	F = 1	Face to	o Face, N	F2F = Non-Face	to Face
12	Spec		1	Software (Code	e Bloo	ck)						
	_	irements	2	Computer Lab								
		resources	3	Visual Studio C	ode							
		eliver the	5	Visual Studio G	ouc							
		se (e.g.										
	softv											
	_	outer lab,										
		lation 1etc.)										
13	10011	1	T	Sahni, S 2001	"T)ata (Strii	ctur	OC 1	laorithm	us and Apllica	tions in Cur
13			1	WCB/McGraw-H		vald i	วนน	ctui	cs, A	ugui itiilli	is anu Apinca	110115 III C++
			\vdash	Introduction to		rithmo	hu	Tho	mac L	I Cormo	n Charles E Lai	serson Ronald
	Том	t book and	2	L. Rivest, and Cli	_		Б	1 110	ша5 Г	i. Corine	ii, Giiai ies E. Lei	serson, Ronaid
		eference:	3	Data Structures			hm	Ana	lvcic i	n C++ hv	Mark Allen Wei	SS
	1/6	LICI CIICE.	4	Cracking the Cod					•			55
		5	MIT OpenCourse									
			6	https://leetcode			Jul	10010	11 10 11	.501101111	<u> </u>	
			U	intpar/ / icettouc	LUIII	4						

	Adama Science and Technology University										
1	1 School: Humanities and Social Science Department: Humanities Unit										
2	Course	General Course									

	Category																	
	Course N	ame	e	In	tro t	to Lo	ogic :	and	Cr	iti	cal tl	hinkiı	ıg					
	Course C	ode	:	LA	RT	100	2											
3	Synopsis	:		Th	e ma	ain g	goal	of th	e c	ou	rse i	s to in	iprove	critical	and logical	l reasoning skills.		
				Stı	ıder	its w	ill se	ee ho	ow	ou	r or	dinary	intuiti	ons on	good or ba	d reasoning can be		
				art	ticul	ated	l exp	licitl	y i	n f	orma	al syst	ems, ar	nd gain	a new abili	ty to evaluate		
							and	reas	son	in	g the	y enco	ounter	every d	ay with rig	orous logical concepts		
				an	d to	ols.												
																f reasoning, such as		
				arg	gum	ent,	dedı	ıctio	n, i	inc	lucti	on, sy	llogisti	c, and p	roposition	al logic.		
4	Name(s)																	
	Academic Staff:																	
5)	ear:	1					
	Year offe			ļ	:													
6	Credit Ho			3														
7	Prerequi			No	None Outcome (CLO): At the end of the course the student will be able to do:													
0	Co-requi			- 0														
8	Course L	ear	ուոչ	g Ou	Jutcome (CLO): At the end of the course the student will be able to do:													
	CLO-1	Aı	ppre	eciat	e th	e im	port	ance	of	lo	gic a	nd cri	tical thi	inking				
	CLO-2	kr	10W	how	riate the importance of logic and critical thinking how to construct valid arguments of their own the the proper use of language for effective communication													
	CLO-3	Aı	naly	ze tł														
	CLO-4	0-4 Apply logical rules and principles for evaluating arguments																
	CLO 5	O 5 Identify logical fallacies																
	CLO 6	Uı	nde	rstar	tand the significance of logical and critical attitude for science													
9	Mapping	of t	he o	cour	ourse Learning Outcomes to the Students Outcome, Teaching Methods and													
	Assessm						J								•	J		
											St	udent	s Outco	me (SO)			
	b0 —				1	ı						1						
	ning LO)							_					1		Assessm	ent		
	Course Learn Outcomes (C								eac					nt		ب ا		
	Le	S0-1	S0-2	SO-3	S0-4	SO-5	9-0S	[V]	letł	100	ıs			Assignment		Lab-report		
	rse	S	S	S	S	S	S	L	T	P	0		.,	guı	ect	·re		
	ou out											Test	Quiz	SSi	Project	ab		
													0		Ц			
	CLO-1						✓	✓ ✓			✓	✓		✓ ✓				
	CLO-2 CLO-3							∨				√		∨				
	CLO-3					√		∨				∨		∨				
	CLO-4					•		∨			√	V		V ✓				
								·										
	CLO 6							✓				✓		✓				
	Indicate t	te the relevancy between the CLO and SO by ticking " $\sqrt{\ }$ "on the appropriate relevant box																
10	Transfera																	
	(Skills lea	rne	d in	the	cour	rse o	f stu	dy v	vhi	ch	can	be use	eful and	l utilize	d in other s	settings)		
	1	De	velo	p th	e att	itud	e of	criti	cal	th	inkin	g						
	2	Log	gical	l reasoning														

	3	Clear and accurate use of language										
11	Distribut	ion of Student Learn	ing Tim	e (SL7	Γ)							
			CLO	Т	eachi ided l	earr		arning Act Guided	Indepe	Total (SLT)		
	Course Co	ontent Outline			(F2	F)		Learnin g (NF2F)	ndent Learnin g			
									(NF			
				L	Т	P	0		2F)			
	Chantar	1: Introduction:	1									
	The Natu 1.1 Argur	re of Argument nents, Premises, onclusions	1	1h r			1hr		2 hours	4 hours		
		gnizing Arguments	1	1h r			1hr		1 hour	3 hours		
	1.3 Dedu	ction and Induction	1	1h r					1 hour	2 hours		
		ty, Truth, ss, Strength,	1	1h r			2hr		2 hours	5 hours		
	Chapter	1&3										
	_	and Definition tive and Emotive		1h r					2 hours	3 hours		
		sion and Extension	3	1h r					2 hours	3 hours		
	2.3 Defini Purpo	itions and their oses	3	1h r					2 hours	3 hours		
	2.4 Defin	itional Techniques	3	1h r			1hr		2 hours	4 hours		
		ria's for Good efinitions	3&5				1hr		2 hours	3 hours		
	Fallacies	3: Informal cies in General	5	1h r			1hr		2 hours	4 hours		
		ries of Relevance	4,5,6	1h			1hr		2 hours	4 hours		
	3.3 Fallac	ries of Weak	3,4,5	1h			1hr		2 hours	4 hours		
	3.4 Fallac	4,5,6	1h			1hr		2 hours	4 hours			
	3.5 Fallac	1,3,5 ,6	1h			1hr		2 hours	4 hours			
	Chapter Proposit	4: Categorical	1,4	1h			1hr		2 hours	4 hours		

Cate	egorical Propositions			r					
	Quality, Quantity and ribution		1,2,3 ,4,6	1h r		1hr		2 hours	4 hours
4.3	Venn Diagrams and t	he	4&5						
Squ	ares of Opposition			1h		1hr		2 hours	4 hours
<i>4.4</i> 7	Three categorical		4	r 1h				2 hours	3 hours
	rations		7	r				2 110013	3 Hours
	pter 5: Categorical		2,3,5						
	ogism	,		1h		1hr		2 hours	4 hours
	Standard Form, Mood Figure	1		r					
	Venn Diagrams		2,3,4	1h		1hr		1 hours	3 hours
	_		,5	r					
5.3	Rules and Fallacies		4&5	1h		1hr		2 hours	4 hours
5.4.1	Reducing the Numbe	r of	4&6	r		1hr		1 hours	3 hours
Teri		1 01	ταυ			1111		1 Hours	5 Hours
5.5 1	Enthymemes and Soi	rites	2					2 hours	2 hours
	pter six: Propositio	nal	1-6	41					
Log	ic Symbols and Transla	tion		1h r		1hr		2 hours	4 hours
	Truth Functions	uon	2&4	1h				2 hours	3 hours
0.2			_0,1	r					
	Truth Tables for		1&3	1h		1hr		2 hours	4 hours
	positions and			r					
	uments Indirect Truth Tables	3	4,5,6	1h				2 hours	3 hours
0.17			1,0,0	r					
	Argument Forms and	l	2,3,4	1h		1hr		1 hour	3 hours
	acies		,5	r				2 1	21
6.6	Natural Deduction		2,4,6	1h r				2 hours	3 hours
	Т	otal		26		22		53 hr	101 hours
				hr		hr			
Con	tinuous	Doro	entage	Total-	_	ssment	NF2F		SLT
	essment	1 610	50(%		F		111.71.		311
1	1 1 hour 10			•	•				1 hour
2						✓			10 hours
3	3 8 hours 10 4 1 hours 20				1]			16 hours 1 hours
4	1 110015	20			<u> </u>	1		Total	17 hours
Fina	al Exam	Pe	Percentage 50				NF2F	1041	SLT
			(%)		F2 F				
Fina	al Exam		50%		,	1	C 1 m	atal CIT	2 hours
							Grand T	otal SLT	120 hours

	L = Lecture, T = Tutorial, P = Practical, O = Others, F2F = Face to Face, NF2F = Non Face to Face Note: indicates the CLO based on the CLO's numbering in item 9.											
12	Special	1										
	requirements and resources to deliver	2										
13	Text book and	1	Hurley, Patrick J.(1997) A Concise Introduction to Logic (6-12) th									
	reference:		Edition. Belmarnt: Wadsworth Publishing Company.									
	(note: ensure the latest edition	2	Copi, Irving M.and Carl Cohen, (1990) <u>Introduction to Logic</u> , New York: Macmillan Publishing Company.									
	/publication)	3	Fogelin, Robert, J, (1987) <u>Understanding Arguments: An Introduction to</u>									
			Informal Logic New York: Harcourt Brace Jvanovich Publisher.									
		4	Guttenplan, Samuel: (1991) The Language of Logic. Oxford: Blackwell									
			Publishers Stephen, C.(200) The Power of Logic. London and Toronto:									
			Mayfield Publishing company.									
		5	Simico, N.D and G.G James. (1983) <u>Elementary Logic</u> , Belmont, Ca:									
			Wadsworth Publishing Company.									

				A	Adam	a Scie	ence	and Ted	chnol	ogy l	Univer	sity			
1	College: Engine	Mechar	ical, C	hemi	cal a	nd Ma	teria	als		Dep	oartme	nt:Mechanical Engineering			
2		Category				Bas	ic Ma	ndator	v						
	Course							ring Dra	•	[
	Course	Code:					ıg 10								
3	Synopsi	s:				Geo prac	metri ctices	c constr of Mult	ructio i view	n, an repi	d theoi esenta	e of engineering drawing, and Basic ry of projections, theory and tions, Pictorial drawings, Auxiliary drawing instrument.			
4	Name(s	ame(s) of Academic Staff:													
5	Semeste	ter and Year offered: Semester: II Year: 1													
6	Credit F	lour (Led	:-Tut-P	ra.):		3(2-	0-3)								
7	Prerequany)	iisite/Co	-requi	site: (if	None									
8		Learning	Outco	me (0	CLO):	At the	end	of the co	ourse	the s	tudent	will be able to :			
	CLO 1	Apply o		_	ventio	ons ar	ıd sta	ndards	in eng	ginee	ring dr	awings to effectively communicate			
	CLO 2	Apply 1	nethod	ls and	lrules	s of co	nstrı	iction fo	r diffe	erent	types	of geometrical shapes.			
	CLO 3	Sketch	multi-	view (drawi	ngs of	fgive	n object	s or p	ictor	ial dra	wing			
	CLO 4	Draw p	ictoria	l drav	vings	of ob	jects	from giv	en m	ulti-v	iew dr	awings			
	CLO 5	Draw a	uxiliar	y and	secti	onal v	iews	as a sup	plem	ent c	f multi	-view drawings			
9	Mappin	g of the o	ourse	Learn	ing 0	utcon	nes to	the Stu	ident	Outc	omes, T	Teaching Methods and Assessment:			
	ar ng utc	Stu	dent C	utcor	nes (S	50)									
	Lear ning Outc omes	0	0	0	0	0	0					Assessment			

							1						1				
											hing					Ħ	_
									ľ	vietr	nods		E E			Assignment	Final exam
													Mid Exam			guu	l ex
										1	1	1	Lid	5	Quiz	SSi	ina
				,					L	Т	P	0	ļ		0	Α	<u>r</u>
	CLO 1		,	√					√ 		, r		1	,	,		V
	CLO 2		√ 						√		1		1	,	√		V
	CLO 3		√						√		√		√	'		,	V
	CLO 4		√						√		√				,	√	$\sqrt{}$
	CLO 5		V						√						$\sqrt{}$	√	V
	I d:	. 41		1	-	41.	- CI C	ا ا	CO h-	1۔ نہ ۔	_: 0	. [v _	41.				
10							ie CLC	ana	SO by	tici	king	ν c	n tne	e ap	prop	riate	relevant box
10	Transfe (Skills l						idv wi	hich d	an he	1156	oful a	nd 1	ıtiliza	ed i	n oth	or sot	tings)
		mmur							all be	usc	iui a	iiu t	1011120	cui	.11 0 (11	ici sci	ungsj
						•		ering	Draw	<i>i</i> ing							
11	Distrib								Dian	8							
								. ,			Tea	chi	ngan	nd L	earni	ing	
													Activ			O	
														en	b 0		
									CT0		(Guid	ed		l Ma	ing (Total (SLT)
		Cou	rse C	onte	nt Ou	ıtline			le			Guided learning (F2F)					
															t Learning (NF2F)		
											L	T	P	0			
	CHAPT	ER 1:	Intro	oduc	tion				CLO	1	2		3		1	3	9
	1.1 De				_												
	1.2 Ty	_		_													
	1.3 Hi	-				_											
	1.4 Ap	-			_	rs Dr	awing	5									
	1.5 Dr 1.6 Dr	•	_														
	CHAPT					ic.			CLO	2	2		3		2	4	12
	Constr								CLO	_	_		3		۷	4	12
	2.1 Ba					5.											
				-	oes												
	2.2 Lines and their Types2.3 Lettering																
	CHAPTER 3: Theory of Projections							CLO	3	4		12		2	4	22	
	and Multi -View Drawings																
	3.1 Types and classifications of																
	Projections																
	3.2 Choice of views 3.3 Laying out of views																
	3.4 Projection of lines																
	3.5 Planar and non-planar lines																
	3.6 Tangent surfaces, Fillets, Rounds																
	<u></u>	and Run-outs									1						

	4.1 Co pi 4.2 A 4.3 O	omparison be ictorial drawi xonometric d	rawing ntral projectio	iew and	CLO 4	4	1	2	1	3	20
	4.5 0	blique drawii	ng								
•	CHAI	PTER 5: Auxi	liary Views		CLO 5	4	9	9	1	2	16
	5.1 P	rimary and se	condary auxil	liary view	/S						
	5.2 C	omplete and j	oartial auxilia	ry views							
	CHAI	PTER 6: Secti	onal Views		CLO 5	4	1	2	2	5	20
	6.1 T	ypes of sectio	ns								
	6.2 C	onventional r	epresentation	s section							
	view										
		ectional auxil									
	6.4 \$6	ections in pict	orial drawing			00			4.0	20	400
				Tot		28		2	10	20	100
-					1	sment	<u> </u>				T
		Continuou	s Assessment		Percentag Total- 50(%)	ge	F2F	F	NI	F2F	SLT
•	1	Tests			10%						2
•	2	Quiz			10%						2
	3	Assignments	3		10%						9
-	4	Mid Exam			20%					<u> </u>	3
•							•	Total	16		
	F	inal Exam	Percen	tage (%)		F2F		NF2F			SLT
•	Final	Exam		0%							4
•					Grand 7	Γotal S	LT :	120			
	L = Le	ecture, T = Tu	torial, P = Pra	ctical, 0 =	= Others, F2	2F = Fa	ce to	Face, N	IF2F	= Nor	r Face to Face
			CLO based or								
12	Speci	al requireme	nts and	1	Software						
	resou	irces to delive	r the course	2	Video Tut	orial					
		software, com	•	3	Choose an						
	simu	lation room	.etc.)	4	Choose an						
		,		5	Choose an						
13	Text	book		•		_	_	_		•	th Edition, 2016.
			_		Harlow, Te	chnica	ıl Dra	awing	with	Eng	ineering Graphics,14th
	D. C		Edition, 2		D : 1 D M	1	г .				0 D ' (d Elic
	keter	ences:	1. David A. I 2017	viadsen,	vavia P. M	ausen,	Engi	neerin	g Dr	awing	g & Design, 6th Edition,
				F Cioco	cko Alvo M	[itchal]	l Цоп	ru Co	oil Cr	oncoi	r and Cindy M. Johnson
					with Engin			-	-		-
				_	_	_	-				d Graphics. 3 rd edition,
			Jain Broth			- ,	٠ ٥٠	-0 -0		v	F 23.2
			4. M. B. Shah			neerin	g Dra	wing, 2	2 nd E	dition	, 2009
			5. Cecil H. Jei	nsen, Jay	D. Helsel, a	nd Der	nis Sl	hort, E	ngin	eering	g Drawing and Design,
			Aug 17, 20								
			6. M.L. Math	ur and R	.S. Vaishwa	nar, E	ngine	ering l	Draw	ing a	nd Graphics. 3 rd edition,

	Jain Brothers 2013	

	Adama Science and Technology University School: Humanities and Social Science Department: Humanities Unit Course Category General Course																
1	Schoo	l: Hum	anitie	es and Social Science													
2																	
	Course						ıg Skil	lls									
	Course	e Code:		En	La100	02											
3	Synops			Sci stu ser mi pro pa cor lev	ience (idy Sc ntence splace onoun ragrap ncludi mplete vel wr oes of	Contience con ed n , fau oh, cong s enes iting	ext. To ext. T	he container, containe	ours ins s s, con dang men ts o chan step e of	se gisente mme gling t are of a racte os in	ves stuence le on seng mod mod shift parag eristics	tence (fier, tes); praph (fier) apply (fier) tes); praph (fier) tes (fier) thesi	s the riting erro fault arage (top ffection arage s sta	langua : sente rs (frag raph le ic sen ve par raph ar temen	nge writing sence structured gment, run of allelism, faute writing: tence, supposagraph (united types of a	writing skills in kills they need to be, sentence types in, comma splices, alty reference of the essence of a porting sentences, by, coherence and paragraph; essay rting paragraphs,	
4	Name(Acade		ıff:	ТВ	SA												
5	Semes offered		l Year	Se	meste	r: I	I		_	_	Year	: 1					
6	Credit			3								l					
7	Prerec	uisite/Co- Communicative English Skills (EnLa1001)															
	requis	ite: (if any)															
8	Course	e Learn	ing 0	utcon	ne (CI	۵): ،	At the	end	of t	he c	ourse	he st	uden	t will b	e able to do:		
	CLO-	Write	gram	matio	cally a	nd st	tructu	rally	or cor	rect	sente	nce (F	PLO-1	.0)			
	CLO-	Ident	ify and	d corr	ect co	mm	on ser	itend	ce er	ror	s in pai	agra	phs a	nd essa	ays(PLO-10)		
	CLO- 3	Write	cohe	rent,	unifie	dano	d com	plete	par	ragr	aphs o	f diffe	erent	types	in science co	ntext (PLO-10)	
	CLO- 4	Ident	ify bas	sic str	uctur	es ar	ıd elei	ment	ts of	par	agrapł	and	essay	7 (PLO-	10)		
	CLO-	Write	differ	ifferent types of essays in science context (PLO-10)													
9	Mappi	ng of tl	ne cou	ırse L	earnir	ıg Oı	utcom	es to	the	Stu	dents	outco	me, T	' eachir	ng Methods a	nd Assessment:	
									St	ude	nts out	come	(SO)		•		
	ing [0]								_	_			1		Assessmen	t	
	earn s (Cl	3	4	LΩ	2			thoo	_			int		l t			
	Solution No. 1						ımı	 	oda								
	Course Learning Outcomes (CLO)			P	РО	Test	Quiz	Assignment	Project	Lab-report							
	CLO-1							✓		√		✓	<u>✓</u>	7	—	 	
				-									·				
	CDO-2	CLO-2															

	CLO-3							✓		✓											
	CLO-4							✓		✓											
	CLO-5							✓		✓					_						
	Indicate	e the re	eleva	ncy b	etwee	en the	CLO	and	SO 1	by t	ickir	ւց "₁	√"on	the	ap	prop	riate ı	elevant	box		
10	Transfe (Skills l						y wh	ich (can l	be u	sefu	l an	ıd ut	ilizeo	d iı	n oth	er sett	tings)			
	1	Writi				•															
	2	Comi	nuni	catio	n skill																
	3etc.																				
11	Distribu	ıtion o	f Stu	dent l	Learn	ing Tir	me (S	SLT)													
											Te	ach	ing a	and I	₄ea	rnin	g Activ	vities		To	tal
							CI	.0	Gı	iide			ng (I				ded		endent		LT)
	Course	Conte	ıt Ou	tline									0 (,		Lear	ning	_	ning		,
																	⁷ 2F)		F2F)		
									L	,	T		P	C)						
	Chapte	r 1: Se	nten	ce																	
	1.1 Defi	nition	of Se	nten	ce		1		1:3	0		1 h	ır					1 hr			0hrs
	1.2 Sent	tence '	Types	;			1		1:3	0		1 h	ır					1 hr		3:30	0hrs
	Chapte	r 2: Co	mbi	ning																	
		Sent	ence	S																	
	2. 1 Coo	rdinat	ion				1		1 h	r		1 h	ır					3 hrs		5 hı	rs
	2.2 Coo	rdinat	ing C	onjun	iction		1		30'			30	,					1 hr		2 hı	r
	2.3 Sub	ordina	tion	Conju	ınctio	n	1		30'			30	,					1 hr		2 hı	r
	Chapte	r 3: Co	mm	on Se	nten	ce															
	Errors																				
	3.1 Frag						1,		30'			30						2 hrs		3 hı	
	3.2 Rur				lice		1,		30'			30						2 hrs		3 hı	
	3.3 Mis						1,		30'			1 h						2 hrs		3:30	
	3.4 Dan						1,		30'			1 h						2 hrs		3:30	
	3.5 Fau	, i					1,		30'			30						2 hrs		3 hı	
	3.6 Fau			_	noun		1,		30'			30						2 hrs		3 hı	
	3.7 Fau	, ,	eeme	nt			1,		30'			30						2 hrs		3 hı	
	3.8 Shif	ts					1,	2	30'			30	,					2 hrs		3 hı	rs
	Chapte	r 4: Pa	ragr	aph '	Writi	ng															
	4.1 Para		_	-		8		.	4.0	_		2.0						- 1			0
							3,4	ł	1:3	U		2:0)0					5 hrs		8:30	0
	4.2 Char Para	racteri agraph		orerr	ective)	3,	4	1:3	0		2:3	30					5 hrs		9:00	0
	4.3 Step	s in w	riting	g para	agrapl	1	3,	4	1hr			2:0	00					4 hrs		7 hı	rs
	4.4 Typ	es of p	aragı	aph			3,	4	1hr	ı		2:0	00					4 hrs		7:00	0
	Chapte	r 5: Es	say V	Writi	ng		3,4	1,5	30'			1 h	ır					5 hrs		6:30	0
	5.1 Con	nponer	nts of	Essa	ıy		3,4	1,5	30'			1 h	ır					4 hrs		5:30	0
	5.2 Essa	ay outl	ine				3,4	1,5	30'			1 h	ır					3 hrs		4:30	0
	5.3 Typ	es of E	ssay				3,4	1,5	30'			1 h	ır					3 hrs		4:30	0
	-					Total			16			21	:30					56 hrs		93:3	30

			hrs									
			Ass	essment	<u> </u>							
	Continuous Assessmen	nt		Percentage Total-60 (%)	F2F	NF2F	SLT					
	1 Quizzes (Sentence 5%	(1) 5	% and Paragraph (1)	10	1 hr		1 hr					
	2 Test 1 (paragraph 10%)	struc	ture and elements	10	30'		30'					
	3 Assignments (para 10%)	agrap	h (2) 10%, Essay (1)	20		16 hrs	16 hrs					
	4 Mid Exam (Senten	ce Le	vel)	20	3 hrs		3hrs					
				F2F	•	Total	20:30					
	Final Exam	NF2F		SLT								
	Final Exam		40	6 hrs			6 hrs					
						otal SLT	120 hrs.					
12	L = Lecture, T = Tutorial, P = Practical, O = Others, F2F = Face to Face, NF2F = Non Face to Face Note: indicates the CLO based on the CLO's numbering in item 9. Special 1 Computer Lab											
	requirements and	2	Software									
	resources to deliver the course (e.g.	3	Choose an item.									
	software, computer lab, simulation roometc.)	4	Choose an item.									
13	Text book and reference:	1	Brandon, L. and Bran Wadsworth Cen		agraph and Es	ssays. Bo	ston:					
	(note: ensure the	2	Erliana, Santi Rahma	diN., Sabarun &M.								
	latest edition /publication)	Sentences into Paragraph: Course material for Paragraph Writing. Genius Media Publishing										
		3	Langan, John. 2010, E. Hill. NY.	xploring Writing Se	entences and Pa	ıragraph	s. McGraw					
		4	Radford, Andrew. 20 Cambridge Univ	009, An Introducti ersity Press, New Y		Sentenc	e Structure.					
	5 Sherrise Roehr. USA. Murray, Neil. 2012, Cambridge University press. NY.											

	Adama Science and Technology University								
1	School: Humaniti	es and Social Science	Department : Humanities Unit						
2	Course Category	General Course							
	Course Name	Physical Fitness and condi	tioning II						
	Course Code:	HPEd1022							
3	Synopsis:	science students with the na It emphasize the value of eand focuses on the fundame life time leisure activity also to healthy active living through	acquaint freshman engineering and applied natural ture and scope of different ball games. stablishing lifelong fitness using ball games as a means intal of volley ball, hand ball, basketball and football as a focuses on the development of personalized approach ugh participation in a verity of ball games that have the ts' interest throughout their lives. Again the courses						

						•		•		, ,	ing pra the ball			-	•	•		
				ules	uate	3163	assuc	Jate	u w	ILII	lile Dail	ı ganı	25 111	entio	neu abi	ove a	illu lea	1 11
4	Name(s)	of	1	uics														
•	Academic		f:															
5	Semester			Sem	ester	:	II				Year:	1						
	Year offer					-												
6	Credit Ho			0 c	r.hr	I								l l				
7	Prerequis	site/	I	HPEd	1011													
	Co-requis		if															
	any)																	
8	Course Le	earnii	ng Ou	itcom	ne (C	LO):	At th	e en	d of t	he c	ourse th	ne stud	lent w	vill be	able to	do:		
	CLO-1	Und	lersta	and th	ne val	lue c	of play	ing	ball g	ame	es and it	s basio	rule	s. (W	A 1)			
	CLO-2	Imp	rove	their	phys	sical	fitnes	ss an	d we	llne	ss for be	etter q	uality	life.	(WA 12))		
	CLO-3	Den	nonst	trate	basic	tecl	nnique	es of	volle	eyba	ll, baske	etball,	footb	all an	d hand l	ball g	ames. (WA 5)
	CLO-4										in defer				WA 1)			
	CLO-5	Imp	prove	e tean	n wor	k ar	ıd sho	w R	espe	ct to	their co	olleagu	es. (V	VA 9)				
	CLO-6	Use 3)	their	leisu	ıre tii	me p	roper	ly a	nd ap	pro	priate sa	afety n	ıeasu	res in	playing	g ball	games.	(WA
9	Mapping		cou	rse Le	earni	ng O	utcon	nes 1	to the	e Stu	dents 0	utcom	e, Tea	achin	g Metho	ods		
	and Asses					Ü												
						Students Outcome (SO)												
	rse Learning Outcomes 3)																	
	tco														Assessn	nent		
	00							Te	achii	ng M	ethods			•	10000011	10110		
	ing									O			1					
	ırı	7	-5	-3	4-	-5	9-							Lt				
	Lea	S0-1	SO-2	SO-3	S0-4	SO-5	9-0S							ner		report		
	se ()							L	T	P	0			gnment	ect	rep	<u>L</u>	
	Cour (CLO											Test	Quiz	Assig	Proje	Lab-		
		1						1				Ĕ	0	Ą	- I	ļ i	<u> </u>	
	CLO-1 CLO-2	V					√	V		1	1		1					
	CLO-2					1/	V			1	V 1/		1					
	CLO-3					1		-			V V							
	CLO-4							-			V V							
	CLO-5	1						-		1/	V 1/							
	Indicate t	•	lowar	ocy be))	nn th	O CI C) and	1 50 1	\ \ 317 ti	cking "a	/"on th	o ann	ronr	iato rolo	want	hov	
10							ie CLC	and	1 30 1	Ју ц	cking v	/ On th	ie app	порг	iate reie	vaiit	DUX	
10	Transfera (Skills lea						اطبر سا	hich	can l	20.11	coful an	d utilis	od in	otho	r cottine	.c)		
		Basic					iuy wi	IIICII	taii i	Je u	seiui aii	u uuiiiz	zeu III	ouie	i settiii <u>e</u>	35)		
	2	Basic	hand	l ball	skills	3												
	3etc.	Basic	bask	et ba	ll and	l Foo	ot ball	skil	ls									
11	Distribut	ion of	Stud	lent L	earn	ing '	Γime (SLT)									
										Te	aching a	and Lea	arnin	g Acti	vities		Total	(SLT)

	urse Content tline		CLO	G		d learn F2F)	iing	Guided Learning (NF2F)	Independent Learning (NF2F)	
				L	T	P	0			
	apter One: lleyball	CLO	1 to CLO 6	1h						1h
1.1	Passing					2h			3h	5h
1.2	Serving					1h			2h	3h
1.3	6 vs 6 game					1h			2h	3h
Cha bal	apter Two: Hand l	CLO	1 to CLO 6	1h						1h
2.1	Passing					2h			3h	5h
2.2	Receiving					1h			2h	3h
2.3	Shooting					1h			3h	4h
2.4	7 vs 7 game					1h			3h	4h
	apter Three: sket ball	CLO	1 to CLO 6	1h						1h
2.1	Passing					2h			3h	5h
	Dribbling					2h			3h	5h
	Shooting					1h			3h	4h
3.4	5vs 5 game.					1h			3h	4h
	apter Four: tball	CLO	1 to CLO 6	1h						1h
4.1	Passing					1h			3h	4h
4.2	Controlling					1h			2h	3h
4.3	Dribbling					2h			3h	5h
4.4	Heading					1h			2h	3h
4.5	Shooting					1h			2h	3h
4.6 gan	Small sided nes					1h			2h	3h
<u> </u>	Total			4h		22 h				70h
					Asse	ssmen	t		•	
Cor	ntinuous Assessmer	nt	Percentage 60(%)		-	F2F		NF	2F	SLT
1	Assignments		20%					41	1	1
2	Tests		10%			1/2h				2
3	Tests		10%			1/2h				3
4	Mid exam		20%		1]	h				4
5	Choose an item.								Total	5

	Final Exam		Percentage 40 (%)	SLT								
	Final Exam		40%	4h		4h						
				Grand Total SLT 80h								
	L = Lecture, T = Tutori Note: indicates the CL	•	•	•	ice to Face, NF2F = Non Face to F tem 9.	'ace						
12	Special	1	Choose an item.									
	requirements and resources to deliver	2	Choose an item.									
	the course (e.g. software, computer lab, simulation roometc.)	3	Choose an item.									
13		1	Federation Inte	rnational	de Volleyball (FIVB) Coaching Ma	anual						
	reference: (note: ensure the	2	International Handball Federation (IHF) Coaching Manual									
	latest edition /publication)	3	Federation of In	ternation	al Basketball Association (FIBA)	Coaching						
	4 Federation of International Football Association (FIFA) Coaching Manual											

	Adama Science and Technology University College: Freshman Division Department: Pre-Engineering												
1	College: Freshma	n Division		Departn	nent: Pre-Engine	ering							
2	Course Category	Basic											
	Course Name	Applied M	lathematics -II	I									
	Course Code:	Math2101											
3	Synopsis: This course covers the topics in First order ordinary Differential Equation, second order ordinary Differential Equation, Laplace transforms and its application, scalar and vector fields and complex analytic function. Particularly, basic definitions and properties of linear and nonlinear, homogeneous and non-homogeneous differential equations, the Laplace transform of functions and the inverse Laplace transform will be discussed. Also different methods of solving an ordinary differential equations considered and practical problems in application of Engineering and Applied Science will be solved.												
4	Name(s) of Academic Staff:												
5	Semester and Year offered:	Semester :	I	Year:	2								
6	Credit Hour:	4											
7	Prerequisite/ Applied Mathematics-II Co-requisite:												
8													

		ordinary differential equations Apply the method of solving ordinary differential equations to formulate and solve engineering problems																	
	ordinary differential equations CLO-2 Apply the method of solving ordinary differential equations to formulate and solve engineering problems																		
	CLO-2	Apply	the me	ethod	of sol			y diff	eren	tial e	quat	ion	s to	form	iulate	e and	l solv	re	_
	CLO-3	State	Laplace	e tran	sform										a fun	ctio	ns an	d then	_
	CLO-4	Ident	ify scala	ar an	d vect	or fiel	ds, sta	te and	dapp	ly Gı	een'				Gauss	div	erger	ıce	
	CLO-5	_	ze the t		-	_	-					plex	int	egra	ls and	d fin	d inte	gration	
9	Mapping o Assessmen		urse Le	arnin	ig Out	comes	to the	Stud	ents	Outc	ome	, Te	achi	ing M	letho	ds a	nd		
							St	uden	ts Ou	tcon	ne (S	0)							_
	1g ((1	Asse	ssme	nt	
	earnir s (CLC	+	.2	က	4	rċ	9	L.			eachi etho					ent	U		
	Course Learning Outcomes (CLO)	S0-1	S0-2	SO-3	SO-4	SO-5	9-08	S0-7	L	1	T	P	0	sst	aiz	Assignment	Mid Exam	Final	
	<u>ან</u> CLO-1	1/	\frac{\lambda}{\lambda} \frac{\lambda}{\lambda}															-	
	CLO-1	· ,					· r			V		√ √	V	· /	_				
	CLO-2	$\frac{1}{}$							1	/	$\frac{v}{}$				$\sqrt{}$	V	<u>√</u>	√ √	_
	CLO-4	1							1	7	$\frac{\mathbf{v}}{}$,	$\sqrt{}$		1	-
	CLO-5	Ī							$\frac{1}{\sqrt{2}}$	/	$\frac{}{}$							1	_
	Indicate th	e releva	ancy be	twee	n the (CLO ar	nd SO k	y tic	king	"√"o	n the	ap	proj	oriat	e rele	evan	t box		_
10	Transferal (Skills lear	ole Skill:	S																
	1	Mathe	matical	skills	that i	used to	o solve	diffe	rent	prac	tical	eng	gine	ering	g prol	olem	ıS		
	2																		
11	Distributio	n of Stu	ıdent L	earni	ng Tin	ne (SL'	T)												
															ctivit			Total	
	0 0						CLO	Gui	ded l		ing		uid			epen		(SLT)	
	Course Co	ntent Oi	utline						(F2	2F)			arn	_		earn	_		
								L	Т	P	0	- (1	NF2	F)	(NF2	F)		
	Chapter 1 Equation				itial	C	LO-1	6	6				2			9		23	
	1.1 Prelim	inary co	ncepts					0. 5											
	1.2 Separa	ble Equ	ations					0. 5								1			_
	1.3 Homog Equation		Differe	ential				1	1							1			
	1.4 Exact D		tial Equ	ation	ıs			1	1				1			3			
	1.5 Non Ex				ation			1.	2							2			
	and Int	egratin	σ Facto	rs				5											

1.6 Linear differential Equation (with application)		1. 5	2	1	2	
Chapter 2: Ordinary Linear Differential Equation of the second order	CLO-2	9	9	3	9	30
2.1 Homogeneous Linear Differential Equations of the second order		1			1	
2.2 Homogeneous second order Differential Equations with constant coefficients		1. 5	1	1	1	
2.3 General Solutions, Basis		1	1		1	
2.4 Real Roots, Complex Roots and Double Roots of the characteristic Equations		1. 5	2		2	
2.5 Method for solving non- homogeneous Linear Differential Equations		2	2	1	2	
2.6 System of Differential Equation		2	3	1	2	
Chapter 3:Laplace Transforms	CLO-3	6	6	2	8	22
3.1 Laplace Transformations		2	1	1	2	
3.2 Differential and Integration of Laplace Transformations		2	2	1	3	
3.3 Convolution and Integral Equations		2	3		3	
Chapter 4: Vector Calculus	CLO-4	12	12	3	10	37
4.1 Scalar Field and Vector Fields		1				
4.2Vector calculus		1	1		1	
4.3 Curves, Arc Length and Tangent		2	1		2	
4.4 Gradient of a scalar Field, Divergence and Curl of a Vector Field		2	1	1	1	
4.5 Line Integrals, Line Integral Independent of Path and Greens Theorems		3	2	1	2	
4.6 Surface Integrals, Gauss Divergence Theorem and Its Application		1. 5	2		1	
4.7 Stock's Theorems and Its Application		1. 5	2	1	2	
Chapter 5: Complex Analysis	CLO-5	6	6	2	6	20
5.1Complex Analytic Functions		1			2	
	-	+	_	1	2	
5.2 Complex Integrals		2	3	1		

			Total	39 39	12	42	132							
	Continuous Assessme	ent	Percentage	F2F	NF2F	S	LT							
	_		Total-50(%)	_										
	1 Tests(2)		10%(Each	\checkmark			2							
		_	5%)											
	2 Assignments(2	.)	20%(Each		V	20								
	2 M:d		10%)	. [2							
	3 Mid-exam		20%	V	Total		3 25							
	Final France		Davianta na EO	FOF		SLT								
	Final Exam		Percentage 50 (%)	F2F	NF2F	5	F I							
	Final Exam		50%	$\sqrt{}$		3								
					Grand Total SLT	1	60							
2	Special requirements and	2	Choose an item. Choose an item.											
	requirements and resources to deliver													
	the course (e.g.	3	Choose an item.											
	software, computer	4	Choose an item.	Choose an item.										
	lab, simulation roometc.)	5	Choose an item.	Choose an item.										
3	Text book and	1	Erwin Kreyszing:A	dvancedEngine	eering Mathematics									
	reference:	2	Edwards and Penn	ey : Calculus an	nd Analytic Geometry	7.								
	(note: ensure the latest edition /publication)	3	Zill D. G: A first course in differential equations with application. International edition,1981											
		4	Kaplan W: Ordinary	y differential e	quations									
		5	Martin R. H :Ordinary Differential equations											
		6	M.D Raisinghania: (Ordinary and p	artials Differential E	quations								

	Adama Science and Technology University										
1	College: CoEEC	Department: ECE									
2	Course Category	Major Mandatory									
	Course Name	Electronics circuits I									
	Course Code:	ECEg2201									
3	Synopsis:	It introduces semiconductor devices, basic structure, principles, and operations. Analysis of BJT and FET basic operation with i-v characteristics and small signal analysis of BJT and FET. Application of semiconductor devices, BJT, and FET with real-time examples. Frequency Response of BJT and FET and various coupling methods. The basic construction of Amplifiers with various biasing methods and their application.									
4	Name(s) of Academic Staff:										

5	Semester	Year	Sen	nester	:	I	Y	ear:			I							
(offered:			4														
6	Credit Ho		C -	4	LL 110	1 Db1	101	. J C -		-:+	- Г			- C				
7	Prerequisite requisite	-				1, Phys1				SIT	e: Fur	iaame	ntais	OI				
8	Course L	_ `				Engine				th	o ctu	dont w	rill ho	ablo	to d	٠.		
O	CLO1					onducto												
	CLOI		h appl			onducti	n uev	1003	WUIKI	пg	, priii	cipies	anu	Strt	ictui	CS		
	CLO2					eristics	of Ser	nicon	ductoi	. Ч	indes	tyne	s of v	zario	110			
	CHOZ					es, its ch												
	CLO3					applicat												
	CLO4					ith var	ious	biasir	ng tec	hn	iques	, appli	catio	ns a	nd			
					•	ntation.												
	CLO5					y respo	nse of	ampl	ifiers v	vit	h vari	ous p	arame	eters	and			
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9	Mapping Methods					g Outcor	nes to	tne S	tuaent	: Ui	utcon	ies, Ie	eachin	ıg				
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Chapter 4: CLO 4 4hr 6hr 2hr 3hr
Field Effect Transistors 15hr
4.1. FET Types
4.2. FET characteristics
4.3. Equivalent circuits and
biasing techniques
4.4. Parametric
representations
Chapter 5: CLO 5 4hr 12hr
Frequency Response of 2h 6hr
Amplifiers r
5.1. Basic concepts
5.2. Types of frequency
response
5.3. Frequency response
analysis of BJT
Chapter 6: CLO 5 2h 3hr 1hr 2hr 8hr
Multistage Amplifiers r
6.1. Coupling methods

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		Adama Science and Technology University
1	College: COEEC	Department: EPCE
	Course Category	Basic Mandatory College Req.
2	Course Name	Fundamentals of Electrical Engineering
	Course Code:	EPCE2101
3	Synopsis:	The course deals with basic concepts of electrical engineering, basic circuit law and circuit analysis methods, fundamental circuit theorems, transient circuit analysis, steady state circuit and power analysis, introduction to polyphase circuits, electromagnetism, and frequency analysis.

4	Name(s) of A	Acaden	nic S	taff:																
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7	Prerequisite	:				Mat	ths1	102 ส	and F	hys1	1101									
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	Coning registers and Voltage divider rule								
	Series resistors and Voltage divider rule Parallel resistors and current divider								
	rule								
	Star-delta transformation								
	1.3 Methods of circuit analysis								
	Nodal analysis: without and with a								
	voltage source								
	Mesh analysis: without and with current								
	source								
	1.4 Circuit Theorems								
	Linearity property								
	Superposition theorem								
	Source transformation								
	Thevenin's theorem								
	Norton's theorems								
	Maximum power transfer theorem								
	Chapter Two:							-	
	First and Second Order Transient	CLO2	4	6	6	_	2		18hr
	Circuit Analysis								
	2.1. First Order Circuits								
	2.2. Source free RL and RC circuits								
	2.3. Step response of RL and RC circuit								
	2.4. Second order circuits								
	2.5. Source free series and parallel RLC								
	circuits								
	2.6. Step response of series and parallel								
	RLC Circuits								
	Chapter Three:	CLO3	6	6	6	_	4		20hr
	AC Steady State Analysis	СПОЗ	U	Ü			1	-	20111
	3.1. Introduction to Sinusoids								
	3.2. Capacitors and inductors								
	3.3. Sinusoidal and complex forcing								
	functions								
	3.4. Phasors and Phasor diagrams								
	3.5. Phasors representation for circuit								
	elements								
	3.6. Impedance and admittance								
_	3.7. AC circuit analysis techniques								
	Chapter Four:	CLO4	2	3	3	_	5		13hr
	Steady State Power Analysis							-	
	4.1. Instantaneous power								
	4.2. Average power and maximum								
	average power transfer								
	4.3. Effective or RMS value								
	4.4. Complex power								
	4.5. Power factor and power factor								
	correction	01.07	_	_					4.43
	Chapter Five:	CLO5	2	3	3	-	6		14hr

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	5.1. Thr	ee Phase Genera												
	5.2. Thr	ee phase connec	ctions											
	5.3. Sou	irce and load cor	nnection											
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	Fi Fi L = Lect Special comput Text boo	Mid exnal Exam nal Exam ure, T = Tutorial requirements an er lab, simulatio ok ce: nsure the latest	Percent, P = Practed resource in room	50% ctical, (ces to etc.) 1	O = Other deliver the constant of the constant	s, F2F e cou nder a 0th ec win, R n, Joh ylstad ducati rald & Engin ymou	= Fa rse (e and M lition . Mar n Wi , Intr on, 2 b D.E. eerin r Sish	ce to F e.g. soft f. N. O. , McGr k Nelm ley & S oducto 002 Higgir g, 7 th e kind, E	Sac awns, long ory nbo d, l	diku, fu Hill, Basic e s, Inc., circuit tham, Mcgrav	= No 1 2 1 2 1 2 2 3 2 4 4 4 5 7 7 8 7 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Total n-Face Comput Works mentals eering comput grabel compar ts, 2 nd e	to Fa ater La hop of cir ircuit th edit l, Basi nies, 2 d, Mc	24hr SLT 3hr 60hrs ce. ab cuit analysis, cion, c 2009 Graw-

						Ad	ama	Sci	ence	e and	Tecl	nol	ogy l	Jniv	ers	ity					
1	College	e: CoE	EC							DEP	ART	MEN	T: CS	E							
2	Course Catego			Bas	ic Ma	andat	tory														
2	Course	Title	:	Dat	a Str	uctui	res ar	nd A	lgor	ithm	S										
	Course	Code	:	CSE	g210)1															
3	Synops	is		algo suc and	orithi h as a l gra	ms t array phs.	o sol /s, sta The	ve acks alg	engi , qu gorit	neeri eues,	ing p and l used	roble lists a	ems. and a mar	Top adva nipu	oics ince late	inc d d th	lude ata s	bas truc	ic d ture	ata s s sucl	tructures and as trees and their
4	Name(s Acaden		ff:																		
5	Semesto offered	-	ar	Sen	neste	r:						I	Yea	r	2						
6	Credit I	lour:		3																	
7	Prerequ	iisite:		CSE	g 11	04 - 1	Funda	ame	ental	ls of F	rogra	amm	ing								
8	Course	Learn	ing	Outc	ome	(CLC): At	the	end	of th	e cou	rse t	he st	ude	nt w	ill k	oe ab	le to):		
	CLO1	Desc	ribe	the f	uncti	ions	and a	ppli	icati	ons o	f bas	ic da	ta str	uctı	ıres						
	CLO2	Analy	yze t	he p	erfor	man	ce of	diff	eren	ıt algo	orithr	ns in	tern	1 S O	ftim	ie a	nd s	pace	com	plexit	y.
	CLO3	Appl																			
	CLO4																	_			
	CLO5 Discuss the runtime and memory efficiency of principal algorithms for sorting, searching, and hashing.																				
9	Mappin Assessr	_	ne co	ourse	lear	ning	outc	ome	es to	the p	rogra	am L	earni	ng (Outo	om	es, T	'each	ing	Metho	ods, and
	ng 0)	Stu	den	t Ou	tcom	es (S	50)				Ī			1							
	rni										r	Гeacl	ninσ			1 1		Asse	essm	ent	
	Course Learning Outcomes (CLO)	S01	S02	S03	S04	S05	90S	S07	808	60S		Meth	_	_	Test	Quiz	nment	Project	Lab report	Mid exam	exam
	Cour Outc										L	Т	P	0	Ĭ	Q	Assignme	Prc	Lab 1	Mid	Final exaı
	CLO1	√					,				√						$\sqrt{}$	$\sqrt{}$		√	$\sqrt{}$
	CLO2		√	r			√				√		,				√	√		√	
	CLO3			1/			-/		./		1/		1/			٧	1	1/		√ √	- V
	CLO4								√		√ √		V √					√ √		V	
	Indicate the relevancy between the									•	V 1	. "	<u> </u>	.1				•		. 1	v
10																					
10	Transie	Transferable Skills; (Skills learned in the									uy WI	11011 0	an DE	use	iul d	iiu l	auiiz	eu III	ouie	a setti	<u></u>
11		tio	n of	Stud	ent L	earn	ing 7	Γim	e (S	LT)											
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									CL		ded le			Guio				ende	nt	Tota	al (SLT)
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	CL O- 3, 4 CL CL	CL O-3, 4	CL 0-1, 6 2 3 4 4 CL 0-3, 4 3 4 CL 0-4, 3	CL 0-1, 6 3 CL 0-2, 3 3 CL 0-3, 4 3 CL 0-3, 4 3 CL 0-3, 3 3 CL 0-3, 3 3 CL 0-3, 3 3 A 3 A 3 A 3 A 3 A 3 A 3 A	CL O-1, 2	CL O-1, 2 3 3 3 3 4 4 3 3 3 3 3 4 CL O-4, 3 3 3 3 3 3	CL O- 2, 4

4.5. Applications of Stack								
	CL							
5. Chapter Five: Queue Data	04,	3		3		3	3	12
Structure	5							
5.1. Queue Definition								
5.2. Operations on Queue								
5.3. Implementations of Stack Queue								
Array								
5.4. Implementations of Queue using Linked Lists								
5.5. Circular Queue								
5.6. Priority Queue								
5.5. Applications of Queue	L							
	CL							
	04,	3		3		3	3	12
6. Chapter Six: Tree Data Structure	5							
6.1. Tree Definition								
6.2. Basic Terminolgies								
6.3. Types of Tree (n-ary tree, binary								
tree, full BT, complete BT, balanced								
BT, BST, AVL tree)								
6.4. Tree Traversal Methods								
6.5. operation on Tree								
6.2. Sheap Data Structure								
	CL							
7. Chapter Seven: Graph Data Structu	04,	3		3		3	3	12
re	5							
7.1. Graph Definition								
7.2. Basic Terminologies								
7.3. Representation of Graphs								
7.4. Types of Graphs (cyclic and acyc								
lic, directed and undirected, complet								
e and balanced)								
7.5. Operation on Graphs								
7.6. Graph Traversal (DFS, BFS)			+ +					
7.7. Djikistra and Prims Algorithms			+	+				
,	Cī		+					
8. Chapter Eight: Advanced Sorting	CL	3		3		3	3	12
Algorithms	0,5		+ +					
8.1. Quick Sort			+					
8.2. Merge Sort			+					
8.3. Shell Sort			+					
8.4. Heap Sort								400:
							Total	103 hrs.
			sessm			1	T	T
Continuous Assessment		Perc	entag		tal-	F2F	NF2F	SLT
			60(%					
1 Quiz			5%			1	1	2
2 Assignment			10%	6	-	1	1	2

	3	Mid Exam			25%	2	1	3				
	4	Project			10%	1	3	4				
		•					Total	11hr				
	Fina	l Exam			Percentage 40	F2F	NF2F	SLT				
					(%)							
	Fina	l Exam			40	3	7	10				
							Frand Total SLT	124hrs.				
	L = L	ecture, T = T	`uto	rial, P = Practical, O = 0		o Face, N	F2F = Non-Face	to Face				
12	Spec		1	Software (Code Bloc	k)							
	_	irements	2	Computer Lab								
		resources	3	Visual Studio Code								
		eliver the										
		se (e.g. vare,										
		vare, puter lab,										
		lation										
	0	netc.)										
13			4	Sahni, S 2001. "D	ata Structures, <i>F</i>	Algorithm	s and Apllica	tions in C++				
			1	WCB/McGraw-Hill.			-					
			2	Introduction to Algor		H. Corme	n, Charles E. Lei	serson, Ronald				
	Tex	t book and		L. Rivest, and Clifford Stein								
	Re	eference:	3	Data Structures and A	<u> </u>			SS				
			4	Cracking the Coding I								
			5	MIT OpenCourseWar		lgorithm	S					
			6	https://leetcode.com	L							

	Adama Science and Technology University											
1	College: Humanit	ties and Soc	ial Science	Department : Humanities Unit								
2	Course Category	General Co	ourse									
	Course Name	Geograph	y of Ethiopia an	d the Ho	ori	1						
	Course Code:	LART1004	•									
3	3 Synopsis: This course covers a brief description on the location, shape and size of Ethiopia as well as basic skills of reading map, the physical background and natural resource endowment of Ethiopia and the Horn which includes its geology and mineral resources, topography, climate, drainage and water resources, soil, fauna and flora. It also deals with the demographic characteristics of the country and its implications on economic development.											
4	Name(s) of											
	Academic Staff:											
5	Semester and	Semester	II	Year:	1							
	Year offered:	:										
6	Credit Hour:	3										
7	Prerequisite/	None										
	Co-requisite: (if											
	any)											

8	Course Le	arn	ing	Out	com	e (C	L0):	At t	he en	d of t	he o	cou	rse t	he st	tude	ent w	ill be	abl	e to d	do:			
	CLO-1	D	Demonstrate basic knowledge on the geographic attributes of Ethiopia and Horn. Acquire general understanding of physical geographic processes, and human-environment relationships.																				
	CLO-2										ysic	cal g	geogi	raph	ic p	roces	ses, a	and					
	GY 0. 0																						
	CLO-3			lop e onm		al ap	titu	des a	and di	ispos	itio	ns i	neces	ssary	y to	live i	n har	mo	ny w	ith th	ne nat	ural	
	CLO-4	D	eve	lop a	ın ur	nder	stan	ding	of na	tiona	ıl po	pu	latio	n dis	trik	outio	nal pa	ittei	ns a	nd dy	nami	CS	
	CLO-5.		Describe the comparative advantages of economic regimes; and understand the impacts of globalization.																				
	CLO 6		Identify their country's overall geographic conditions and opportunities;																				
9	Mapping o		the course Learning Outcomes to the Students Outcome, Teaching Methods and Assessment:												nt:								
										S	tud	ent	s Ou	tcon	1e (SO)							
	ing (0)		Assessment																				
	arn (CI			Teaching to in its in i																			
	Lea	SO-1	SO-2	SO-3	S0-4	SO-5	9-0S																
	rse	S	S	S(S	S	S	LI		P	0												
	Course Learning Outcomes (CLO)																						
	CLO-1																						
	CLO-1																						
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	CLO-5																						
	CLO 6																						
	Indicate th							ie CI	∆0 and	d PO	by t	ick	ing"	√"or	th	e app	ropri	ate	relev	ant l	OOX		
10	Transferal (Skills lear							ıdy v	vhich	can l	be u	ısef	ul an	ıd ut	ilize	ed in	other	· set	tings	;)			
						reac																	
	2	Loc	cate	a pl	ace	on a	map	usi	ng lon	igitu	de a	nd	latitı	ıde									
11	Distribution	on o	of S	tude	nt L	earn	ing '	Γime	(SLT)													
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				_			CI	LO			A	ctiv	ities										
	Course Co	nte	nt (Outli	ne			-	Gui	ided		Gui	ded	Inc	dep	end							
										ning			ırni		ent								
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			L T P O																				
	Chapter 1 1.1. Geogramscope, the approach	rap em es	hy: es a	Def ind	initi		1		3	2					5		10						
	1.2 . Locat	ion	, Sh	ape	and																		

	_							
Size of Ethiopia and the								
Horn								
1.2.1. Location and its								
effects								
1.2.2. The shape of								
Ethiopia and its implication								
1.2.3. The size of Ethiopia								
and its implications								
1.3. Basic Skills of Map								
Reading								
Chapter 2: The geology of	2	3	3				6	12
Ethiopia and the horn	-							12
2.1. NTRODUCTION								
2.2 The Geologic Processes:								
Endogenic and Exogenic								
Forces								
2.3. The Geological Time	1	1						
scale and Age Dating								
Techniques	1	1						
2.4. Geological Processes								
and the Resulting								
Landforms								
2.4.1. The Precambrian Era								
geologic processes and								
resultant features								
2.4.2. The Paleozoic Era								
geologic processes and								
resultant features								
2.4.3. The Mesozoic Era								
geologic processes and								
resultant features								
2.4.4. The Cenozoic Era								
geologic processes and resultant features								
2.5. Rock and Mineral								
Resources of Ethiopia								
Chapter 3: The	3	2	3				5	10
Topography of Ethiopia								
and the Horn		1						
3.1. Introduction	1	1						
3.2. Physiographic Divisions								
	1	1						
3.2.1 The Western	1	1						
Highlands		1						
and Lowlands .	1	1						
3.2.2 The Southeastern								
Highlands and Lowlands	1	1						
3.2.3 The Rift Valley	+	1			<u> </u>			
	1	1						
33. The Impacts of Relief	1	1						
				1	1	1	1	

	on Biophysical and						
	Socioeconomic Conditions						
	Chapter 4: Drainage	3	3	3		6	12
	systems and water						
	resources of Ethiopia and						
	the horn						
	4.1. Introduction						
Ī	4.2. Major Drainage Systems						
	of Ethiopia						
ŀ	4.3. Water Resources:						
	Rivers, Lakes, and						
-	Subsurface Water						
	4.4. General Characteristics						
	of Ethiopian Rivers						
	4.5. Water Resources						
	Potentials and Development						
	in Ethiopia						
	Chapter 5: The climate of	5	4	3		7	14
	Ethiopia and the horn						
	5.1. Introduction						
Ī	5.2. Elements and Controls						
	of Weather and Climate						
-	5.3. Spatiotemporal Patterns						
	and Distribution of						
	Temperature and Rainfall in Ethiopia						
	•						
	5.4. Agro-ecological Zones of						
-	Ethiopia						
	5.5. Climate and its						
	Implications on Biophysical						
	and Socioeconomic Aspects						
	5.6. Climate Change/Global						
	Warming: Causes,						
	Consequences and Response						
	Mechanisms						
Ī	Chapter 6. : Soils, natural	6	3	3		6	12
	vegetation and wildlife						
	resources of Ethiopia and						
	the horn						
ŀ	6.1. Introduction						
}							
	6.2. Ethiopian Soils: Types,						
	Degradation and						
ļ	Conservation						
	6.3. Types and Distribution						
	of Natural Vegetation in						
	Ethiopia						
ļ	6.4. Natural vegetation:						
	Uses, Degradation and						
	Conservation Strategies						
			1	1		i	1

Chapter 7. Population of	4	5	5		10	20
Ethiopia and the horn						
7.1 Introduction						
7.2. Population Data: Uses						
and Sources						
7.3. Population Dynamics:						
Fertility, Mortality and						
Migration						
7.4. Population Distribution						
and Composition						
7.5. Sociocultural Aspects of						
Ethiopian Population: Education, Health and						
Language						
Chapter 8. Economic	6	4	4		8	16
activities in Ethiopia						
8.1. Introduction						
8.2. Mining, Fishing and						
Forestry						
8.3. Agriculture in Ethiopian						
8.3. 1 Contributions,						
potentials and						
characteristics of agriculture						
in Ethiopia						
832. Agricultural systems						
in Ethiopia						
8.3.3. Major problems of						
Ethiopian agriculture						
8.4. Manufacturing in						
Ethiopia						
8.4.1. Manufacturing:						
essence and contributions						
8.4.2. Types,						
characteristics and						
distribution of						
manufacturing						
8.4.3. Industrial						
development in Ethiopia:						
Challenges and Prospects						
8.5. The Service Sector in						
Ethiopia 8.5.1. Transportation and		-				
communication in Ethiopia:						
types, roles and						
characteristics						
8.5.2. Trade in Ethiopia:						
types, contributions and						

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	chai	racteristics										
	;	8.5.3. Tourism i	n									
		iopia: Types, ma	•									
		rist attraction si	-									
	chal	llenges and pros										
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	2	Assignments			L0%		1		1			2
	3	Tests			L0%		1		1			2
	4	Assignments			10 %		1		1			2
	5	Quiz		5	5 %		1					1
							ı				Total	14
	Fina	al Exam		Pe	ercentage (%)	e 50	F2	2F		NF2	2F	SLT
	Fina	al Exam		50 %			2		4			6
				,	<u> </u>		_			d To	tal SLT	120
	Not	e: indicates the	CLO b	asec	d on the (CLO's n						F2F = Non Face to Face
12	Spe		1	Cho	ose an it	em.						
	resc	uirements and ources to	2	Cho	ose an it	em.						
		ver the course										
		. software,										
		iputer lab, ulation room										
	et											
13		t book		Mir	nistry of S	Science	and	High	er Ed	ucat	ion Mor	ral and Civic Education Module.
			1	Mor	gan R.P.	C (2005	5). So	il Ero	sion	and	Conserv	vation. National Soil Resources
					_	•	-					ishing, Oxford, UK
	Refe	erence										River Basin; Eco hydrological
									-		-	Springer International
					lishing, S							
			3							•	_	Essentials of Physical Geography.
					mson Hi							
			4							trodi	uctory G	Geography of Ethiopia, Teaching
	Text, Department of Geography.											

		Adama Science and Tech	nology University	
1	College: CoEEC		Department: ECE	
2	Course Category	Major Mandatory		
	Course Name	Electronic circuits-II		

	Course Cod	le:			ECE	g220	2											
3	Synopsis:				amp feed para and diffe desc semi	lifier back mete illust rent ribe iconc	rs wit amp ers. In crate type abou ducto ristic	th vari lifier with a with a s of os at mular devis. Exp	ous with ucing real to scillativib	topol differ ginte time a tor c rator ike S in de	ogies rentia gratec applic ircuit circu CR, Tl	and ap I mode I circui ations. with fr its with RIAC, I	pplica resp it wit Intro eque h app DIAC ngle a	ntions oonse h vari oducir ency d olicati device and do	, More and so ous ef ng osci leterm ons. P es with	ve feed analys ome oth fective illators ination ower h opera	is of ner paran and and	and
4	Name(s) of Academic S			'	ТВА													
5	Semester a Year offere				Sem	ester	: 				II	Year:		I				
6	Credit Hou	r:			4													
7	Prerequisit requisite: (•			Elec	troni	cs cii	cuits	-I									
8	Course Lea	rnin	g Outcome (CLO): At the end of the course the student will be able to do:															
	CLO1																	
	CLO2	An	alys	is of	Diffe	rent	ial ar	nplifie	ers w	ith it	s appl	ication	ıs.					
	CLO3	Illı	ıstra	te th	e ch	aract	terist	ics of	oper	atior	nal am	plifier	s wit	h real	time e	example	es	
	CLO4	De	mon	strat	e th	e de	sign	of osc	illat	or ci	cuits,	multi	vibra	tor ci	rcuits	with e	xamp	
																ent fre	_	
	CLO5										s and lifiers		hara	cteris	tics, tı	ıned an	ıplifie	ers
9	Mapping of Assessmen		coui	rse L	earn	ing (Outco	mes t						eachi	ng Me	thodsar	nd	
	g		1	1		1	1		Stu	dent	Outco	mes (S	SO)					
	CLO									rr -	عام	Mall.	d c	Asse	essme:	nt	<u> </u>	
	Lear es (1	T	2	3	4	ъ	9	7		1 ea	cuing	Metho	uS	ory		ent	ш	am
	rse I	S01	S02	S03	S 04	S05	90S	S07		L	Т	P	0	rat		gnm	Exa] Ex
	Course Learning Outcomes (CLO)									ם	1	1		Laboratory	Quiz	Assignment	Mid Exam	Final Exam
	CLO1	V										√		1 √	$\sqrt{}$	1	✓	
	CLO2			1	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$													
	CLO3												V					
	CLO4																	
	CLO5							$\sqrt{}$		$\sqrt{}$	$\sqrt{}$					V		$\sqrt{}$
	Indicate th	e rel	evar	icy b	etwe	een t	he CI	.O and	1 SO	by tio	cking '	'√"on t	he a	pprop	riate i	relevan	t box	•

10	Transferable Skills (if				rhigh g	an ha ua	oful o	and utilized in oth	on acttings)	
	(Skills learned in the c	ourse						on and hardware		
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	3									
11	Distribution of Studen	t Loar	nina'	Timo	(CL T)					
11	Distribution of studen	Lear				d Learn	ίησ Δι	ctivities		Total
		CLO				earning		Guided	Independent	(SLT)
	Course Content	CLO		u	(F2	_		Learning	Learning	(SLI)
	Outline				(1 2	11)		(NF2F)	(NF2F)	
	Outline		I	_	Т	P	0	(111 21)	(11121)	
	Chapter 1:	CLO	1 /	lhr	6hr	6hr		1hr	4hr	21hr
	Feedback	CLO	1 -	r111	OIII	OIII		1111	4111	21111
	Amplifiers									
	1.1 Types of									
	feedback, basic									
	representation,									
	topologies.									
	1.2 Analysis of									
	feedback									
	amplifiers									
	1.2 Effect of									
	feedback on different									
	parameters									
	Chapter 2:	CLO		lhr	3hr	3hr		1hr	3hr	14hr
	Differential	2	•		0111	JIII				11111
	Amplifiers									
	2.1 Response for differential inputs									
	2.2 small signal									
	analysis									
	2.3 Common mode									
	rejection ratio,									
	Constant current									
	sources 2.4 Current mirror,									
	Level shifter									
	2.5 Buffer circuits,									
	Output driver circuit									
	Chapter 3:									
	Op-Amp	CLO	1	5hr	6hr	12hr		2hr	4hr	30hr
	Characteristics	3								
	and Applications 3.1 Introduction									
	3.2 The ideal									
	operational									

characteristics							
3.3 Different Op amp configurations and analysis							
Op amp applications Summer Difference Amplifier Integrator Differentiator Log and anti-log amplifier Inverse amplifier Voltage regulator							
Chapter 4: Oscillators & Wave shaping Circuits	CLO 4	6hr	6hr	9hr	2hr	6hr	29hr
4.1 Sinusoidal oscillators							
4.2 Design of oscillator circuits with different frequencies							
4.2 Wave form generator circuits-Schmitt triggers circuits							
4.3 Multi-vibrators							
4.4 Timer circuits							
4.5 Sample and hold circuits							
Chapter 5: POWER SEMI CONDUCTOR DEVICES	CLO5	6hr	3hr		3hr	8hr	20hr
5.1 Types of power semiconductor devices							
5.2 SCR construction and working with characteristic							
5.3 SCR applications							
5.4TRIAC construction, characteristic with applications.							

	5.5.DIAC											
	construction											
	characteristics w	ith										
	Applications.		OI OI		01			01		C 1	101	
	Chapter 6: Tuned and Pow	or	CLO5	6hr	3hr			3hr		6hr	18hr	
		er										
	amplifiers 6.1 Single and											
	double tuned											
	amplifier 6.2 Bandwidth,											
	parallel andserie	S										
	response	.5										
	6.3 Ideal band pa	ass										
	Amplifier											
	6.4 Classification	of										
	poweramplifiers	-										
	6.5 Analysis of											
	poweramplifiers											
	Т	otal									132h	.r
						Asses	sment					
	Continuous A	Continuous Assess			ercenta	ige	F2F		NF2	F	SLT	
				Т	otal-50([%)						
	1		Quiz		5%			1hr			1hr	
	2	Mi	d exan	ı	20%			2hr			2hr	
	3	Ass	ignme	nt	10%				1	8hr	18hr	
	4	Lab	orator	У	15%			2hr	2	2hr	4hr	
				l					l	Total	25hr	
	Final Exam		Perc	entage 5	0 (%)			F2F	NF2	F	SLT	
	Final Exam			50	%			3hr			3hr	
			1	Grar	nd Total	SLT	1		ı		160hr	
	L = Lecture, T = 7	Tutori	al, P =	Practica	l, O = Ot	hers,	F2F = F	ace to Fa	ce, NF2I	F = Non Fa	ace to FaceNo	te:
	indicates the CLO) base	ed on t	he CLO's	numbe	ring i	n item '	9.				
12	Special		1 :	simulatio	on lab							
	requirements an	d										
	resources to deli	ver	2	Compute	r lah							
	the course (e.g.		- '	Sompate	.1 100							
	software, compu	ter	3	Choose a	n item							
	lab, simulation			ciioose a	.ii ittilli							

	Roometc.	4	Choose an item
		5	Choose an item.
13	Text book and reference:	1	Jacob Millman– Integrated Electronics , McGraw-Hill series in electrical engineering,1St Edition.
	(note: ensure the latest edition	2	Microelectronic Device and Circuits-2006 Electronic Edition- Clifton G. Fonstad
	/publication)	3	Electronic devices and circuits, Bell A David

					Α	dan	ıa Sci	ience	and	Te	chno	log	y Un	iversit	y			
1	College: C									De	epartr	ner	nt: EC	Έ				
2	Course Ca		У	,	,		atory											
	Course Na						Syst	ems A	Anal	ysis	5							
	Course Co	de:		ECE	Eg-22	204												
3	Synopsis:			and	l sys	stem	s. To	pics	incl	ude	repi	res	entat	ions o	f linea	r time-in	ıvariar	ime signals nt systems, e response,
				_				_		-							_	analysis for
																to sampli		J
4	Name(s) o Academic		:														_	
5	Semester Year offer			Ser	nest	er:	II			Y	ear:	II						
6	Credit Ho	ur:		3														
7	Prerequis	ite/C	O-	App	plied Mathematics III- Math2101													
	requisite:	(if an	y)															
8	Course Le	arnin	ıg Oı	ıtcor	ne ((CLO)	: At t	he en	d of	the	cours	e tl	ne sti	ıdent v	vill be a	ble to do	:	
	CLO1	Rec	ogni	ze, s	ketc	h an	d mar	nipula	ite b	asic	signa	ıls (comn	nonly u	sed in	engineeri	ng app	olications
	CLO2							entia nd ste						g lineai	r, time	invariant	(LTI)	systems,
	CLO3	Exp	lain	matl	hema	atica								ain and	d time (domain ai	nalysis	}
	CLO4	Fou	rier	tran	sfori	n, aj	plica							nals an mpling		ms and e	valuat	e system
	CLO5	Dete	ermi	ine L	apla	ce tr	ansfo		with	the	ir pro	pei	rties l			oncept of	ROC a	nd relate
9	Mapping of Assessmen	of the												nes, Te	aching	Methods	and	
	g								S	tud	ent O	utc	omes	s (SO)				
	nin :L0														A	ssessmen	t	
	Course Learning Outcomes (CLO)	S01	S02	S03	S04	S05	90S	S07			hing nods		Test	Quiz	Assi gnm		Fina I	Exa m
	Cours		7,	7,	<i>•</i>	9,	,	3 ,	L	Т	P	0						

	CLO1					1	/ 1	\checkmark							\checkmark		
	CLO2		$\sqrt{}$			١	/ 1	$\sqrt{}$									
	CLO3	$\sqrt{}$	$\sqrt{}$			1	/ 1	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$					$\sqrt{}$		V
	CLO4		$\sqrt{}$			1	1	$\sqrt{}$	$\sqrt{}$								V
	CLO5		$\sqrt{}$			1	/ 1	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$						V
	Indicate t	he re	levan	icy b	etw	een the	e CLO	0 and	d SO	by t	ickin	g "ν	on'	the ap	propria	te relev	ant box
10	Transfera			_						-					-		
	(Skills lea						dy w	hich	can	be ı	ısefu	l and	d util	ized in	other	settings)
	-																-
11	Distributi	on of	Stud	ent	Lear	ning T	ime	(SLT	')								
								_		Tea	chin	g an	d Lea	arning	Activiti	es	Total (SLT)
							C	LO			ded			uided		epend	
	Course C	ontei	nt Ou	ıtlin	e				lea	rnir	ıg (F2	2F)	Le	arning		ent	
												,		NF2F)		arning	
														,	(NF	_	
									L	Т	P	0					
	Chapter 1	:					-	0.1	2h				43		-1		10hr
	Introduc						CL	ـ01	r	-	-	-	1hr		5hr		
	1.1 Int	trodu	ction	to s	igna	l and											
	systems				O												
		gnal ı	repre	sent	tatio	n											
		<u>l</u> assif							2h								
					- 0				r								
	1.4 Ba	sic Si	gnals	5													
		erati			ignal												
	Chapter 2																24hr
	Time-Do		Ana	lysi	s of		CL	٠02	2h	2	_	_	2hr		12h	r	
	Continuo	us-T	ime S	Syst	ems				r	hr							
	2.1 System	m Re	spon	se to	o Int	ernal											
	Condition	ıs: Ze	ro Inj	put l	Resp	onse											
	2.2 The U	nit In	ıpuls	e Re	espoi	ıse											
	2.3 Syster		_						2h	2							
	Response		•						r	hr							
	2.4 The Co																
	2.5 Interc																
	2.6 Total																
	2.7 Differ					ce ea			2h								
	uation of					1			r								
	Chapter 3		,				- CT	00	2h				21			21.	22hr
	The Four			CL	703	r		-	-	2hr			.2hr				
	3.1 Introd	luctio	n							2							
										hr							
	3.2 Expon	entia	l forr	n of	Four	rier											
	series																
	3.3 Trigo	nome	tric f	orm	of F	ourie			2h								
	r series								r								
	3.4 Prope	rties	of Fo	urie	r Sei	ries											
	3.5 Relati								2h								
			1							l		1	1				l .

Fou	onometric and exponen rier series			r						1		
The	oter 4: Fourier Transform		CLO4	2h r		-	-	2hr			11hr	21hr
Sign					2 hr							
	The Fourier Transform odic Signals	for		2h r								
	Properties of The Fourionsform	er										
of L	Analysis and characteri: II system in FT			2h r								
	nverse Fourier Transfo	rm										
	oter 5: pling: Discrete Time als		CLO4	2h r		-	-	2hr			5hr	13hr
5.1	Introduction to Sa orem	mpling										
5.2 \$	Signal Reconstruction			2h r								
5.3	The Effect of Under San	pling			2 hr							
The	oter 6: Laplace Transform		CLO5	2h r		-	-	2hı	r		5hr	15hr
	The Laplace Transform											
	The Region of Converge	nce		2h								
	Laplace Transforms			r	2							
6.3 3	Some Laplace Transfor	n Pairs			2 hr							
	Property of Laplace Isform											
6.5 I	nverse Laplace Transfo	rm		2h r								
		Total		-								105hr
			I	A	ssess	sme	nt					1
Cont	tinuous Assessment		entage [Γotal	-50(9	%)	I	F2F	NF2	2F		SLT
1	Quiz	5%										hr
2	Test	109						√				.5hr
3	Assignments I	5%						,		V		hr
4	Mid exam	20%						√		,		hr
5	Assignments II	100	% 0						m	√ otol		.5 hr
Cinc	l Evom	Domas	ntage 50	0 (0/3	<u> </u>		г	2F		otal VF2	1	2hr SLT
				U (%)	'		<i>r</i>	۷۲ 		F F		
Fina	l Exam						√	7 1	Tr - 1	CI T		3hr
	Lecture, T = Tutorial, P	- ·	1.0	2.1					Total			20hr

12	Special	1	MATLAB
	requirements and resources to deliver	2	computer lab
	the course (e.g.	3	Choose an item.
	software, computer lab, simulation roometc.)	4	Signals and Systems, Second Edition, Simon Haykin and Barry Van Veen, John, Wiley & Sons, 2003
13	Text book and reference:	1	Oppenheim, Alan V., Willsky, Alan S. with Nawab, S. Hamid <i>Signals & Systems</i> , 2nd Edition, Prentice-Hall 1997,
	(note: ensure the latest edition	2	Lathi, B. P. <i>Linear Systems and Signals</i> , 2nd Edition, Oxford University Press, 2005
	/publication)	3	M.J.Roberts, "Signals & Systems Analysis using Transform Methods & MATLA B", Tata McGrawHill, 2007.

				Adama Sci	ence ai	nd Techn	ology Uni	versity			
1	Colleg	ge: COEEC				Depar	tment: EP	CE			
	Cours	e Category	Basic I	Mandatory De	partme	nt Req.					
2	Cours	se Name	Electr	omagnetic Fi	elds						
	Cours	se Code:	EPCE2	202							
3	Synop	osis	Electri Magne	c Fields in	Mater s, Magr	ial Body etic Forc	r, Electro es & Mate	nd vector fields, Electrostatic Fields, estatic Boundary-Value Problems, erials, Forces due to Magnetics and Fields			
4	Staff:	e(s) of Acader									
5	Semester/Year offered: Semester: II Year 2										
6	Credi	t Hour:		3 (2hr Lectu	re, 3hr	Laborator	y)				
7	Prere	quisite:		Maths2101							
8	Stude		` /	lopted from A							
	S01	-		y, formulate, a eering, science		_	_	ring problems by applying			
	SO2	considerati	on of pu		fety, an			that meet specified needs with s global, cultural, social,			
	S03	An ability to	o comm	unicate effecti	vely wi	th a range	e of audien	ices.			
	S04	make inform	ned jud		n must o	consider t	•	ties in engineering situations and of engineering solutions in global,			
	S05	a collaborat	tive and	inclusive env	ironme	nt, establi	ish goals, p	together provide leadership, create plan tasks, and meet objectives.			
	S06	and use eng	gineerin	g judgment to	draw c	onclusion	S	tion, analyze and interpret data,			
	S07	strategies.						sing appropriate learning			
9	Cours							ent will be able to:			
	CLO1	Apply the l	oasic co	ncept of vecto	r algebi	ra to quan	itify the el	ectrical effects of static charge			

		distril																				
	CLO2	Apply	the	laws	s gov	erni	ng el	ectr	ostat	ic to	diffe	ren	t ch	arge	distri	butior	ıs					
	CLO3	Quant	ify a	nd e	xpla	in th	e eff	ects	of ch	arge	s mo	vin	g w	ith ui	niforn	ı velo	city					
	CLO4	Apply	the	laws	gov	erni	ng M	lagn	etost	atic t	o dif	fere	ent (Curre	ent car	rying	cond	uctoi	geome	try		
	CLO5	Discu	ss el	eme	nts c	of ele	ctro	dyna	mics	and	sum	mai	rize	elect	roma	gnetis	m th	rough	Maxwe	ell's		
	CLUS	equat																				
	CLO6	Discu	ss ho	w to	o ger	ierat	e Tii	ne V	'aryiı	ng ele	ectro	mag	gne	tic fie	elds							
10	Mappir	ng of th	ie co	urse	lear	ning	out	com	es to	the S	tude	ent (Outo	come	s. Tea	ching	Meth	ods,	and			
	Assessi	_					,								·	Ü		ĺ				
	1g ((Stu	dent	t Ou	tcon	nes (SO)															
	nin XLC															As	ssessi	nent				
	ear s ((Teac	_					nt		rt	n	ш		
	e L. me	S01	S02	S03	S 04	S05	90S	S07		Meth	ioas		١,	3ť	ZI.	me	ect	od	хаг	жа		
	ars Eco	S	S	S	S	S	S	S					E	ıest	n)	ign	roj) re	d e	al e		
	Course Learning Outcomes (CLO)								L	T	P	0			e useful and utilized in other settings) Time (SLT)							
	CLO1	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$																				
	CLO2		-	-	_	<u> </u>		,	٠,		-	-		-	,		-	-	-			
	CLO3		-	-	-				V	√	-	-		-	$\sqrt{}$	$\sqrt{}$	-	-	-	V		
	CLO4	V	-	-	-				$\sqrt{}$		-	-		$\sqrt{}$	-		-	-	-	-		
	CLO5	V	-	-	-				$\sqrt{}$		-	-		$\sqrt{}$	-	$\sqrt{}$	$\sqrt{}$	-	-	-		
	CLO6																					
		dicate the relevancy between the CLO and SO by ticking " $$ " on the appropriate relevant box																				
10	Transfe	rable S	kills;	(Ski	lls le	arne	d in t	he co	urse	of stu	dy w	hicl	ı caı	n be u	seful a	ınd uti	lized i	n oth	er settin	gs)		
11						Dis	trib	utio	n of	Stud	ent l	Leai	rnir	ng Ti	me (S	LT)						
																ng Act	ivities	5				
									CLO			ded			ided		epend		Total	(SLT)		
		Course	e Cor	nten	t Out	line					lear	ning	5	Lea	rning		arnir					
												2F)	•	(N	F2F)	(NF2F)				
										L	Т	P	0									
			hapt						CLO	$1 \mid 4$	6				6	4			20)hr		
	11.0	Rev																				
	1.1. Sca																					
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	1.3. Lir				olum	16																
		egrals		α v ι	orum	ic																
	1.4. Gr	_		Scal	ar fi	eld.																
		vergen				•	ctor															
		eld, the																				
	Sto	okes's '	Thec	orem	ıs																	
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			hapt			da			CLO	2 4	6				5	5			20	hr		
) 1 T	Elect		latic	riel	us																
	2.1. Int	.rouuci	uon																			

	T				Т	T	
2.2. Coulomb's Law, Electric Field							
and Electric Flux Density							
2.3. Gauss's Law							
2.4. Electric Potential; Relationship							
between Electric field & Electric							
Potential							
2.5. Electric Dipole;							
2.1. Energy in Electrostatic Fields							
Chapter Three:							
2.2. Electric Fields in Material	CLO3	4		6	5	5	20hr
Body							-
3.1. Introduction							
3.2. Properties of materials							
3.3. Convection and conduction							
currents							
3.4. Conductors							
3.5. Polarization in dielectrics							
3.6. Dielectrics constant and							
strength							
3.7. Linear, Isotropic and							
homogeneous dielectrics							
2.3. Boundary conditions							
Chapter Four							
Magneto static Fields	CLO4	4	6		3	2	15hr
4.1. Biot-Savart Law and Ampere's							
Circuital Law							
4.2. Magnetic Flux Density							
4.3. Magnetic Vector Potential							
3.1. Maxwell's Equation for Static							
Electromagnetic Fields							
Chapter Five							
3.2. Magnetic Forces & Materials	CLO5	4	6		2	3	15hr
5.1 Introduction					_		
5.2 Forces due to magnetic Fields							
5.3 Magnetic torque and moment							
5.4 Magnetic dipole							
5.5 Magnetization in materials							
5.6 Classification of magnetic							
materials							
5.7 Magnetic boundary Conditions							
5.8 Magnetic Energy							
3.2.1.1. Faraday's Law of Magnetic							
Forces and Materials							
Chapter Six							
Introduction to Time Varying	CLO6					2	
Electromagnetic Fields	CLOO	2	3		3		10hr
6.1. Introduction							
6.2. Time varying electric and							
magnetic fields							
6.3. Interaction of time varying							
o.o. interaction of time varying							

				agnetic f	elds									
		Continui												
			-	iditions f										
	V	arying 6	electr	omagnet										
					Total									100hrs.
						A	Asses	ssme	ent					
	Conti	nuous A	Assess	sment	Perce	ntage To	otal-	50(9	%)		F2F	NF	2F	SLT
	1	Quiz				5								1hr
	2	Prese	ntatio	n		5								4hr
	3	Assign	nment	t(s)		10						٧	/	8hr
	4	Test(s	s)			10								2 hr
	5	Mid E	xam			20								2hr
		•			•					•		•	Total	17 hrs.
	Final	Exam			Perce	ntage 50	0 (%))			F2F	NF	2F	SLT
	Final	Exam				50								3 hrs.
												Grand Tot	tal SLT	120hrs.
	$L = L_0$	ecture, '	T = Tu	itorial, P	= Practical,	0 = 0th	ers,	F2F	= F	ace to	Face,	NF2F = No	on-Face	to Face
12	Speci	al requi	ireme	nts and r	esources to	deliver	the	coui	se	(e.g.				
	_	•			nulation ro									
13	m .	1 1	1	Matthe	w N. O. Sad	diku, Ele	emer	nts (of E	Electro	omagr	etics, Oxfo	ord Uni	versity Press,
	Text	book	1		k, 2001.	•					5	•		,
			1		.H., Engine	ering El	ectro	oma	gne	tics, 8	8th ed.	, McGraw-l	Hill, 201	2.
	Refe	rence:	2											tice-Hall, Inc.,
	Polic	ies		1999.										

Policies

14 | Grading Policy

Grading of the course will be according to the university's rules and regulation.

Academic Integrity

ASTU values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism, and other academic offences under the Code of Student Conduct and Disciplinary Procedures.

Referencing style

The department of Electrical Power and Control Engineering advises students to use the "IEEE Referencing Style" for written work and oral presentations. However, students are permitted to use other recognized styles that appear in the Engineering literature.

Other Requirements

Students must attend at least **80% lecture** and **100% tutorial/Labratory** sessions except for some unprecedented mishaps.

This course is a basic course for other upcoming courses. Students are expected to attend all classes regularly and study from text books once the topic is discussed in classes. Students are advised to prepare for classes by reading the available materials before coming to classes and participate actively to enhance better understanding of the course and attain the learning outcomes.

There have been many reference books proposed for each topic which will be discussed in class. Students are encouraged to read and prepare based on the additional materials.

Irrespective of continues assessment result, a student must score a minimum of **40%** of the **final exam** to pass the course. (E.g., if final exam is out of **50** a student must score a minimum of **20**

						Ac	lama	a Sci	enc	e a	nd T	Гесhn	ology	Un	nivers	sitv				
1	College:	COEE	EC													· J				
	Course C			Ma	jor l	Mano	lato	ry												
2	Course N			En	gine	erir	ıg Aj	pplic	cati	on S	Soft	rogramming/simulation methodology Forms whose solutions can be found allowed by the solutions can be found allowed by the solution of the solution outcomes. The solution outcomes application software. The solution outcomes application software application software. The solution outcomes application software								
	Course C	ode:		EC	Eg2	208							the various engineering application software ronics and communication engineering. The ning are illustrated with emphasis on features ion systems problems. Introduction: Matlab signment, operations on variables, relational ons on vectors and matrices, data types and LAB: MATLAB scripts, decision and loop ays, structures sorting and indexing. Plotting, functions and customizing tools. Advanced all functions, fitting data to a curve, system of LAB. Discrete Time Signal and Systems with tions on signals, discrete time systems (LTI) 2 e the student will be able to: ing application software. In Learning outcomes. In Learning Outcomes, Teaching Methods, and Indexing outcomes, Teaching Methods, and Indexing outcomes, Teaching Methods, and Indexing outcomes, Indexing outcomes, Teaching Methods, and Indexing outcomes, Indexing outcom							
3	Synopsis			tha fur tha de: and cas sta Fil- Ma lin	nt andam nt an skto d nu sting tem e in ear	re in nentare aperior	use als o plic viro ical ogra Dat outp cswi	in to the state of the second	the to nt, essing uct using ATI	field converse ware and consumer with the consumer of the cons	d of programmic of the plant of	elect gramm unicati es ass peratio MATI ell arra ting f tistica	ronics ing ar ion sy ignme ons or AB: ays, st function LAB. I	are in the control of	nd co llustrems p oper ectors TLAF ctures and ns, fit crete	mmur ated worobles rations s and B scri s sorting custo ting da	nication with ems. In the son matricular mat	on en mpha ntrod varia ices, d decis d ind ng to a cur al and	aginee: asis on actior bles, 1 data t cion a exing. ools. A	ring. The a features as Matlab relational ypes and and loop Plotting, Advanced stem of ems with
4	Name(s) Staff:				<u> </u>							7	Lal							
5	Semester	•	ar off	erec	1:		este	er:	II		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	ear_	2							
6	Credit Hour: 1 Prerequisite: None																			
7	A .																			
9	Course Learning Outcome (CLO): At the end of the course the student will be able to:																			
	CLO1 Identify and familiarize with important engineering application software. CLO2 Discuss the basic features and recall the programming/simulation methodology of engineering application software.																			
10	Mapping	of th														comes	, Tea	ching	Meth	ods, and
	Assessm		<u> </u>		L = .		CO													
	ing O'	Stu	dent	Out	con	ies (SUJ									Λ.	ccocci	mont		
	arn (CI											_					336331			С
	e Le	S01	S02	S03	S 04	S05	90S	20 <i>S</i>		M	ethc	ds	یب ا		Z	mer	ect	por	xam	xan
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	Course Learning Outcomes (CLO)								L	T	P	0				Ass	Ь	Lal	Mi	Fin
	CLO1	$\sqrt{}$						V					√	_	_		V		V	√
	CLO2		$\sqrt{}$,		V			√		_			√ ,	<u> </u>	$\sqrt{}$
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11	Distribution of Student Learning Time (SLT) Teaching and Learning Activities										
				Τe	achi	ng a	nd Learnin	g Activities			
		CLO		Gu	ided		Guided	Independent	Total (SLT)		
	Course Content Outline		l	ea	rning	5	Learning	Learning			
			([F2			(NF2F)	(NF2F)			
			L	T	P	0					
	Chapter 1				_				3hrs		
	Introduction	CLO1	1		2h						
			h		rs						
	117 0		r								
	1.17. Overview of Engineering										
	Application Software 1.18. Features of Engineering										
	1.18. Features of Engineering Application Software: MATAB,										
	Proteus, PSpice, µVision, Xilinx								ļ		
	ISE										
	1.19. Application Examples of										
	selectedengineering Softwares										
	Chapter 2	CLO2	3		2h		5hrs	2hrs	12hrs		
	Introduction to MATLAB		h		rs						
			r								
			S								
	2.1 The MATLAB Desktop										
	Environment										
	2.2 Variables and Assignment										
	Statements										
	2.3 Numerical Expressions										
	2.4 Relational Expressions										
	2.5 Built-in Numerical Functions										
	2.6 Vectors and Matrices										
	Scalar and Array Operations on										
	Vectors and Matrices										
	3.4. Matrix Multiplication										
	2.7 Data Types and Type Casting										
	String Variables, Operation on Strings Conversion between String										
	and										
	Number Types										
	Chapter 3		3					5hrs	15hrs		
	Introduction to Programming	CLO3	Н		2h		5Hrs	51115	151115		
	Using MATLAB	GLOS	r		rs		01110				
	3		S								
	3.1 MATLAB Scripts										
	3.2 Scripts with Input and Output										
	3.3 User-Defined Functions th										
	at Returna Single Value										
	3.4 Selection Statements										
	 The if Statement 										
	 The if-else Statement 										

• Nested if-else Statements							
The Switch Statement							
3.5 Loop Statements							
The for Loop							
Nested for Loops							
 While Loops 							
 Loops with Vectors and 							
Matrices		_					
Chapter 4 Data Structures		2	3			5Hrs	15hrs
	CLO3	h	h	ır	5 Hrs		
		r					
4.1.Call Assessed		S					
4.1 Cell Arrays 4.2 Structures							
4.3 Sorting							
4.4 Indexing	1	2	H.,)]_			
Chapter 5		2 b		3h			
Plotting, File Input and Output		h	r	'S	4 hrs	6hrs	15hrs
	CLO4	r s			4 111 8	OIIIS	151118
5.1 Plotting Functions and Customizi	CLU4	3					
ngPlots, Saving and Printing Plots							
5.2 3D plots							
5.3 Core Graphics Objects			H				
 Plotting from a Function 							
Plotting File Data							
5.3 Writing and Reading Spreadsheet							
Files							
5.4 Lower-Level File I/O Functions							
Chapter 6	CL	3	2	2			15hrs
Advanced Mathematics With MAT	02	Н	ŀ	Ir	5Hrs	5Hrs	
LAB	,	r	s	;			
	CLO3	S					
6.1 Statistical Functions							
6.2 Fitting Curves to Data							
6.2 Matrix Solutions to Systems ofLin							
ear Algebraic Equations							
6.3 Calculus: Integration andD							
ifferentiation	0.00			\perp	61		0.07
Chapter 7	CLO3	2	3		8hrs	7hrs	20hrs
Discrete Time Signal and Systems		h		Ir			
with MATLAB		r	S				
7.1 Discrete time signal sequences:	-	S					
7.1 Discrete time signal sequences: 7.2 Operations on signal sequences:	-		\vdash	+			
7 . L ODCI AUDIIS DII SIEHAI SCUUCHCES.	-		\vdash				
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7.3 Discrete Time Systems 7.4 Discrete Time FourierTransform							

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	Continuous	Assessr	nent	Percentage 7	Γotal-5	50(%)	F2F	NF2F	SLT				
	1	Quiz		Ĺ	5		1hr		1hr				
	2	Lab		1	0		5hr	3hr	8hr				
	3	Assign	ment	1	0		1hr	10hr	11hr				
	4	Mid Ex	am	2	5		2hr		2hr				
								Total	Total				
	Final Exam			Percentage 5	50 (%)		F2F	NF2F	SLT				
	Final Exam			50			$\sqrt{}$		3 hrs.				
				rand Total SLT	120hrs.								
	L = Lecture,	T = Tut	orial, P =	Practical, 0 = 0t	hers, l	F2F = Face	to Face, NI	F2F = Non-Face	to Face				
12	Special requ	iremer	ts and re	esources to	1	Compute	er Lab						
		•	_	vare, computer	2	MATLAB	Software						
1.	lab, simulati	on roo	metc.)		3								
13		1	A Praction	cal Introduction	to Pro	gramming	and Probl	em Solving, Sto	ormy Attaway,				
			Boston I	Jniversity, Fourtl	h Editi	on		_					
		2	MATLAE	Recipes, A Prob	lem-S	olution Ap	proach, Mi	chael Paluszek	and Stephanie				
	Text book		Thomas, Apress										
	Reference:	3	BookWare Companion Series										
		4 Modeling and Simulation of Systems Using MATLAB and Simulink, Dvendra K. Chaturvedi, CRC Press											

				Adama Sci	ence an	d Techn	ology Unive	ersity					
1	Colleg	ge: COEEC				Depar	tment: EPCI	E					
	Cours	se Category	Major	Mandatory									
2	Cours	se Name	Comp	utational Met	hod								
	Cours	se Code:	Math-2	2103									
3	Synop	osis	error nonlin	analysis, rev	iew of approxi	matrices mation a	s, solution	s: - Number system and numerical of linear equation, solution of lation techniques, and numerical					
4	Name Staff:												
5	Seme	ester/Year offered: Semester: II Year 2											
6	Credi	t Hour:		3 (2hr Lectur	e, 3hr L	aborator	y)						
7	Prere	quisite:		Maths2101									
8	Stude	nt Outcome	(PO): Ac	lopted from Al	BET								
	SO1			y, formulate, a eering, science		•	_	ng problems by applying					
	SO2	An ability to apply engineering design to produce solutions that meet specified needs with											
	S03	An ability to communicate effectively with a range of audiences.											
	SO4	-	_		•		•	es in engineering situations and f engineering solutions in global,					

		ec	onon	nic, e	envii	ronn	nent	al, ar	nd sc	ocietal	con	texts	S.								
	S05													nen	nber	s toge	ther p	rovid	le lea	dership	, create
														_		_				objectiv	
	S06									t appi draw					nent	ation,	analy	ze an	d inte	rpret d	ata,
	CO7									ew kn					ded,	using	appro	priat	e lear	ning	
	S07	str	ateg	ies.																	
9	Course																			0.0.	
	CLO1		iscus ompi			ent ty	pes	of e	ror,	Signi	ticar	it fig	ure	s, ar	ıd nı	ımber	repre	esenta	ation	&Stora	ge in
	CLO2	D	iscus	ss ba	sic c	conc	epts	of m	atrio	ces											
	CLO3		evelonetho		prog	gram	tha	t wil	l sol	ve line	ear e	equa	tion	s us	ing (direct,	matr	ix, and	d iter	ative so	lution
	CLO4	Ic	lenti	fy ar								neth	ods	for	the	deteri	ninati	on of	the r	oots of	an
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1.22. Representation of Integers						
and Fractions						
1.23. Number Representation and						
Storage in Computers						
1.24. Source of errors and types of						
errors						
1.24.1. Round-off error and						
Truncation Error						
1.24.2. Error propagation						
1.25. Algorithm for Conversion						
from one base to another						
1.26. Computational Problems and						
Algorithms						
1.27. Computational Efficiency						
1.28. Computational Methods for						
•						
Error Estimation (absolute						
error, relative error and						
percentage error)						
Chapter Two:	CLO2	2	3	1		6hrs.
Review of Matrices				_	2	
2.4. Elementary Properties of						
Matrices;						
2.5. Orthogonality and Ortho						
normality of Vectors and						
Matrices;						
2.6. Norm of Vectors and Matrices,						
System of Linear Equations						
Chapter Three:					4	
Solution of system of linear	CLO3	4	6	4		18hrs.
Equations						
3.3. Introduction						
3.4. Existence and Uniqueness of						
Solutions						
3.5. Methods of Solution of Linear						
Equations						
3.5.1. Direct method						
3.5.1.1. Elimination Method						
3.5.1.2. Substitution Method						
3.5.1.3. Cross multiplication						
Method						
3.5.2. Matrix Method						
3.5.2.1. Crammer's Rule						
3.5.2.2. Gauss Elimination Method						
3.5.2.3. Gauss-Jordan elimination						
Method						
3.5.2.4. LU decomposition						
3.5.3. Iterative methods						
3.5.3.1. Jacobi Iterative Method						
3.5.3.2. Gauss-Seidel Iterative						

	26.1.1		1		1		
	Method						
	3.5.3.3. SOR method						
	Chapter Four:			_	_	_	2.13
	Solution of Nonlinear	CLO4	4	6	5	6	21hrs.
-	Equations						
-	4.1. Introduction						
	4.2.Root finding methods						
	.2.1. Bracketing method						
	4.2.1.1. Graphical Method						
	4.2.1.2. Bisection Method						
	4.2.1.3. False -position Method						
	4.2.2. Open Methods						
	4.2.2.1. Simple Fixed-point						
	Iteration method						
	4.2.2.2. Newton-Raphson Method						
	4.2.2.3. Secant Method						
	4.3. Multiple Roots						
Ī	4.4. Roots of Polynomials						
	4.4.1. Convectional Method						
	4.4.2. Muller's Method						
•	Chapter Five:	CLOF	4		-	6	241
	Interpolation and Approximation	CLO5	4	6	5		21hrs.
•	5.1.Introduction						
•	5.2.Class of Common Approximation						
	Functions						
•	5.3.Criteria for the Choice of the						
	Approximate Function						
•	5.4.Piecewise Polynomial						
	Approximation;						
•	5.5. Curve fitting						
	5.5.1. Least –Square regression						
	5.5.1.1. Linear regression						
	5.5.1.2. Polynomial regression						
	5.5.1.3. Multiple regression						
	5.5.2. Interpolation						
	5.5.2.1. Newton's Divided –						
	Difference						
	5.5.2.2. interpolating polynomial						
	5.5.2.3. Lagrange interpolating						
	polynomial						
	5.5.2.4. Cubic Spline Interpolation						
	Chapter Six:						
	Numerical Differentiation and	CLO6	6	9	3	5	23hrs.
	Integration						
-	6.1. Numerical Differentiation and						
	Integration						
	6.1.1. Numerical Differentiation						
	6.1.1.1. High –Accuracy						
	Differentiation formula						
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	6.1.1.2. Rio	charde	on Evtran	olation									
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	6.1.2. Newto		tes mitegra	ation									
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	6.1.2.1. Th			uie									
	6.1.2.2. Sir			,									
	6.1.2.3. Int			nequal									
		gment											
	6.2. Numeri												
	Differen	itial Ed	quations										
	6.2.1. Ordii	nary D	ifferential										
	Equat	ions											
	6.2.1.1. Eu	ler 's I	Method										
	6.2.1.2. Ru	nge-K	utta Meth	ods									
	6.2.2. Parti	al Diff	erential Ed	quations									
	Fir	nite Di	fference: I	Elliptic									
	Eq	uation	IS										
	6.2.3. Finite	e diffei	rence: Para	abolic									
	Equa	tions											
	6.2.3.1. Ex	plicit l	Methods										
	6.2.3.2. A S			lethod									
	6.2.3.3. Th	e Cran	k-Nicolso	n									
	Mε												
	6.2.4. Finite	e –Eler	nent meth	od									
	6.2.4.1. On	e -Din	nensional	Problem									
	6.2.4.2. Tw	vo - Dii	mensional										
	Pro	oblem											
				Total								97 hrs.	
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	1		nments		10					√	V	8hrs.	
	2		eport		15					√	V	8hrs.	
	3	Mid E	Exam		25					<u>√</u>		2hrs.	
											Total	18 hrs.	
	Final Exam			Percer	itage 50) (%)				F2F	NF2F	SLT	
	Final Exam				50					√		3 hrs.	
											Grand Total SLT	120hrs.	
	L = Lecture,	$T = T\iota$	ıtorial, P =	Practical,	0 = Oth	ers, I	F2F	= Fa	ace to	Face,	NF2F = Non-Face	to Face	
12	Special requ	ıireme	nts and re	sources to	deliver	the c	cour	se (e.g.	1	Computer lab		
	software, co	mpute	er lab, sim	ulation roc	meto	:.)				2	MATLAB simulat	ion software	
13			Channa ('C and Car	ala D D	"NI.	1100.0	ni aa	l Mat				
13	Text book	ook 1 Chapra C.S. and Canale P.R., "Numerical Methods for Engineers with Programming and Software Application											
		1				orico	1 1/1	+h o	dem	rith Ma	tlab, Prentice Hall	1 2000	
		2											
								_			ics, 9th edition, Wi	_	
	D - C	3		. w. & cn	urcniii,	K. V	, Co	mp	iex v	ariabi	es and Applicatio	ns, /" eartion,	
	Reference:	1	2003	Change	'omport	ation.	al	o+l-	oda (for an -	tingors Eth adition		
		4									gineers,5 th edition.		
		5		4 & P. Kabi	nowitz	A F1	rst (oui	rse ir	ı Num	erical Analysis, 2 nd	ea, McGraw	
			Hill,										

6	Mohammed Abdo, Introduction to Computational Methods.
7	Jain M.K., S.R.K. Iyenger and R.K. Jain: Numerical Methods for Scientific and Engineering Computation, 2 nd ed, Wiley Eastern Ltd., 1985

	Adama Science and Technology University College: Applied Science Department: Mathematics															
1	College: A	ppl	ied S	cie	nce					De	epar	tmen	t: Mather	natics		
2	Course			Ba	isic l	Man	dato	ory								
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3	Synopsis:															spaces and linear
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4	Name(s)	of.								e Em		103616	iction pro	acticca	III IIIOGCI	in mathematics today.
1	Academic		ff:	וטו	· mai	ica i	Turre	ic, 11.	SHar	C LIII	ana					
5	Semester			Se	mes	ter	II			1	Year	: 2				
	Year offer	ed:			:											
6	Credit Ho	ur:		3						•		•		•		
7	Prerequis	•		No	ne											
	Co-requis	ite:	(if													
	any)	Learning Outcome (CLO): At the end of the course the student will be able to:														
8	Course Le	earn														
	CLO-1 Understand and apply basic ideas of Vector Algebra and Matrix Algebra to mathematical and															
		physical problems														
	CLO-2	So	Solve systems of linear equations using Gaussian Elimination method and Cramer's rule													
	CLO-3				e row reduced echelon form of a matrix and also able to find eigen -value(s) and											
	OT O 4			vector of a square matrix. stand the concept of a vector space over a field.												
	CLO-4	Ur	ider	stai	nd tr	ie co	nce	ot of	a vec	tor s	расе	over	a field.			
9	Mapping	of th	വക സ	urc	م ا م	orni	nσΩ	utco	mesi	to the	s Stii	dente	s Outcom	е Тезс	hing Met	node and
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	Course Learr Outcomes (C	S0-1	S0-2	SO-3	S0-4	SO-5	9-0S		Meth	ıods				Assignment		Lab-report
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0	(Skills lea							ıdv w	hich	can l	be 11	seful	and utili:	zed in c	ther setti	ngs)
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	1	Computation skills								
	2	Ability or skill to ha	ndle abstr	act th	inkin	g or	met	hods in mathe	ematics	
	3etc.									
1	Distribut	ion of Student Learni	ng Time (SLT)						
1	Course C	ontent Outline	CLO	Guio	Tea ded le (F2I	arn		nd Learning A Guided Learning (NF2F)	Independent Learning (NF2F)	Total (SLT)
				L	Т	P	0	(141 21)	(141 21)	
	Chapter	1: Vectors	CLO 1	3	2			`	1	6
		etric and Co- representation of		1	1					
	1.2 Lines	and Planes		1	1				1	
		Cross – product		1						
	Chapter	2: Vector Spaces	CLO-4	6	4			1	3	14
	Examples			1						
	2.2 Subs			2	1				1	
		r combinations and		1	1				1	
		ar dependence and lence of vectors		1	1				1	
		and dimension of a		1	1				1	
		3: Matrices	CLO-2 & CLO-3	9	6			1	3	19
	3.10pera	tions with Matrices		1	1					
		al Types of Matrices		1						
		singularity		`1	1				1	
		entary Row and operations on		3	2				1	
	3.5 Rank	of a Matrix		1						
	of linear	cations to Systems Equations		2	2				1	
	Chapter 4: Determinants		CLO-2	9	6			1	3	19
	Examples			1						
		ctors and minors		3	2				1	
	4.3Deter	minants of n × n		2						

	mat	rices												
	4.4	Adjoint of a Matr	ix			2	2				1			
	4.50	Cramer's Rule				1	2				1			
		pter 5: Linear nsformations			CLO-1 & CLO-4	9	6			1	4	20		
	5.11	Definition and Ex	kamp	les	GEO 1	1								
	5.2	Kernel and Imag	e			2	1				1			
		The space of Line opings	ear			2					1			
		Inverse of Linear opings	•			2	2				1			
	5,5Î	Linear Mappings ociated with a Ma				2	3				1			
		pter 6: Eigenva Eigen Vectors	lues	3	CLO-1 & CLO- 3	6	4			1	2	13		
	6.1	Introduction			3	1								
		The Eigen space ar operator	of a			2	2				1			
	6.3	Eigenvalues and envectors of a Ma				3	2				1			
	8-			Γotal		42	28			5	16	91		
	Con	tinuous Assessm	nent		Percentag		Asse	F2F		NF2F		SLT		
	1	Quizzes (2)			10	<i>7</i> 0)		√				1		
	2	Tests (2)			20					I		3		
	3	Assignments			15 5			2/		1/		12 10		
	5	Project Choose an item	1.		<u>J</u>			V		V		10		
					Tota	al						26		
	Fina	al Exam		Pe	rcentage 5 (%)	50		F2F	1	NF2F		SLT		
	Fina	al Exam			50		$\sqrt{}$					3		
	, ,		. 1	D D	1.6	<u> </u>	, ,	EQ E		Grand Total		120		
		Lecture, T = Tuto e: indicates the (∠r = Non Fac	e to race		
1	Spe	cial	1	Softv	ware (Mat	hema	atica c	r M	aple)					
2	requ	uirements and	2		Computer Lab									
		ources to ver the course	Choose an item.											
		software,	Choose an item.											
	com	iputer lab, ulation room	Choose an item. Choose an item.											

1	Text book and	1	An Introduction to Linear Algebra (DemissuGemeda, AAU press)
3	reference:	2	Linear Algebra, 3rd edition(Serge Lang)
	(note: ensure the latest edition	3	
	/publication)		

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1	C 11	C PPC	Ad	ama Science and					
1	College:	COEEC	T		Departmen	t: ECl	년 		
2	Course		Major Mand	atory					
	Category								
	Course N	lame	Digital Logic	c Design					
	Course C	Code:	ECEg3201						
3	Synopsis	S:	In this cour	se, students wil	l study vario	us di	gital logic fa	milies such	as TTL, ECL,
				the logic gates ur					_
			used to im	plement them.	Subsequently	, the	ey will learn	Boolean a	llgebra, logic
			expressions	, number syste	ms and con	nbina	tional logic	design, in	cluding logic
			minimizatio	n and hazards.	In addition,	with	the understa	anding of co	ombinational
			logic design	n, students will	learn how	to d	esign seque	ntial systen	ns, including
			analysis of	the behavior of	synchroniza	tion	elements an	d system ti	ming design.
			_	nis course, stude			_	_	
			out experim	ents with compo	nent-level de	vices	s and designi	ng digital sy	stems.
4	Name(s)	of							
	Academi	ic Staff:							
5	Semester	r and	Semester:	I	Year:	III			
	Year offe	ered:							
6	Credit H	our:	4						
7	Prerequi	isite/	ECEg2201 E	Electronics Circui	ts I				
	Co-requi	isite: (if							
	any)								
8	Course L	Learning (Outcome (CLO	O): At the end of	the course th	e stu	dent will be a	ble to do:	
	CLO1	Disting	uish the analo	og and digital sys	tems and app	oly po	ositional nota	itions, numb	er systems
				in digital system					
	CLO2	Unders	tand the conc	epts of a logic ga	tes to constru	ıct va	arious logic ci	rcuits	
	CLO3								
	CLO4	Design	and impleme	nt combinationa	l and sequent	ial lo	gic in digital :	systems	
	CLO5	Design	shift registers	s for various app	lications in di	gital	systems		
	CL06	Apply t	he concept of	combinational a	nd sequentia	l circ	uits in memo	ry devices	
	Mapping Assessm		course Lear	rning Outcomes	to the stud	dent	Outcomes,	Teaching M	lethods and

	ng)	Stud	lent C	utcoi	mes (SO)											
	Course Learning Outcomes (CLO)												Asse	essment			
9	Lea s (C								Tead	ching	g Meth	ods	L.		4)		
	e me										1_		Laborator		Assignme nt	Mid Exam	
	Course	T	2	23	4	ក	9		L	T	P	0	bor	iiz	Sigr	d E	Final
	00 00	S01	S02	S03	S 04	S05	90S	S07					La	Quiz	As	Mi	Fir
	CLO1	$\sqrt{}$							$\sqrt{}$	$\sqrt{}$							$\sqrt{}$
	CLO2	$\sqrt{}$	$\sqrt{}$			$\sqrt{}$			$\sqrt{}$						$\sqrt{}$	$\sqrt{}$	$\sqrt{}$
	CLO3	$\sqrt{}$	$\sqrt{}$		$\sqrt{}$	$\sqrt{}$			$\sqrt{}$	$\sqrt{}$				$\sqrt{}$	$\sqrt{}$		$\sqrt{}$
	CLO4		$\sqrt{}$	$\sqrt{}$	$\sqrt{}$									$\sqrt{}$	$\sqrt{}$		$\sqrt{}$
	CLO5																$\sqrt{}$
	CL06																
	Indicate	the re	elevar	icy be	etwee	n the	e CLO a	and SO	by tio	king	;"√"0≀	n the	approp	riate releva	ant box		
10	Transfer				_	-	_	_			_		_	_			
						fstuc	ly whi	ch can	be us	eful	and u	tilized	l in oth	er settings))		
	1	Com	puter	Syste	ems												
	2	Com	puter	Arch	itectu	ıre											
	3	VLSI	circu	its an	d sys	tems											
11	Distribu	tion o	f Stud	lent L	earni	ing Ti	ime (S	LT)									
								Teac	hing a	and L	earni	ng Ac	tivities				
	Course C	ontor	s+ Oss+	lino				Guid	ed lea	rnin	g (F2I	F) G	uided	Indepe			
	Course	Joniter	it Out	ше							0 (-	earning	_	Total	(SLT	')
							CLO					[]	VF2F)	Learni			
							GLO							ng			
								_	m	В				(NF2F)			
								L	T	P	0						
	Chapter																
	INTROD		•		UMB	ER											
	SYSTEM	S AND	COD	ES			CLO1	6hr	6hr			2	hr	1hr	15hr		
	1.1 Anal	og Vs	Digit	al Ou	antiti	es					-+						
		Repres															
	1.2 Adva	_				ns											
	of Digita				tem			-						1			
	1.3 Type					VID.											
	1.4 Decir	nal ry nur		ıber	Αľ	ND											
		ecima		to	bina	ırv											
	conversa		4.1	w	DIIId	11 y											
	1.6 Hexa		nal nu	mber	•												

AND Octal number							
1.71's and 2's compliment of							
binary number							
1.8 BCD codes and its uses							
Chapter 2:	CLO2	6hr	3hr	6hr	2hr	3hr	20hr
Digital Logic Gates	CLOZ						
2.1 The NOT gate, logic symbol,							
output expression							
2.2 The AND gate, logic symbol,							
output expression							
2.3 The OR gate, logic symbol,							
output expression							
2.4 The NAND gate, logic							
symbol, output expression							
2.5 The NOR gate, logic symbol,							
output expression							
2.6 The EX-OR AND EX-NOR							
gate, logic symbol, output expression							
Chapter 3:		6hr	6hr	3hr	2hr	3hr	20hr
Boolean algebra and Logic	CLO3	OIII	OIII	JIII	2111	3111	20111
expression simplification	CLOS						
3.1 Boolean Operation and							
Expression							
3.2 Basic Theorems, Laws and							
Rules of Boolean Algebra							
3.3 Boolean Functions and							
Truth Tables							
3,4 Standard and Canonical							
forms of Boolean Algebra							
3.5 Simplification of Boolean							
Functions:							
Algebraic Simplification							
Karnaugh Maps Or K-Maps							
3.6 Techniques for Minimal SOP							
and POS Forms							
3.7 The Use of Don't Care							
Chapter 4		C1.	21.	C1 .	21-	21	201
Chapter 4:	CLO4	6hr	3hr	6hr	2hr	3hr	20hr
Analysis and Synthesis of	CLO4						
Combinational Logic Circuits					<u> </u>		
4.1 Design of Combinational Logic Circuits							
4.2 Basic combinational logic							
circuits							
cii cui to	1	<u> </u>	1			1	<u> </u>

4.3 Implementing							
Combinational logic							
4.4 Universal property of NAND and NOR gates							
4.5 Functions of combinational logic							
4.5.1 Basic Adder							
4.5.2 Comparator							
4.5.3 Encoder and Decoder							
4.5.4 Multiplexer and							
Demultiplexer 4.5.5 Parity							
4.5.5 Parity generator/checker							
		Chu	3hr	Chr	Ohm	2hu	201-4
Chapter 5:	CL04	6hr	3nr	6hr	2hr	3hr	20hr
Sequential logic circuit							
5.1. Sequential logic circuit							
5.1.1 Flip flops							
5.1.2 Latches							
5.1.3 Edge triggered flip flops							
5.1.4 Master slave flip flops							
Applications							
5.2. Counters							
5.2.1 Asynchronous counters							
5.2.2 Synchronous counters							
5.2.3 Design of synchronous							
counters		61	21	01	41	01	4 51
Chapter 6:	CL05	6hr	3hr	3hr	1hr	2hr	15hr
Shift registers							
6.1 Basic shift registers							
6.2 Serial in serial out registers							
6.3 Serial in parallel out							
Registers							
6.4 Parallel in serial out							
Registers							
6.5 Parallel in parallel out							
registers, Jonson's counter	CLOC	C 1.	21.	/ 1.	21	21	201
Chapter 7	CL06	6hr	3hr	6hr	2hr	3hr	20hr
Memory and Programmable							
Logic							
7.1 Random-Access Memory							
7.2 Memory Decoding							
7.3 Read-Only Memory							
7.4 Programmable Logic Array7.5 Programmable Array Logic							
Total							130hr
1 Otal							130111

Continuous Assessn	nont	Percentage								
Continuous Assessi	ient	Total-50(%))	F2F	NF2F	SLT				
1 Quiz 1		5		1hr		1hr.				
2 Lab		15		8hr	7hr	15hr.				
3 Assignment		10		5hr	10hr	15hr.				
4 Mid Test		20		2hr		2hr				
Total		-1			-	33 hr.				
Final Exam	Perce (%)	entage 50	F2F		NF2F	SLT				
Final Exam			:	3hr		3hr				
Grand Total SLT						166 hr.				
L = Lecture, T = Tut	orial, P	= Practical, O =	= Othe	rs, F2F = F	Face to Face, N	F2F = Non Face to Face				
Note: indicates the	CLO bas	ed on the CLO	's num	nbering in	item 9.					
Special	1	MATLAB So	ftware)						
requirements and resources to	2	Computer la	ıb							
deliver the course	3	Simulation I	Room							
(e.g. software, computer lab,	4									
simulation roometc.)	5									
Textbook and	1	Morris M. M	ano: D	Digital Des	ign (4th Editio	n)				
reference:	2			_		al Systems – Principles a				
(note: ensure the		,			ce Hall, 2004					
latest edition	3	Stephen Br	own, '	n, ZvonkoVranesic: Fundamentals of Digital Logic with						
/publication)		Verilog Design, McGraw-Hill Science/Engineering/Math; 1st edition 2002								
	4	T.L. Floyd: Digital Fundamentals, 9th edition, Prentice Hall								

		Adama Science and Technology University
1	College: COEEC	Department: EPCE
	Course Category	Major Mandatory
2	Course Name	Network Analysis and Synthesis
	Course Code:	EPCE3201
3	Synopsis	The course deals with the following major points: - Introduction to Network Analysis and Synthesis, network transform representations and analysis, network functions for one port and two ports, properties of driving point functions and transfer functions, calculation of network functions, poles and zeros, time domain behavior from pole-zero plot, elements of realizability theory, synthesis of one port networks using two kinds of elements, two-port networks and the

				int	erco	nne	ction	ı of	two	-port	par	amet	ctions er, bas of activ	sics o	f filte	rs, fil	ter a	pproxi	mation,
4	Name Staff:	(s) of <i>a</i>	Acade		70101			,			<i>,</i>			0 01101	puoori	0 1100			
5	Semes	ster/Y	ear of	fere	d:	Sen	1este	er:	I		Yea	r	3						
6	Credit								re. 3	hr Tu									
7	Prerec						Eg22					,							
8	Stude	nt Out	come	(PO)): Ad	opte	d fro	om A	BET										
	S01		oility t										engine	ering	proble	ems b	у арр	lying	
	SO2	consi	-	ion c	of pu	blic l	healt	th, sa	ifety	, and			olution as well			_			ith
	S03	An al	ility 1	:0 CO	mmı	ınica	ite ei	ffecti	vely	with	a ra	nge c	f audie	nces.					
	S04	make		med	jud	gmei	its, v	vhicl	ı mu	st co	nside	er the	onsibi e impac						
	S05		-					-					ember 1 goals,	_	•			•	, create es.
	S06		oility 1 Ise en										riment	ation,	analy	ze and	d inte	rpret d	ata,
	S07	An al	_	to ac	quir	e and	d app	oly no	ew k	nowl	edge	as n	eeded,	using	appro	priat	e lear	ning	
9	Cours					•	-						the stu						
	CLO1	Elec	trical	netv	vork	s in o	diffe	rent	conc	lition	S		hnique						
	CLO2												thesize		orks i	n tim	e and	freque	ncy
	CLO3												lar netv e electr		etworl	ks			
	CLO4												etworks						
	CLO5		gn of																
10	Mappi Assess	sment						com	es to	the S	Stude	ent O	utcome	es, Tea	aching	Meth	ods, a	and	
	ing (O	St	uden	t Ou	tcon	nes (SO)								Λ.	22222			
	arn) (CI	<u> </u>								Teac	hing					ssessr			
	e Lea mes	201	S02	S03	S04	S05	90S	S07		Meth	ods		st	iz	men	ect	por	xam	exan
	Course Learning		S	S	S	S	S	S	L	Т	P	0	Test	Quiz	Assignment	Project	Lab report	Mid exam	Final exam
	CLO1	√		-	-	-	-	-		$\sqrt{}$	-	-		-	$\sqrt{}$	-	-	$\sqrt{}$	√
	CLO2 CLO3	√	+-	-	-	-	- 1/	-	1	$\frac{}{}$	-	-	- 1/	√ √	√ √	-	-	√ √	√ √
	CLO3	-	- √	-	-	-	√ -	-	√ √	$\frac{}{}$	-	-	√ -	√ √	√ √	- √	-	√ -	√ √
	CLO5	-	√	-	-	-	-	-	1	√	-	-	-	-	-	√	-	-	v √
											•		"√" on						•
10	Trans	ferabl	e Skil	ls; (S	kills	lear	ned	in th	e coi	arse o	of stu	ıdy w	hich ca	n be	useful	and u	ıtilize	d in otl	ner

	settings)								
	1	MATLAB software sl	xill						
11		Distributi	on of St	ude			<u> </u>		
	Course Co	ntent Outline	CLO	L		ded ning	nd Learnin Guided Learning (NF2F)	g Activities Independent Learning (NF2F)	Total (SLT)
	Chan	ter One:			-	_			
	Introduction to	network analysis ynthesis	CLO1	2	4		2		8hr
		nalysis tion of networks							
	Network 7	ter Two: Fransform ation and analysis	CLO2	4	6		4	4	18hr
	2.1. Introduction 2.2. Stability	Network Functions							
	_	er Three: Realizability	CLO3	4	6		2	4	16hr
	3.1. Causality and 3.2. Hurtwitz Pol 1.31. Positive re	ynomial							
	Synthesis of	ter Four: one port network nds of elements	CLO4	4	6		4	6	20hr
	C Immittance 4.2.R-C Impedan admittance fo R-L impedance fu	ce or R-L inction or R-C admittance action							
	Two Port No		CLO4	6	9		4	8	27hr
	invariant (L7 networks. Re port variable 5.2. Two port par parameters 2.7. Interconnect	elation Between two es rameters Z, Y, T, H, G							
	network Chaj Filter Synth	CLO5	4	6		3	3	16hr	
	6.1. Low pass File 6.2. High pass File								

				Total				105 hrs.				
				Assessment			·					
	Continuous	Assessmer	nt	Percentage Total-50(%)	F	F2F	NF2F	SLT				
	1	Test(s)		10				1hr				
	2	Quiz		10		$\sqrt{}$		1hr				
	3	Assignme	nt	10			V	8hr				
	4	Mid exam		20		$\sqrt{}$		2hr				
							Total	12hr				
	Final Exam			Percentage 50 (%)	Percentage 50 (%) F2F NF2F		NF2F	SLT				
	Final Exam			50		$\sqrt{}$		3 hrs.				
							Grand Total SLT	120hrs.				
	L = Lecture,	T = Tutori	al, P =	Practical, 0 = Others, F2F = Face	NF2F = Non-Face	to Face						
12	Special requ	irements	and re	sources to deliver the course (e.g	ξ.	1	Computer lab					
	software, co	mputer la	b, sim	ulation roometc.)		2	MATLAB simulat	ion software				
13			cuits a ll Indi	and systems, K.M. Soni, M E VanV a	alke	enbu	rg, Network Analy	vsis, Prentice				
	Text book/	2 Ne	twork	analysis and synthesis, F.F.Kuo								
	Reference:	3 Cir	rcuits and networks analysis and synthesis,									
		4 A S	A Sudhakar, Shyammohan. Network theory and filter design, V. Aatre									

		Adama Scie	ence and Tec	hnology	y University	
1	College: CoEEC		Departmen	t: ECE		
2	Course Category	Major Mandatory				
	Course Name	Probability & Rando	m Processes			
	Course Code:	ECEg3103				
3	Synopsis:	Set theory, Function Probability Theory: probability, Independent of Probability, Inde	n, Factorial, Probability ndence and Pensities fun Variable and ons, variance stic Functio Two and mor processes, A	Permumodels Bayes ction, I Q-Funes, mon n, Center rando auto an	itation and Combined and axioms, Continuous the Orem. Random Continuous Conditional Continuous Expectation and Limit Theorem variables and the Continuous Correlation Random Processis Correlations Continuous Co	om processes and revising bination. Basic concept of aditional probability, total om Variables, Probability cinuous random variables, Distribution and Density of a Function of Random and Transformation of heir joint distributions and on Functions, covariance, sses and Power Spectral and prediction.
4	Name(s) of Academic Staff:					-
5	Semester and Year offered:	Semester:	I	Year :	III	
6	Credit Hour:	3		•		
7	Prerequisite/	Maths1102-Applied	Mathematics	i II		
	Co-requisite: (if					
	any)					

8	Course Learn	ing O	utcon	ne (C	LO):	At the	end	of t	he c	oui	se th	ie s	tude	ent w	ill b	e ab	le to	do:
	CLO1					dameı h elec					-		_		ndo	m p	roces	ses and illustrate
	CLO2	Cha	ractei	ize	prob		mo								m v	varia	ables	based on single &
	CLO3					mom		& c	hara	acte	risti	c fu	ncti	ons				
	CLO4														rai	ndor	n nro	ocesses needed in
	GEO I		licatio		busic	Pilli	стртс	5 01	· · ·	iuo	111 V	11 IU	DICE	una	1 (1)	iiuoi	n pr	seesses needed in
	CLO5				ncen	t of ra	ndor	m n	roce	2556	s and	d de	teri	mine	COV	aria	nce a	nd spectral density
	GLOS					m pro			1000	,550	5 and	a ac			COV	ui iu	iicc a	ina spectral actionty
9	Manning of								to	the	Stu	den	t O	utcor	nes	Те	achii	ng Methods and
	Assessment:	tiic (Jourse	. пс	ai iiii	ig ou	ccom	ics	to	tiic	ota	acii		accor	1105	, 10	uciiii	ing Methods and
	Student Outcomes (SO) Assessment Teaching																	
	Assessment																	
	Course Learn Outcomes (CLO)									Те	eachi	ng						
	T (C										etho	_				nt		g
	ues															ne	am	xar
	rse											D		1		gnı	Ex	田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田田
	Course Outcon	S01	S02	S03	S04	S05	908		S07	L	T	P	0	Fest	Quiz	SSi	Mid Exam	Final Exam
	CL01	S	S	S	S	S	<i>ν</i> .		S						\ √	<a>Assignment	$\sqrt{\frac{2}{}}$	\frac{\tau}{\sqrt}
	CLO2									$\sqrt{}$	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			1	V	V	$\sqrt{}$	V √
	CLO3	V	1				1			V	1/			V	V	1/	· ·	V
	CLO4	1/	1/				V			V	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			V	V	1/		V
	CLO5		V							1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			V		1/		1/
	Indicate the r	eleva	ncy h	etwe	en th	e CLO	and	SO	hv t	icki	<u>'</u> nσ"1	\/"o	n th	⊥ e ann	ror	riat	e rele	vant hox
10	Transferable					ic did	unu	00	Бус	1011	118	• 0	11 (11	сирр	101	71 141	<u>c rere</u>	ovane bon
10	(Skills learne					ıdv wł	nich d	can	be u	isef	ul an	ıd u	tiliz	ed in	oth	er s	etting	2S)
	1		LAB s															<i>,</i>
	2																	
	2																	
	3																	
11	Distribution of	of Stu	dent I	₋earr	ning [Γime (SLT)											
						Teac	hing	and	d Lea	arn	ing A	ctiv	/itie	S		To	otal (SLT)
					CL	Guid	ed	lea	rnin	ıg	Guio	ded	Iı	ndepe	end			
	Course Conte	nt Ou	tline		0	(F2F)				Lear	nin		nt				
											g		L	earni	ng			
											(NF	2F)						
														(NI	F2F			
								1)					
						L	Т	P	C)								
	Chapter 1:				CL	21.	1				11		1	h.		6ł	ır	
	INTRODUCT	ION			01	2hr	hr				1hr		2	hr				
	1.6 Applic	ation																
	.7 Review		of S	Set														
	theory	·																
	1.8 Review	V		of														

Factorial, Permutation						
and Combination						
Chapter 2:						20hr
BASIC CONCEPTS OF	CL	5hr	5	4hr	6hr	2011
PROBABILITY THEORY	02	Jiii	hr	1111	OIII	
2.1 Introduction						
2.2 Experiment, Sample						
Space and Events						
2.3 Discrete and						
Continuous						
Sample						
2.4 Probability and						
Properties						
of Event						
2.5 Axiom of Probability						
2.6 Conditional						
Probability Conditional						
2.7 Total Probability						
2.7 Total Probability						
2.8 Independent Events						
2.0 macpendent livents						
2.9 Bayes's Theorem						
Chapter 3:	OT.		7		8hr	
RANDOM VARIABLES	CL	7hr	7	3hr	J. J	25hr
TOTAL STATE OF THE	02		hr			
3.1 Random Variables						
3.2 Discrete and						
Continuous						
Random Variables						
3.3 Probability Density						
Function						
3.4 Cumulative						
Distribution						
Functions						
3.5 Joint Probability						
Density and Distribution						
Functions						
3.6 Gaussian Random						
Variable and Q-						
Function						
3.7 Other Important						
Random Variables						
3.8 Conditional						
Distribution and Density Function						
					7less	20h z
Chapter 4:	CL	5hr	5	3hr	7hr	20hr
EXPECTATION	03		hr			
4.1 Moments and						
Variance						

4.2Expectation of a							
Function of Random							
Variable							
4.3 Characteristic							
Function							
4.4 Expectation of a							
Function of Two Random							
Variables							
4.5 Sum of Mutually							
Independent Random							
Variables							
4.6 Central Limit Theorem							
4.7 Transformation of							
Random Variables:							
Monotonically Increasing							
Functions,							
· ·							
Monotonically decreasing							
Functions, and							
Non monotonic Functions							
Chapter 5:							
RANDOM PROCESSES	CL						
KANDOM FROCESSES	05		4		3hr	9hr	20hr
	US	4hr	hr				20111
			111				
5.1 Random Process and							
Ensembles							
5.2 Autocorrelation							
Functions							
5.3 Cross-Correlation							
Functions							
5.4 Stationary Random							
Processes							
5.5 Ergodic Random		1					
Processes							
5.6 Properties of	1	1				1	
5.0 1 tohethes of							
Autocorrelation							
Autocorrelation							
Autocorrelation Function							
Autocorrelation Function 5.7 Properties of Cross							
Autocorrelation Function 5.7 Properties of Cross Correlation Function							
Autocorrelation Function 5.7 Properties of Cross							
Autocorrelation Function 5.7 Properties of Cross Correlation Function 5.8 Power Spectral							
Autocorrelation Function 5.7 Properties of Cross Correlation Function 5.8 Power Spectral Density							
Autocorrelation Function 5.7 Properties of Cross Correlation Function 5.8 Power Spectral Density Function			2				7hr
Autocorrelation Function 5.7 Properties of Cross Correlation Function 5.8 Power Spectral Density Function Chapter 6:	CL	2hr	2		1hr	2hr	7hr
Autocorrelation Function 5.7 Properties of Cross Correlation Function 5.8 Power Spectral Density Function Chapter 6: ESTIMATION THEORY		2hr	2 hr		1hr	2hr	7hr
Autocorrelation Function 5.7 Properties of Cross Correlation Function 5.8 Power Spectral Density Function Chapter 6:	CL	2hr			1hr	2hr	7hr
Autocorrelation Function 5.7 Properties of Cross Correlation Function 5.8 Power Spectral Density Function Chapter 6: ESTIMATION THEORY 6.1 Criteria of Estimators	CL	2hr			1hr	2hr	7hr
Autocorrelation Function 5.7 Properties of Cross	CL	2hr			1hr	2hr	7hr
Autocorrelation Function 5.7 Properties of Cross Correlation Function 5.8 Power Spectral Density Function Chapter 6: ESTIMATION THEORY 6.1 Criteria of Estimators	CL	2hr			1hr	2hr	7hr
Autocorrelation Function 5.7 Properties of Cross	CL	2hr			1hr	2hr	7hr

	param	eter											
	Total						98hr						
	Assessmer	nt	L	_11	l l	1							
	Continuou	is Assessment		entage l-50(%)	F2F	NF2F	SLT						
	1	Quiz	5%		√		1hr						
	2	Test	10%		√		2hr						
	3	Assignment I	5%				6hr						
	4	Assignment II	10%				8hr						
	5	Mid exam	20%			$\sqrt{}$	2hr						
	Total					19hr							
	Final Exan	n	Perc 50(%	entage 6)	F2F	NF2F	SLT						
	Final Exan	1	50	,			3hr						
	Grand Tot	al SLT					120hr						
12		requirements	•		O's numbe	ring in item (9.						
		sources to	2 Co	mputer	· lab								
		e course (e.g. computer lab,		oose an									
		roometc.)	4 Ch	oose an	ı item.								
			5 Ch	oose an	item.								
13	reference:	oook and ure the latest	wi	Donald G. Childers: probability and random processes using MATLAB with applications to continuous and discrete time systems-Richard D. Irwin(1997)									
	-	ublication)					Probability and Random Processes, sing & communication, Oct, 2004						
						-	y and Random Processes for Electrical ntice Hall, 1994						
			4 Ka	ralov, I	Leonid B., S		G: Theory of probability and random						
			5 Ve	nkatara			ty_and_random_processes-Wiley-						

		Adama Science and Te	chnology University						
1	College: CoEEC		Department: ECE						
2	Course Category	Major Mandatory							
	Course Name	Digital Signal Processing							
	Course Code:	ECEg3205							

3	Synopsis:			tin sys the tin	ne si stem: eorer	gna s ir n, S ouri	ls ai n tir Samp er T	nd s me oling ran	evelopi system domai g Rate sform, ters.	is. I in a cor	Discus and to oversi	sing ran on,	g the sform Alias	Ana do ing,	alysis main LTI s	of is. sign	disc ADC als a	rete and	time d D <i>A</i> syste	e sign AC, S ems, l	nals amp Disc	and pling crete
4	Name(s) Academic	· Staff		of																		
5	Semester			ar Se	mest	er:	I				Year	III										
Û	offered:	01101					-				:											
6	Credit Ho	ur:		3																		
7	Prerequis requisite:	•	Co y)	- EC	Eg22	204-	-Sigr	nals	and Sy	yste	ems Aı	naly	sis									
8	Course Le	earnin	g 0	utcom	ie (C	LO)	: At 1	the	end of	the	cours	se tl	he stu	ıden	t will	be	able	to d	0:			
	CLO1	Disc Proc			fun	dan	nent	als	of sign	nal	proce	ssir	ng an	d ap	plica	tio	ns o	f dig	ital	signa	ıl	
	CLO2				discr	ete	time	sig	nals re	epre	esenta	tio	ns in	time	dom	ain						
	CLO3	Anal	yze	discr	ete ti	me	sign	als	and di	scre	ete-tin	ne s	syster	ns ii	n tran	sfo	rm d	loma	ins			
	CLO4	Inte	pre	et digi	tal si	gna	l pro	ces	sing in	ı tin	ne dor	nai	n and	in f	reque	enc	y dor	nain	S			
	CLO5	Desi	gn a	applica	ation	s ba	ased	on	digital	sig	nal pr	oce	ssing	: tra	nsfer	fur	ıctio	ns a	nd di	gital	filte	ers
9	Mapping Assessme		ie c	course	Lea	arni	ng (Outo	comes	to	the	Stu	dent	Out	come	es,	Teac	hing	g Me	thod	s ar	nd
									Stude	nt O	utcon	nes	(SO)									
																	Asse	ssm	ent			
	g es												Геас	_					ent		E	
	ırse ırning tcomes	6											Metl			ı			nme	Exam	Exan	
	Cour Lear Outc	7	S01	S02 S03	S04	S05	90S	20S					L	T	P	0	Quiz	Test	Assignment	Mid E	Final	
	CLO1	<u> </u>	<u>X</u>	<u>X X</u>	S	Š	S	S					V		V		0	Ĕ	A	$\sqrt{\sum_{i}}$	<u>;</u>	
	CLO2												V		√		$\sqrt{}$		$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	
	CLO3	√											V		V			$\sqrt{}$				
	CLO4		V	/									V					$\sqrt{}$	$\sqrt{}$	1	$\sqrt{}$	
	CLO5	√	-										V	$\sqrt{}$					V	-	V	
	Indicate t	he rel	eva	ncy be	etwe	en t	he C	LO	and SC	by	tickir	ng "	√"on	the	appro	pr	iate i	relev	ant l	box		
10	Transfera (Skills lea							whi	ich car	ı ho	usafu	ılar	nd uti	lizo	d in o	the	r cot	tings	·)			
	1			LAB so			auy	vv 11	cii cal	1 00	useru	ai	iu uii	1120	a 111 U	LIIC	1 301	ungs	ני			
	2	0	ctav	e soft	ware)																
	3																					
11	Distribut	ion of	Stu	dent I	earn	ing	Tim	ie (S	LT)													

			Total					
Course Content Outline	CLO	Gui	ded leai (F2	Independe nt Learning (NF2F)	(SLT)			
		L	Т	P	0			
Chapter 1:								3hr
Signals and Signal	CLO1	1hr				1hr	1hr	
Processing								
1.4 Characterization and Classification of Signals								
1.5 Typical Signal Processing Operations								
1.6 Signals and Signal Processing Applications								
Chapter 2:								20hr
Sampling of Continuous Time	CLO2	4hr	3h	3h		4hr	6hr	
Signals			r	r				
2.1 Introduction								
2.2 Periodic Sampling								
2.3 Frequency -Domain Representation of Sampling								
2.4 Reconstruction of Bandlimited Signals from ItsSamples								
2.5 Changing the SamplingRate Using Discrete-Time Processing								
2.6 Digital Processing of Analog Signals								
2.7 Analog to Digital								
Conversion								
2.8 Digital to Analog Conversion								
Chapter 3:				2hr				16hr
Discrete-Time Signals and	CLO3	3hr	3h r			4hr	4hr	
Systems in Time-Domain 3.1 Discrete-time Signals			1					
3.2 Discrete-Time Systems								
3.3 LTI Discrete-Time								
Systems								
3.4 Properties of LTI Discrete-Time Systems								

Equ	Linear Cons fficient Differe ations	ence									
	relation of Signals										
Chapte	er 4:					3hr				24hr	
Discre	te-Time Signals	in	CLO4	6hr	4h		3	Bhr	8hr		
Transf	form Domains				r						
4.1 Series	Discrete-time	Fourier									
Transfe	orm	Fourier									
4.3 Dis	screte Fourier Trar	nsform									
4.4 Fa:	st Fourier Transfor	m									
4.5 Z-T	ransform										
Chapte	er 5:			3hr	2h	2hr	3	Bhr	6hr	16hr	
	iscrete-Time Sys Fransform-Doma		CLO4		r						
	e Frequency Resp										
	Systems										
5.2 The	e Transfer Function	15									
5.3 Ty Function	pes of Transfer ons										
	lationship Betwee cude and Phase	en									
Chapte			CLO5	5hr	3hr	3hr	4h	ır	6hr	21hr	
Digital	l Filter Design										
6.1 Inti	roduction										
Practic	haracteristics of al Frequency ve Filters										
	sign of discrete-tim from Analog Filter										
6.4 De	esign of FIR digit										
Filters Total					1					100hr	
				Λ		ont _				100111	
		1			essm	1					
Contin	uous Assessment	Percen	tage To	tal-50	(%)	F2	F		NF2F	SLT	
1	Quiz	5						$\sqrt{}$		1hr	
2 Test 10										4hr	
3 Assignment 15								V		10hr	

	4	Mid Test		20	V		2hr						
	Total	1					20hr						
	Final Ex	am		Percentage 50 (%)	F2F	NF2F	SLT						
	Final Ex	am		50%			3hr						
	Grand To	tal SLT											
		•		, $P = Practical$, $O = Other$ on the CLO's numbering	•	e to Face, NF2F = Non	-Face to FaceNote:						
12			1	MATLAB Software									
	Special requires	ments and	2	Computer lab									
			3	Software									
	resource deliver												
	the cour	rse (e.g.											
	_		4	Choose an item.									
	softwar lab, sim	e, computer	_										
			5	Choose an item.									
	room												
13	Text boo	ok and	1	Oppenheim, Schafer: I	Discrete-Tim	e Signal Processing.	Prentice Hall, 3rd						
	reference	ce:		edition, August 2009.									
	(note: e	nsure the	2	J.G. Proakis, D.G. Manol									
	latest ed	lition	96. Newer editions ma	ıy beavailable									
	/publica	ation)	3	M. Hayes: Schaums Out edition, September 201	U	al Signal Processing, I	AcGraw-Hill,second						
			4	J. G. Proakis and V. K. I Education, Inc., Upper S	ngle: Digital		ith MATLAB,Pearson						

		Adama Science	and Technology University					
1	School: Humanit	ties and Social Science	Department: Humanities Unit					
2	Course	General Course						
	Category							
	Course Name	General Psychology and	l Life skills					
Course Code: LART 2002								
3	Synopsis:	designed to give student about human behavior a will gain an understanding well as the practical appropriate course, students shall be psychology. Specifically, the course general students and students shall be psychology.	of human cognitive processes and behaviors. This course is an overview of what psychological science has discovered and mental processes throughout human history. Students any of the psychological phenomena that occur in daily life as dications of psychological knowledge. Upon completing the eable to demonstrate a basic knowledge of the science of eneral psychology is concerned with discussing perspectives psychological concepts such as sensation and perception,					

				int an	erpo d pr	erso	nal, cal ir	soci npli	ial ai icati	nd ac	ademic	skil	ls). E	Empha	sis wil	l be g	skills (intrapersonal, given to both theoretical ction as individual and
4	Name(s)																
	Academic		f:				Т								1		
5	Semester			Se	mes	ter	One	9			Year:	One	9				
	Year offer			_	:												
6	Credit Ho			3													
7	Prerequis	•		No	ne												
	Co-requis	ne: ([11														
8		arni	ησ () Duta	utcome (CLO): At the end of the course the student will be able to do:												
		ar III	1116	oun	pe basic psychological concepts												
	CLO-1																
	CLO-2										eoretic						<u></u>
	CLO-3								in ps	sycho	ology: pe	ersor	nality	y; sens	ation a	ind p	erception; learning,
	CLO-4				rand forgetting. Trize motivational and emotional processes.												
	CLO-5				strate basic life skills (intrapersonal, interpersonal, social and academic skills) in												
	CLO 5				ny life.												
	CLO-6	Ap	ply	kno	nowledge of psychology in their life. Irse Learning Outcomes to the Students Outcome, Teaching Methods and Assessment:												
9	Mapping	of th	e cc	urs	e Le	arni	ng C)utc	ome	s to t	he Stud	ents	Out	come,	Teachi	ng M	ethods and Assessment:
						1					Studen	ts Oı	ıtcor	ne (SO)		
	ing LO)														Asse	essme	ent
	arn (C)			Teaching teaching													
	Lea	S0-1	S0-2	S0-3	S0-4	SO-5	9-0S	ľ	Meth	iods				neı			
	rse	S	S(S(S(S(S(L	T	P 0			N1	ssignment	ect	-rej	'
	Course Learning Outcomes (CLO)										Test		Quiz	Assi	Project	Lab-report	
	CLO-1						V	1/		√		<u>'</u>		7	Н		
	CLO-1						V	√ √		V √	$\frac{1}{}$						
	CLO-2						V	v √		1	$\frac{1}{}$						
	CLO-4					V		1		1	•			V			
	CLO-5							V		$\sqrt{}$				V			
	CLO-6																
	Indicate t	he re	elev	anc	y be	twee	en tł	ne C	LO a	nd S	0 by tic	king	"√"c	n the	approp	riate	relevant box
10	Transfera							_	_	_	_			_			_
	(Skills lea					rse o	f sti	ıdy	whi	ch ca	n be use	eful a	ınd ı	ıtilized	d in oth	er se	ettings)
	1	Res	ear	ch s	kills												
	2	Und	lers	rstanding human behavior, social skills and communication skills													
	3etc.																
11	Distributi	on ი	f St	ude	nt La	earn	ing '	Tim	e (SI	LT)							
	2.3011040		- 50			J. 111	<u>8</u>				ching ar	nd Le	arni	ing Act	tivities		Total (SLT)
							CI	LO	G		d learnii			ided	Inde	oen	2001 (021)
	Course Co	ntei	nt O	utli	ne							-0			_		
			nt Outline (F2F) Learnin dent g Learning														

						(NF2F)		
						(111 21)	(NF2	
							F)	
		L	T	P	0			
Chapter 1: ESSENCE OF	CLO-	1h			1h		2hrs	4hrs
PSYCHOLOGY	1	r			r			
1.1 Definition of Psychology								
and Related Concept								
1.2 Goals of Psychology		1h					2hrs	3hr
		r						
1.3 Historical Background		1h					2hrs	3hr
and Major Perspectives in		r						
Psychology								
Chapter 2: SENSATION AND	CLO-	1h					2hrs	3hrs
PERCEPTION	3	r						
2.1 The meanings of								
sensation and perception								
1.2.The sensory lows:		1h					4hrs	5hrs
Sensory threshold and		r						
sensory adaptation								
1.3.Perception		1h					2hrs	3hrs
		r						
Chapter 3: LEARNING AND	CLO-	1h			1h		4hrs	6hrs
THEORIES OF LEARNING	2	r			r			
3.1 Definition,								
Characteristics and								
Principles of Learning								
3.2 Factors Influencing		1h					2hrs	3hrs
Learning		r						
3.3 Theories of Learning and		2h			4h		6hrs	12hrs
their Applications		rs			rs			
Chapter 4: MEMORY AND	CLO-	1h			1h		2hrs	4hrs
FORGETTING	3	r			r			
4.1 Memory								
4.2 Forgetting		1h					1hr	2hrs
3 3 3 3		r						
4.3 Improving Memory		1h					2hrs	3hrs
r		r						
Chapter 5: MOTIVATION	CLO-	1h					1hr	2hrs
AND EMOTIONS	4	r						
5.1 Motivation								
5.2 Definition and types of		1h			1h		2hrs	4hrs
motivation		r			r			
5.3 Approaches to		2h			1h		6hrs	9hrs
motivation (theories of		rs			r			
motivation)								
5.4 Conflict of motives and	1	1h					2hrs	3hrs
							5	

		tration Emotions			r							
		Theories of emo	tion		2h		1h		5hrs	8hrs		
	Cha	pter 6: PERSONA	ΔΙΙΤΥ	CLO-	rs 1h		r		1hr	2hrs		
		Meaning of Pers			r				1111	21113		
		Theories of Pers			2h		1h		5hrs	8hrs		
					rs		r					
		pter 7: LIFE SKII		CLO-	2h		1h		3hrs	6hrs		
		Basic Concepts o	of Life-	5	rs		r					
	skill		1		11.				21	41		
		intra-Personal a rpersonal Skills			1h r				3hrs	4hrs		
		Academic Skills			1h				4hrs	5hrs		
	7.51	readenne skins			r				11113	51113		
	7.4 9	Social Skills							3hrs	3hrs		
			Tot	-al	26		13		66 hrs	105 hrs		
			100	lai	hr		hrs		00 1113	103 1113		
					S							
				I	1 1	Asse	essmer	nt		1		
	Con	tinuous Assessm	nent	Percer	ntage	F2		NF2F		SLT		
				Total-5	50(%)	F	,		10hwa			
	1	Assignments (2	2)	10%		 	√		10hrs			
	3	Test 1 Test 2		10%		√ √			1hr 1hr			
	4	Mid Exam		20%		$\sqrt{}$			1hr			
	5	Wid Exam		2070		-			1111			
								Total	13hrs			
	Fina	ıl Exam		Percentag	ge 50	F2		NF2F		SLT		
				(%)		F						
	Fina	al Exam		50%)	√	L		2hrs			
			. 1 5		1.0			d Total SLT	120hrs			
		Lecture, T = Tuto	-		-	•			NF2F = N	on Face to Face		
	NOU	e: indicates the (LLU bas	sea on the	CLU S	numbe	ring in	item 9.				
12	Spec	cial	1 W	/ell-furnis	shed cla	assroon	n					
	•	uirements and	2 L	aptop								
		ources to ver the course	3 L	CD								
		ver tne course . software,		/hiteboard	<u> </u>							
	computer lab, 5 Whiteboard marker											
		ulation room		incooal	a man							
13		t book and	1 G	leitma	n H (Grnss	I and	Reicher	g D (201	1). Psychology.(8th ed.).		
		rence:						COMPANY	B, D. (201	z j. i sy chology (oul cu. j.		
		te: ensure the	—						nology: An	Introduction. IL: DEF		
	late	st edition	P	ublishers.	DOI: n	obapro	ject.co	m				
	/pul	blication)	3 G	uthrie, R.	V. (200)3). Eve	n the r	at was whit	e: A histor	rical view of psychology		

	(2nd ed.). Boston: Allyn & Bacon.
4	Halpern, D. F. (2002). Thought and knowledge: An introduction to critical
	thinking (4th ed.) Hillsdale, NJ: Erlbaum.
5	Hock, R. R. (2002). Forty studies that changed psychology: Explorations into
	the history of psychological research. Upper Saddle River, NJ: Prentice Hall.

			A	dama Science ai	nd Techn	ology Universit	ty					
1	College: A	Applied	Natural Scie	nce	Departm	ent: Applied Ph	nysics					
2	Course		Major mano	datory								
	Category	•										
	Course N	lame	Applied Mo	dern Physics								
	Course C	ode:	Phys2208									
3	Synopsis: The rationale of this course is to introduce students to the basic ideas of modern											
			physics wit	h emphasis on t	he Theor	y of Special Re	lativity, identification of the					
	limitations of classical mechanics and the development of quantum mechanics, the											
	wave particle duality, the atomic structure and nuclear transformation											
4	Name(s) of Mr.Abdi D, Dr. Tewodros Yirgashewa, Mr.Samuel B, Mr.Fitsum A											
	Academic Staff:											
5	Semester	r and	Semester:	II	Year:	2						
	Year offe	red:										
6	Credit Ho	our:	3		· I							
7	Prerequi	site/	General Phy	ysics								
	Co-requi	site: (if										
	any)											
8	Course L	earning	Outcome (CI	LO): At the end o	of the cou	rse the student	t will be able to:					
	CLO1						rity and its mathematical methods ysics such as Doppler Effect, time					
		dilatio	n, length cor	itraction, relativ	ity of ma	ss and energy						
	CLO2						tions by formulating equations.					
	CLO3	Analyz mecha		tion of classical	mechan	ics that leads	to the development of quantum					
	CLO4	Differe	entiate partio			• •	rties of particles by using different					
			•	ena such as I ody Radiation, I			Compton Effect/Scattering, X-ray					
	CLO5	Analyz	ze atomic str	ucture and atom	ic spectr		nt model such as Thomson,					
	CLO6	+	•	hr Atomic Mode ncipal aspects o		tivity						
		1										

9	Mappir Assessr	_		ourse	Lear	ning	Outcor	nes to	the st	uden	t Lear	ning	Outco	mes,	Teacl	ning N	Methods and
								Stude	nt Lea	rning	g Outo	comes	(SO)				
	Course Learning Outcomes (CLO)								Tea	ching	Meth	ods				sessm	
	rse Le	S01	S02	S03	S04	S05	90S	S07	L	Т	P	0			Assignment	ect	Lab-report
													Test	Quiz	Assi	Project	Lab-
	CLO1	√															
	CLO2		$\sqrt{}$					_	$\sqrt{}$	$\sqrt{}$			$\sqrt{}$	$\sqrt{}$			
	CLO3							$\sqrt{}$	\checkmark						$\sqrt{}$		
	CLO4				$\sqrt{}$				$\sqrt{}$	$\sqrt{}$					$\sqrt{}$		
	CLO5								$\sqrt{}$					$\sqrt{}$			
	CL06								$\sqrt{}$								
	Indicat	e the	relev	vancy	betw	een '	the CLO	O and S	0 by	ickin	g "√"	on the	app	ropri	ate rel	levan	t box
10	Transferable Skills (if applicable) (Skills learned in the course of study which can be useful and utilized in other settings)																
	develop the knowledge and skills required to perform simple relativistic calculations and to																
			_				quence		-	-			-				
11	Distrib	ution	of St	tuden	t Lea	rning	Time										
							a. a		'each				_				Total (SLT)
	Course	e Con	tent	Outli	ine		CLO	Gui	ided l F2)		ing		ided arni		depen lent	1	
	Course	Juli		ouu					(1 2	· · J		1	ıg		arning	5	
												(NI	F2F)		(NF2I	,	
)	(NFZI	1	
								L	Т	P	0						
	Chapte of Rela		_	ial Th	ieory	,		15	5						23		43
	1.1 Rela	ativit l Orig)rient	tation	l	1								1		
	1.2 Ine Referei				nertia	al	1	3	1						1		8
	1.3. Gal	lilear	r Tran	ısforı	natio	n	1	-							2		
	1.4. Mic			orley			1, 2	3	1						2		9
	1.5. Pos Relativ	stula		Spec	ial		1	3							1		9

1.6. Lorenz Transformation	2				2	
1.7. Applications of the Lorentz Transformation	2				2	
1.8. Velocity - Addition Formula	1, 2	3	1		1	9
1.9. Doppler Effect	1, 2				2	
1.10. Time Dilation	1, 2				1	
1.11. Length Contraction	1, 2	3	1		2	9
1.12. Relativity of Mass	1, 2				2	
1.13. Relativistic Momentum	1, 2				2	
1.14. Relativistic Mass and Energy	1, 2	3	1		2	8
Chapter 2: Development of Quantum Mechanics		3	1		6	6
2.1 Limitations of Classical Physics	3					
2.2. Development of Quantum Mechanics	3	3	1		1	6
2.3. Uniqueness and role of Quantum Mechanics	3				1	
Chapter 3: Particle Properties of Waves		9	3		14	22
3.1 Wave Particle Dualism	4	3	1		2	8
3.2 Photoelectric Effect	4				2	
3.3. Quantum Theory of Light	4				2	
3.4 . Compton Effect/Scattering	4	3	1		2	8
3.5. X-ray diffraction and Bragg's law	4	3	1		1	6

1.4 3.6. Black Body	4					
Radiation					1	
3.7. Derivation of Plank's	4				1	-
Distribution Law					1	
Chapter 4: Wave Properties of Particles	4	9	3		14	22
4.1. De Broglie waves					1	
4.2. Wave function and its	4	3	1		2	7
Interpretation					_	
4.3. De Broglie wave velocity	4				2	_
4.4. Phase and Group velocities	4	3	1		1	7
4.5. Particle Diffraction	4				2	
4.6. Uncertainty Principle and its Application	4	3	1		1	8
4.7. Gedanken Experiment	4				1	
Chapter 5: Atomic Structure		9	3		10	22
5.1Atomic Models (Thomson	5				1	
5.2. Scattering Cross Section	5	3	1		1	8
5.3. Alpha Particle Scattering	5				2	-
5.4. Rutherford Scattering Formula	5				2	
5.5. Electron Orbits	5	3	1		2	9
5.6. Atomic Spectra	5				1	
5.7. Bohr Atom his Explanation of Atomic Spectra	5				2	
5.8. Quantization of	5	3	1		2	9
Atomic Energy Levels					2	
5.9. Atomic Excitations	5				1	1
Chapter 6: - Nuclear Transformation		9				
6.1. Radioactive Decay, 6.2. Half Life,						

	6.3. Radioactiv Series, Alpha Dec Beta Decay &Gam decay, 6.4. Nuclear sections, 6.5. Nuclear reactions	ay,										
		Total		45	15				55	115 hrs		
					Assess	ment						
	Continuous Assessment		Percenta Γotal-50(F	F2F		NF2F		SLT		
	1 Quiz	5 % √ 15 min							15 min			
	2 Test		10 %			$\sqrt{}$				30min		
	3 Assignments		15 %					$\sqrt{}$		1 hrs		
	4 Mid exam	Mid exam 20 %								30 min		
	,	· ·	Tota	ıl						2.25 hrs		
	Final Exam	P	ercentag	ge 50	F	F2F		NF2F		SLT		
			(%)									
	Final Exam		50 %)						3 hrs		
		G	rand To	tal SLT						120 hrs		
	L = Lecture, T = Tutorial,	, P = Pr	actical, () = Oth	ers, F2	2F = F	ace t	o Face, NF2	2F = Non-Fa	ice to Face		
	Note: indicates the CLO b	based o	on the CI	∠O's nu	mberi	ng in	item	9.				
12	Special requirements	LO	CD Proje	ctor an	d whit	e boa	rd					
	and resources to											
	deliver the course											
	(e.g. software,											
	computer lab,											
	simulation room											
	etc.)											
13	Text book and 1	l Ai	rthur Be	iser, Co	ncepts	s of M	oder	n Physics,	6th ed., (20	02).		
	reference: 2		aymond nomson				ics:	For Scient	ists & Eng	ineers, 6th ed.,		
	(Note: ensure the						Free	dmann, Un	iversity Phy	vsics with Modern		

latest edition		Physics 12th ed., (2008).
/publication)	4	Douglas C. Giancoli, Physics for scientists and engineers, Printice Hall, 4th (2005).
	5	Robert Resnick and David Halliday, Fundamentals of Physics Extended, HRW 8th ed., (2008).

Ada	ama Science and	Гесhnology	University										
1	College: CoEEC		Dep	partme	nt: ECE								
2	Course Category	Major Mai	ndatory										
	Course Name	Introduc	tion to Comn	nunica	tion Systems								
	Course Code:	ECEg-320	2										
3	Synopsis:	This course introduces about basic of an analog communication system, analysis of AM and angle modulation signals in time and frequency domain, modulation and demodulation technique of linear AM, DSB, SSB, VSB signal and nonlinearmodulation techniques such as PM and FM, various types of noises and its mathematical representation, Effect of noise on AM and FM receiver and comparative performance of between AM and FM system.											
4	Name(s) of Academic Staff:												
5	Semester and Year offered:		II	Year:	III								
6	Credit Hour:	4											
7	Prerequisite/ Co- requisite: (if		2: Electronics	Circuit	II								
8	any)	Outcome	(CI O): At the	end of	the course the st	tudent will be able to do:							
			· · · · · · · · · · · · · · · · · · ·			n communication systems.							
	7.7.5					or their efficiency andBandwidth.							
	CLO3 Analyze a	ngle modul	ation scheme	es and	design Rx as we	ell as Tx for communicationsystems.							
	CLO4 Understa												
						he presence of noise.							
					P&DE in the pres								
9	Mapping of the co	ourse Learn	ing Outcome:	s to the	Student Outcom	es, Teaching Methodsand Assessment:							

	Course Learning Outcomes (CLO)	St	udei	nt Ou	tcome	es (S	50)												
	еат														Ass	essi	nen	t	
	se L									Tea	ching	gMet	hods				n		
	ours)1)2)3	4()5	9(7(Lab	Quiz	Assign	Mid	Final Exam
)	S01	S02	S03	S04	SO5	90S	S07		L	7	Γ	P	0	Гa	Q	As	M	Fi
	CLO1									$\sqrt{}$	1	$\sqrt{}$	$\sqrt{}$						$\sqrt{}$
	CLO2	\int								$\sqrt{}$	1	$\sqrt{}$							$\sqrt{}$
-	CLO3	√	V		$\sqrt{}$					$\sqrt{}$	1	/	√		$\sqrt{}$				$\sqrt{}$
	CLO4	√	V							$\sqrt{}$	1	/			$\sqrt{}$				V
	CLO5	√	√				√			<u>√</u>	1	<u>/</u>			√		√		
-	CL06	√	√		Ļ		√	√		<u>√</u>	1	/	, /n	L.,					√
4.0																			levant box
10					applic	cabl	e) (:	SKII	is lea	arne	d in	the o	course	of st	udy	whi	ch c	an b	e useful and utilized
•	in other				J T _ l_ Y	WES	A7	. CL											
•	2				d Lab' tion L					<u> </u>									
-	3	COI	111111	iiiicai	HOII L	au Iv	100	uies											
11	Distribut	tion	of St	uden	t Lear	nin	g Ti	me	(SLT	<u>')</u>									
							0				nd I	earr	ing A	ctivit	ies			Tota	al(SLT)
						CL	٥,	Gu	iided	i		Gui	ded	Ind	lepen	ıden	t		
	Course C	onte	ent C	utlin	e			lea	arnir	ıg(F	2F)		rning		irnin	g			
								т	Т	D	Λ	(NI	F2F)	(NI	F2F)				
	Chapter	. 1.				CI	.01	L	1	P	0							15h	γ.
	_					GI	101	2	2	2		3	hr	(6hr			1311	11
	Introdu	ıctic	n					h	hr	hr									
-	1.1 Dorri	0111	of ai	anala	and			r											
	1.1 Revi	ew (JI SI	gnais	anu														
-		requ	ency	d	lomair	1													
	represen			signal	S														
	1.30verv			- L															
ļ	Commun 1.4 Comr				nnele							+							
}	1.5 Need											\dashv							
ļ	1.6 Type											\top							
-	1.7 High low level	level	mod	dulatio		i													
-	1.8 Base signals				sband														
ļ	Chapter	2:				CI	.02		2	4		+_	·	<u> </u>	- 1.			24h	ır
	Amplitu		Mod	ulatio	on			6 h	3 hr	4 hr		5	hr	(5hr				

(AM)		r					
(All)		1					
2.1 Time and Frequency domain representation of AM signal.							
2.2 Double side band with Carrier (DSB-C), Double side band suppressed Carrier (DSB-SC) modulation and demodulation techniques.							
2.3 Single Side Band (SSB), Vestigial Side Band (VSB), and Quadrature Amplitude modulation and demodulation techniques.							
2.4 Overview of Frequency Division Multiplexing (FDM)							
Chapter 3: Angle Modulation	CLO3	6 h r	3 hr	4 hr	5hr	6hr	24hr
3.1 Time and Frequency domainrepresentation of Angle Modulation (FM & PM) signal							
3.2 FM and PM modulation anddemodulation techniques							
3.3 Narrow band and Wide bandAngle modulation							
3.4Stereophonic FM Broadcasting							
3.5 Radio Receiver (Tuned Radio Frequency and Super heterodyne Receiver)							
Chapter 4: NOISE	CLO4	6 h r	3 hr	4 hr	5hr	6hr	24hr
4.1 Overview of random process							
4.2 Sources of Noises 4.3 Frequency domain							
representation of Noise							
4.4 Gaussian and white noisecharacteristics							
4.5 Super position of Noises,Linear filtering of Noises							
4.6Mathematical Representation of Noise.							
4.7 Signal to Noise Ratio, Figure of Merit							

Г															
		Equivalent No													
		stance of Amp													
-		perature of sy	stem												
		pter 5:			CLO5	2	2 hr	2 br		3hr	6hr	15hr			
		SE IN AMPLITU DULATION SYS		;		h r	m	hr							
•	5.1	Noisy Receive	r Mod	lel											
•		Noise in AM eivers	DSE	3-FC											
•	5.3	5.3 Threshold Effect													
		Noise in AM eivers	DSE	3-SC											
•		Noise perfor receivers	mano	ce of											
•		pter 6:			CL06	1	2 hr	2 hr		2hr	3hr	10hr			
		SE IN FREQUEN DULATION SYS		;		h r	111	111							
•	6.1	FM Receiver M	Iodel												
Ī	6.2	Noise in FM R	eceiv	er											
ŀ	6.3	Pre-emphasis	and	l De-											
	emp	hasis in FM Sy	stem	ıs											
Ī	6.4	FM Threshold	l Effe	ct											
ŀ	Tota	al										117 hr			
•	Asse	essment		<u> </u>											
ŀ	Con	tinuous		Per	centag	e	То	tal-	F2F	NF2F	SLT				
	Asse	essment		50(%)										
Ī	1	Quiz 1		5							1 hr				
Ī	2	Lab		15						√	28hr				
	3	Assignment		10							8 hr				
	4	Mid Test		20							3 hr				
	Tota	al									40 hr				
	Fina	al Exam		Perce (%)	entage	5	0 F	2F		NF2F	SLT				
		al Exam					٧	/			3hr				
	Gra	nd Total SLT									160 Hrs.				
Ī							•				to Face, $N\overline{F2}$	F = Non-Face to FaceNote:			
	indicates the CLO based or							oeri	ng in it	em 9.					
12	Spe		MATLAB Software												
	requ	uirements	2	Comp	Computer lab										
	and	resources to	LabVIEW Software												
	deli		se an i												
	(e.g.		se an i												
		iputer lab,	5	21100			-								
	simulation room														
	et	c.)													

13	Textbook and	T	Communication Systems, 4th Edition, Simon Haykins, Wiley, 2006.
	reference:	e	Modern Digital and Analog Communication Systems, 4th edition, B P Lathi, Oxford
	(note: ensure the	X.	University Press, 2010.
	latest edition		Digital Communications, John G Proakis, Tata McGraw Hill Publications.
	/publication)	R	[1]. Principles of Communication Systems, Taub and Schilling, McGraw Hill
		e	Publication, 2008.
		f.	[2] Analog and Digital communication system, Dr. Sanjay Sharma, 2015

				Adama Science a	and Tech	nology University					
1	College	: Applied	Science	I	Departm	ent: Physics					
2	Course Categor	у	Basic Mano	latory							
	Course		Solid State	Physics							
	Course		Phys3202								
3	Synops	is:	physics, wi particularl Binding En	th emphasis on t y in materials tha ergy in Crystals,	he beha at are m Therma	vior of electrons in etallic. The other co	sic ideas that underlie solid state crystalline structures, ontents are X-ray diffraction, ds, Dielectric properties of solid, gas.				
4	+	nic Staff:	Dr. Solomo	n Tiruneh, Dr. T.	Gurumı	sa					
5	Semest Year of	fered:	Semester :	I	Year:	3					
6	Credit I		3								
7	Prerequ Co-requ any)	uisite/ uisite: (if	Phys2208								
8	Course	Learning	Outcome (C	LO): At the end o	f the cou	irse the student wi	ll be able to:				
	CLO1		-	icture of solids ir n reciprocal spac		of a space lattice + 1	unit cell, and relate structures in				
	CLO2				-	related to the proand the Brillouin z	operties of the reciprocal lattice, one				
	CLO3	describ	e the various	s atomic bonds, p	ropertie	es of metallic crysta	ls and cohesive energy.				
	CLO4	apply k		f how crystalline	e struct	ures vibrate and t	he associated theories of heat				
	CLO5	CLO5 be familiar with and understand the magnetic and dielectric properties of solids for practical applications									
	CLO6		about the fi	ree electron's ga	s, electr	ical, thermal and c	optical properties in terms of the				
9	Mappin Assessr	_	ourse Learni	ng Outcomes to t	he Stud	ent Learning Outco	mes, Teaching Methods and				

								Stude	nt Out	comes	s (SO)						
														Ass	essme	ent	
Course Learning Outcomes (CLO)	S01	202	803	804	805	908	S07	Tea	aching	Metho	ods	Test	Quiz	Assignment	Project	Lab-report	
ٽ ō								L	T	P	0						
CLO1		-	-	-	-	-	-			-	-				-		-
CLO2	-	$\sqrt{}$	-	-	-	-	-			-	-				-		-
CLO3	-	-		-	-	-				-	-				-		-
CLO4	-	-	-		-	-				-	-				-		-
CLO5	-	-	-	-		-			$\sqrt{}$	-	-	V			-		-
CLO6	-	-	-	-	-	-				-	-				-		-

elevancy between the CLO and SO by ticking " \checkmark " on the appropriate relevant box

10 Transferable Skills (if applicable)

(Skills learned in the course of study which can be useful and utilized in other settings)

- 1. Students will have the interest in developing local technologies and adapting technologies for local needs.
- 2. Students can able to solve problems related to interdisciplinary fields

	Distribution of Student Lea								
		CLO					d Learning Act		Total (SLT)
	Course Content Outline	CLU	Gu		learni 2F)	ing	Guided Learning (NF2F)	Independent Learning (NF2F)	
			L	T	P	0			
	Chapter 1: Crystal Physics		6	2	-	-		5	13
	1.1 Introduction- atomic models	1			-	-		1	
	1.2 Lattice points and space lattice	1	3	1	-	-		1	7
9	1.3 Fundamental types of lattices	1			-	-		1	
	1.4 Index system for crystal planes	1	3	1	-	-		1	6
	1.5 Classification of crystals	1	3	1		-		1	O
	Chapter 2: X-ray diffraction		4	2	-	-		5	11
	2.1 Reciprocal lattices	2			-	-		1	_
	2.2 Diffraction of waves by crystals: Bragg's law	2	3	1	-	-		2	7
	2.3 Brillouin zones in one and two dimensions	2	1	1	-	-		2	4

Chapter 3: Binding Energy in Crystals		5	2	-	-	6	13
3.1 Bonding in solids	3		1	-	-	1	_
3.2 Ionic bonding	3	2	1	-	-	1	5
3.3 Covalent bonding	3			_	-	2	
3.4 Metallic bond	3			-	-	1	
3.5 Properties of metallic crystals and Calculation of cohesive energy	3	3	1	-	-	1	8
Chapter 4: Thermal properties of solids		7	3	-	-	8	18
4.1 Crystal vibrations	4			_	_	2	
4.2 Explanation about the Lattice specific heat	4			-	-	1	
4.3 Dulong and Petit law derivation with explanation based on Classical theory	4	3	1	-	-	1	8
4.4 Einstein's theory of specific heat	4			-	-	2	
4.5 Debyes theory	4	4	2	-	-	1	10
4.6 Explanation about the thermal conductivity	4			-	-	1	
Chapter 5: Dielectric		9	3	_	_	10	21
properties of solid			3			10	21
5.1 Review of basic formulae	5	3	1	-	-	1	6
5.2 The microscopic concept of polarization	5	3	1	-	-	1	O
5.3 Langevin's theory of po-larization in polar dielectrics	5			-	-	-	
5.4 Clausius-mosotti relation	5			-	-	2	
5.5The static dielectric constant of solids and liquids (Elemental dielectrics, Polarization of ionic crystals)	5	3	1	-	-	2	8
5.6 Ferroelectricity	5	2		-	-	2	-
5.7 Piezoelectricity	5	3	1	-	-	1	7
Chapter 6: Magnetic properties of solids		8	4	-	-	8	20
6.1 Magnetic permeability	5	2	1	-	-	-	
6.2 Magnetization	5	3	1	-	-	-	6

	6.2	Diamagnations		۲							2	
		Diamagnetism		5			-	-			2	
		Paramagnetism		5	2	1	-	-			2	6
	6.5	Ferromagnetism		5		1	-	-			1	
	para ferr	Quantum theory of amagnetism and omagnetism		5	3	2	-	-			2	8
	6.7	The domain model		5			-	-			1	
		pter 7: The free ctron Fermi gas			6	2	-	-			6	14
		Energy levels in one ension		6			-	-			2	
	on t	Effect of temperatur he Fermi-dirac ribution	e	6	3	1	-	-			1	7
		Free electron gas in ee dimensions		6	_		-	-			2	7
		Heat capacity of the stron gas		6	3	1	-	-			1	,
			tal		45	1 8	-	-			48	111
							Asses	smen	t			
	Con	tinuous Assessment		Percer Total-5	_		F2			NF2F		SLT
	1	Quiz 1		5			V			-	3	0 min.
	2	Quiz 2			5					-	3	0 min.
	3	Assignment 1		5			-			$\sqrt{}$.5 hrs.
	4	Assignment 2		5			-			$\sqrt{}$.5 hrs.
	5	Mid Test		30					-			2 hrs.
	г.	l r		Tot		<u> </u>	Ε') F		NEOE	•	6 hrs.
		al Exam	Pe	rcentage 50	50 (%)	F	2F	_	NF2F		SLT
	FIII	al Exam		50				(Cr	and	l Total SLT		3 hrs. 20 hrs.
		Lecture, T = Tutoria e: indicates the CLO						F = Fa	ace	to Face, NF2		
12	and deli (e.g com	cial requirements resources to ver the course . software, nputer lab, ulation room c.)	1	Power Point Projector								
13		t book and erence:	1	Introduc Edition.				ite Ph	ysi	cs by Charle	s Kittel, Wiley a	nd Sons, 8 th
	(No	te: ensure the	Solid Sta	Solid State Physics by S.O. Pillai (Reference Book)								

1			
	latest edition		
	/publication)	3	Elements of Solid-State Physics by J.P. Srivastava (Reference Book)
	/ publication)		

						Adan	na Sci	ence and	Technol	ogy Unive	rsity					
1	School:							De	epartmen	t:						
2	Course		G	enera	al Cou	rse										
	Catego															
	Course					Ethiop	ia an	d the Ho	rn							
	Course				1003											
3	Synops	is:	re pa th fo er ri m	egion atternese ormatend of valry	Ethical Ethica	opia an well a rical be and ac 13th de, etion at	nd the relication of the control of	Horn. It gion and ounds, t ment in ary. Hist al relat s, Italian	treats hull religious the cours terms of orical procession, three occupati	iman evo s process e describ architectu ocesses i eats and on, and so	lutiones in es stare, was noted to the estimated to the e	n, Neolith Ethiopia ates, ext vriting, c ing stat jor bat economi	hic Revoluta and the ternal contains alendar, and the feet format tles, centicolution	d introduces the tion, settlement Horn. Based on tacts, economic and others to the ion and power ralization and as from 1800 to		
4	Name(1941 makes central position in the modern history of the region. e(s) of emic														
	Acaden	nic														
	Staff:															
5	Semest			Sen	neste	r:	II		Year:	3						
6		offered: 3														
7	Prerequ	•	N	one												
	Co-requ															
0	(if any)		0		((\			.ll .		11.11.1				
8	Course	Learni	ng O	utcor	ne (C	،LUJ: Æ	at tne	ena or tr	ie course	the stude	nt Wi	ii be abie	e to ao:			
	CLO-	Ident	ify th	e nat	ure o	f histo	ry an	d criticiz	e sources							
	1		,				,									
	CLO-	Identi	fy pe	rtine	nt so	urces	for the	history	of the pe	oples of E	thiop	ia and th	ne Horn			
	2															
	CLO-	Descr	ibe cl	nange	es and	d cont	inuiti	es in Eth	iiopia and	d the Horn	1.					
	3	.									•					
	CLO- 4	Discus	ss the	e caus	ses, co	ourses	and	conseque	ences of e	vents that	thapp	oened in	the region			
	CLO-	Explai	in the	natı	ire of	the re	gion's	s externa	l contact:	s and thei	r effe	cts				
	5															
	CLO 6	Appre	ciate	peop	oles" a	achiev	emen	ts, herita	iges and o	cultural di	versi	ties of th	ne region			
9	Mappir	ng of th	e cou	rse L	earni	ing Ou	tcome	es to the	Students	Outcome	Teac	hing Me	thods and	Assessment:		
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	e ing	me					. =					Ass	essment			
	ourse earning	SO-1	S0-2	SO-3	SO-4	SO-5	9-0S		ching hods	est	Juiz	Assi gnm	Proj	ab- epo t		

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	CLO-	3																	
	CLO-	4																	
	CLO-	5																	
	CLO	6																	
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	2					ubstant	iatio	n o	f argu	ıme	nts.								
	3	Docum						_											
11	Distr	ibution	of Stu	dent l	Learn	ing Tim	e (SL	T)											
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						CLO						10 Le			tivities		ı	Total (SLT	1)
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	2.4. F	Religion	and Ro	eligio	us														
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	and S	Socio-Cu	ltural	Proce	esses														
	in Et	hiopia ai	nd the	Hori	ı to														
		nd of th			tury														
		Evolution																	
	3.2 A	ncient P	olities	S															

3.3. External Contacts						
3.4. Economic Formation						
3.5. Socio-cultural						
Achievement			4			4.4
Chapter 4: Politics, Economy and Socio-Cultural Processes from the Late Thirteenth to the beginning of the Sixteenth Centuries 4.1 The "Restoration" of the "Solomonic" Dynasty	4	3	4		7	14
4.2. Power Struggle, Consolidation, Territorial and Religious Expansion of the Christian Kingdom						
4.3. Political and Socio- Economic Dynamics of Muslim Sultanates						
4.4. Rivalry between the Christian Kingdom and the Muslim Sultanates						
4.5. External Relations	5					
Chapter 5: Politics, Economy and Socio-Cultural Processes from Early Sixteenth to the End of the Eighteenth Centuries		5	5		10	20
5.1. Interaction and Conflicts between the Christian Kingdom and the Sultanate of Adal	6					
5.2. Foreign Interventions and Religious Controversies						
5.3. Population Movements						
5.4. Interaction and Integration across Ethnic and Religious Diversities						
5.5. Peoples and States in Eastern, Central, Southern and Western Region	4					
5.6. The Period of Gondar (1636-1769) and Zemene- Mesafint / Era of the Princes (1769-1855)						
Chapter 6. Internal Interactions and External Relations in Ethiopia and the		5	5		10	20

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	Horn, 1800-1941												
	6.1. The Nature of Interactions among and States of Ethio Horn			4									
	6.2. Power Rivalry												
	6.3. The Making of Ethiopian State			4									
	6.4. Modernization		pis	4									
	6.5. Socio-Economic Issues/Development	nts											
	6.6. Socio-Economi Issues/Developme			5									
	Chapter. 7. Interna Developments and Relations, 1941–19	Extern	al		3	2					5	10	
	7.1. Post-1941 Imp Period			5									
	7.2. The Derg Regin 1991)	ne (197	74-	6									
		,	Γotal		27		27				54	108	
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	Continuous Assess	ment	7	Percer Cotal-5	_			F2F			NF2F	SLT	
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	2 Assignments		10%				1					1	
	3 Tests		10%				2					2	
	4 Assignments		10%)			1					1	
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	Final Exam		50		- ,		2			4		6	
			•								Grand Total SL	Т 120	
L = Lecture, T = Tutorial, P = Practical, O = Others, F2F = Face to Face, NF2F = Non Face to Face Note: indicates the CLO based on the CLO's numbering in item 9.										o Face			
12	Special	1	Ch	oose a	n ite	m.							
	requirements	2	Ch	oose a	n ite	m.							
	and resources to	3											
	deliver the												
	course (e.g. software,												
	computer lab, simulation room etc.)	5	Cn	oose a	in ite	m.							
13	Text book		Mi	nistry	of Sc	ience	and l	Highe	r Edu	cation Hi	story of Ethiop	ia and the Horn	

	Module.

			Ac	lama Science and T	Technology U	Jniversity	
1	College:	CoEEC			Departmen	t: ECE	
2	Course		Major Elective				
	Category	7					
	Course N	lame	Microelectron	ic devices & circui	ts		
	Course C	Code:	ECEg-3306				
3	Synopsis	::	Semiconductor of BJT, MOSF CMOS, CMOS based amplificand advanced	or devices, analysis ET operation and invertor, Implem ers and differentia I filters including	s of BJT as ar MOS spice re entation of al pair have Butterworth	n amplifier and swi nodel. Further in o circuits using CM to be discussed. th filter have to be	ered include review of tch, Small signal model chapter III the basics of OS invertor and CMOS are operational amplifier discussed in chapter 4. erformance matrices
4	Name(s) Academi	c Staff:					
5	Semeste	r and	Semester:	II	Year:	III	
	Year offe	ered:					
6	Credit H	our:	3(2/0/3) (lec	/tut/lab)			
7	Prerequi	site	Electronic Cir	cuit-II (ECEg2202)			
8	Course L	earning	Outcome (CLO): At the end of the	course the s	student will be able	to do:
	CLO1	Explai	n the basic conc	epts realization of	microelectro	onic devices and ci	rcuits;
	CLO2	Explai	in the analysis o	of BJT and MOS in o	context with	microelectronics d	evices to circuits
	CLO3	Imple	mentation of Di	gital and analog ci	rcuits using	CMOS based circuit	ts
	CLO4	Analyz	e and design op	o-amp based circui	ts and advan	ced filters	
	CLO5	Learn	and design the a	analog to digital co	nvertor and	vice versa.	
9	Mapping	of the c	ourse Learning	Outcomes to the S	Student Outco	omes, Teaching Me	thods and Assessment:
	Course Learning Outcomes			Stuc	lent Outcom	es (SO)	

		S01	S02	S03	804	805		908	807		Γeac Meth				Ass	sessm	ent	
										L	T	P	0	Lab		Assignment	Mid Exam	Final Exam
	CLO1	V								√	√	V		√	√	√	√	
	CLO2		V	,	,					√	√			√ 	√	√ 	V	
	CLO3			V	√	<u> </u>				1	√	√ 		√ 		√ 		√
	CLO4		$\frac{ }{\text{between t}}$	l CLO	100:::	 √	11	u Iv		√	√	1		√ 		√		٧
1 0	(Skills 1 2	SPICE:	kills (if ap in the cou software AB (Simuli	nk)														
	3		odern mic				circui	its de	sign an	d sim	ulati	on t	ool	S				
1	Distrib	ution of	f Student L	Learning T	ime (SLT)) 	,	Геасh	ing and	d Lear	ning	Act	ivit	ies			То	tal
1	Course	e Conten	t Outline		CLO	Gı L	iided	learn 2F)		(L	Guide earn (NF2	ed ing		Ind t L	eper earn NF2		_	T)
	Chapt	er one					1	1									101	
	_	uction	to		CLO1	4hr	_	_	_	1hr				5hr				11
		electror																
			of microele nificance	ectronics														
		view of s	emicondu als	ictor														
		arge car ergy ban	riers, dopi ıds	ng, and														

1.4 p-n junctions, diode behavior and band diagram								
Chapter Two: Transistors Analysis	CLO2	6hr	-	3h r	-	2hr	6hr	17hr
2.1 BJT operation, characteristics, and biasing 2.2 Small-signal models and linear applications 2.3 BJT as a switch and Ebers Moll Model								
2.4 MOSFET operation and characteristics 2.5 MOS Parasitic & SPICE Model								
2.6 Current Mirror								
Chapter Three: CMOS Circuits	CLO2, CLO3	6hr	-	3h		3hr	8hr	20hr
3.1 CMOS Inverter Basics								
3.2 Logic gates and basic combinational circuits using CMOS								
3.3 Biasing of MOS Amplifier								
3.4 CMOS Common Source/Common Gate /Source Follower- Amplifier Configuration 3.5 MOS Differential Amplifier								
3.6 MOS Current Mirror								
Chapter Four: Operational Amplifiers and Filters	CLO4	4hr	-	2h	-	4hr	5hr	15hr
4.1 Ideal vs. non-ideal op-amps								
4.2 Design of amplifiers and filters using op-amps								
4.3 First and Second Order Filter Functions,4.4 Butterworth and Chebyshev								
Filters Chapter Five:	CLO5	6hr	-	3h		4hr	7hr	20hr
ADC and DAC								

					T			ı	Т				I
							r						
	5.1	How ADCs work	: sampl	ing									
		and quantization	1										
	5.2	Successive Appr	oximati	on									
		ADC : Operation	and										
		applications											
	5.3	How DACs funct	ion:										
		converting digita	al signal	ls to									
		analog											
	5.4	Binary-weighted	l DAC:										
	Cir	cuit configuration	n and										
		operation											
	5.5	Performance Me	etrics:										
		Resolution, linea	-	ttling									
		time, and power											
		consumption											221
									Т	'otal			82hr
						Assessm	ent						
	Cor	ntinuous Assessm	nent]	Percentage		F2	F	N.	F2F		SI	Т
				Т	otal-60(%)								
	1	Quiz			5%							11	nr
	2	Lab			15%				√			24	hr
	3	Assignment			10%							81	nr
	4	Mid exam			20%		$\sqrt{}$					2.5	.hr
		<u> </u>								•	Total	37.5	5 hr
	Fin	al Exam		Perce	ntage 40 (%	b)	F2	F	N.	F2F		SI	Т
	Fin	al Exam			50%		$\sqrt{}$					3	hr
			1			ı			Grand	Tota	l SLT	12	0 hr
	L =	Lecture, T = Tuto	orial, P	= Practi	cal, O = Oth	ers, F2F	= Fac	e to Fac	ce, NF2F = N	Non F	ace to F	ace	
	Not	te: indicates the (CLO bas	ed on t	he CLO's nu	mbering	in ite	m 9.					
1		ecial	1	MATLA	B Software								
2	_	quirements and cources to	2	Compu	ter lab								
		iver the course	3	SPICE									
	(e.g	g. software,											

	computer lab, simulation room	4	MATLAB (Simulink)
	etc.)		
1 3	Text book and reference:	1	Behzad Razavi, Fundamentals of Microelectronics, Second Edition University of California, Los Angeles
3	(note: ensure the	2	M. N. Horenstein, Microelectronic Circuits and Devices, Prentice Hall, 2nd ed., 1996.
	latest edition	3	R. C. Jaeger, Microelectronic Circuit Design, McGraw Hill, 1997.
	/publication)	4	S. Sedra and K. C. Smith, Microelectronic Circuits, 4th ed., 1997.
		5	Adel S. Sedra , K. C. Smith : Microelectronic Circuits: Microelectronic Circuits, Oxford University Press; 5th edition Nov 2003

						A	dam	a Sci	ence ar	ıd Techn	ol	ogy U	nivei	rsity	7						
1	College	: COEI	EC						D	epartmer	ıt:	ECE									
	Course	Catego	ory	Ma	ajor	Elect	ive														
2	Course	Name		Op	toel	ectro	nics														
	Course	Code:		EC	Eg3	318															
3	Synops	is		Op Ra pri	toel y Ti incip	ectro racin oles,	onic g an stru	mate nd In octure	erial, Ra naging. es, and	will studiometry Compreh their charges of La	a en ara	nd Ph d wic acteri	otom le ra stics.	netry nge Des	y, v of sign	ariou optic con	us Op cal di ivers:	itics iodes	Len op	ses a erati	nd on
4	Name(s Staff:	s) of Ac	cadei	mic																	
5	Semest	er/Yea	ar off	fere	d:	Sen	ieste	er:	II	Year	3										
6	Credit I	lour:				3															
7	Prerequ	ıisite:				Nor	ıe														
9	Course	Learn	ing ()utc	ome	(CLO)): A	t the	end of t	he course	e tl	he stu	dent	will	be a	able	to:				
	CLO1	Inves opto	_			-		ather	natical (optical pr	op	erties	of se	mic	ond	ucto	rs an	d fan	ilia	r wit	h
	CLO2	Exan	nine	the a	appr	oach	ies o	f var	ious Opt	tical mirr	ors	s and	lense	S							
	CLO3	Evalı	uate	mat	hem	atica	l ope	eratio	ons, stru	icture and	d a	pplica	itions	of v	vari	ous (optica	al LEI	Os.		
	CLO4	Evalı Optio				atica	l ope	eratio	ons, stru	icture, wo	ork	king p	rincip	ole a	nd a	appli	icatio	ns of	var	ious	
	CLO5	Desig detec	_	_	plica	ation	s of	optic	al prop	erties and	l p	roces	ses in	sen	nico	ndu	ctor c	ptica	al		
	CLO6		gn ar	nd D						oplication	1S (of sem	icon	duct	oro	ptic	al sou	ırces	usi	ng	
10	Mappin Assessr		ie co	urse	lear	ning	gout	come	es to the	program	Le	earnir	ıg Ou	tcon	nes,	, Tea	ching	Met	hod	s, and	ī
	po se		dent	Ou	tcon	nes (SO)														
	Course earnin atcome	(CLO) 301	21	~	1	10	,	_	Тог	- ching				_			ment	1			
	Course Learning Outcomes	SO1	S02	S03	S04	S05	90S	S07		iching thods		Test	Quiz	Assig	nmen	Proje	Lab	Mid	exam	Final	exam

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	CLO2		√					√		√	1					√	√			√ /	√ /
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	CLO4		√	√				<u> </u>	V	1	1				1		. [V
	CLO5		<u>v</u>	•				<u> </u>	∨	ν 1/	1/				√		√				$\sqrt{}$
			he r	eleva	ncv	hetw	veen	the	CLO	and	l PO	hv 1	icki	nσ'	'√" or	the ap	nron	riate [:]	relev:	nt hox	*
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	2																				
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	1.32.			Intro																	
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	1.34.	1.3	i.	Ene	rgy t	and	s in s	solic	ls												
	1.4.	E-l	k dia	ıgran																	
	1	l.5.		p-n	junc	tions															
	Chap	ter 2	<u>2:</u>							CLO	4	4H				4Hrs	6Hı	10		14 hr	
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		2.1. P				_															
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		ODT		<u>Chap</u>			CHI	,		CLC) (6H				CII	OII			2	20 hr
	EMI7			L SO		<u>.c Ll</u>	<u>uП I</u>	-		3]]	îs.				6Hrs	8Hı	S			
	3.1. L					des															
	3.2. I								+												
				mo j		ion l	LED		+												
	3.4. F							is													
				D ma		als															
	3.6. F	rom	LEI) to la	aser																

Chapter 4: Semiconductor Applica		CLO 4	4H rs	5 H rs		3Hrs	3 Hrs	15 hr
4.1. Laser Evolution				13				
4.2. Laser Materials								
4.3. Principles of LASER								
Operation								
4.4. Laser Dynamics &								
Modulation response	9							
4.5. Types of Lasers								
4.6. Modes of LASER Ope	erations							
<u>Chapter 5:</u>		OI O	4H	4				16 hr
<u>OPTOELECTRON</u>		CLO	rs	Н		4Hrs	4Hrs	
<u>RS</u>	_	5		rs				
5.1. Optical Absorption is	n a							
Semiconductor								
5.2. Materials for Optical								
Detectors		<u></u>	<u> </u>					
5.3. Photocurrent in a P-								
5.4. Photocurrent in a P-								
5.5. Photo conductive de	tector							
5.6. Photo Transistors								
5.7. Advanced De	tectors							
Chapter 6: MODULATO	<u>RS</u>	CLO	4	4		4Hrs	6 Hrs	18 hr
		6	Hr	Н				
			S	rs				
6.1. Light modulation an	d							
Modulator choices								
6.2. Modulator paramete								
6.3. Electro-optic modul								
6.4. High-speed electro-o	ptic							
Modulator design								
6.5. Electro absorption r								
6.6. Electro absorption n								
Structures and parar								
6.7. Modulator and laser	drivers						m . 1	051
			Λ				Total	95 hrs.
C1'	1		Asses	ssmen	τ	<u> </u>		T
Continuous Assessment	Perce	ntage T	otal-5	50(%)		F2F	NF2F	SLT
1 Test		109	%			V		2 hr
2 Assignment	:1	5%						9 hr
3 Mid exam		209						2 hr
4 Assignment	2	109						9 hr
1 - 0	L	- 1				1	Total	22
Final Exam	Perce	ntage 5	0 (%)			F2F	NF2F	SLT
Final Exam		50	()			√ V	3 hrs.	
						· ·	rand Total SLT	
L = Lecture, T = Tutorial	D - Practical	$\Omega = \Omega t$	iers F	72F =	Face			

12			ents and resources to	1	Opto Lab						
	deliver the collab, simulation		(e.g. software, computer	2							
2.	iab, Sililulatio	511 1 00	ometc.j	3							
13		1	Optoelectronics and Phot	tonics Principles and Practices, S.O.KASAP							
		2	Semiconductor Devices for	or High-Speed Optoelectronics, GIOVANNI GHIONE							
		3	1	bert F. Coughlin. Solid State devices and Fundamentals of							
	Text book		Optoelectronics, CLIFFOR	RD R. POLLOCK, Cornell University.							
	Reference:	4	Semiconductor Optoelec	ctronics Physics and Technology, Jasprit Singh, McGraw-							
			Hill,Inc.								
		5	S. Wang, Fundamentals o	of Semiconductor Theory & Device Physics, Prentice Hall,							
			1989								

	ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY													
1	College: C	oEEC			DI	EPA	RTME	NT: CSE						
2	Course Category:	Major	Course											
	Course Title:	Object	: Oriented P	rogramı	ming									
	Course Code:	CSEg2	202											
3	Synopsis:	develo begins paradi empha the ob	op problemes with a con igm, includi asis on stru ject-oriente ojects. Key t	solving parison and a brid a brid ctured deduced progressing to be a contraction of the c	skills un of the ef review lata typerammin clude in	sing stru w o es a g pa nher	g an objectured f controlled arradigments.	ect-oriented programmir of structures by processing on packages an	ject-oriented programming (OOP) and programming language. The course in paradigm and the object-oriented and data types, with a particular g. Subsequently, the course introduces in the definition and utilization of classes in the definition and utilization					
4	Academi c Staff:													
5	Semester and Year offered:	Sem este r:	II		Ye	ear :	2							
6	Credit Hour:	3	Lect:	2	Lab:		3	Tutor:	0					
7	Prerequi site / Co- requisite : (if any)				CSE1	102	(Funda	amental of Pr	rogramming)					
8	Course Lea	rning 0	utcome (CL	0): At th	ne end c	of th	e cours	e the studen	t will be able to:					
	CLO-1	structure	ed program	ming, hi	ighlight	ing	its adva	antages and a						
	CLO-2	nformat	ion hiding,	inherita	nce, an	d pc	olymorj	ohism, with r	ling data abstraction, encapsulation, relevant examples.					
		Apply ob using Jav	•	ed progr	ammin	g pr	inciple	s to develop	solutions for real-world problems					

	CLO-4		_			_	ment ues a	-				tion	s to	mai	nipu	late	file	s ef	fect	vely	y, ensuring proper exception
	CLO-5	Cr	eat	e G	UI-b	ased	Java	ap	pli			to a	ddr	ess	real	-W0	rld p	orob	len	ıs, iı	ncorporating user interface
9							onali	_		c (C	ΙΩc) to	tho	Ctu	dont	- I or	rni	na C	luto		es (Sos), Teaching Methods
9	and Asse				Lea	.I 111111§	g Out	CO	ше	s (C	LUS	j to	me	Stu	aem	Lea	11 111	ng c	rutc	OHIE	es (sos), Teaching Methods
						rnin (SOs	ıg Ou	tc	om	es			chin hod							As	ssessment
	Learning Outcomes (CLOs)	S0-1	7-0S	SO-3	S0-4	SO-5	9-0S	ı	S0-7	8-0S	6-0S	Tec	Lab/Tut	PBL	GD	Test	Quiz	nt	Mid Exam	Proiect	First Institution
	CLO-1 CLO-2 CLO-3	$\sqrt{}$										$\sqrt{\frac{}{}}$	$\sqrt{\frac{}{}}$						$\sqrt{\frac{1}{\sqrt{1}}}$		√ √ √
	CLO-4 CLO-5		V	V		√						$\sqrt{\frac{1}{\sqrt{1}}}$	V				$\frac{v}{}$	V √	V		$\sqrt{}$
1	Indicate Transfer	able	Sk	ills	(if a	applio	cable)													e relevant box
0	(Skills lead	arne	ed i	n tł	ie co	ourse	e of st	uc	dy v	vhic	ch ca	an b	e us	eful	and	l uti	lized	d in	oth	er se	ettings)
	3etc.																				
1	Distribut	ion	of 9	Ctu	dont	- I 001	rnina	Тi	imo	CI	ፐን										
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_								Guided Learnin				Guided			Independe		le				
	Cours	e Co	nnt	ent				(F2F)		•	Ь	Learnin			g	nt Learning (NF2F)			ng		Total (SLT)
		utlii		CIIC		CLO	o lī		T	P	0	1	(NF2F)			(NFZF)				•	
	Chapter					<u> </u>	<u> </u>	+	_			Ï									
	Introduce Program Paradign Java, Fea Java vs C Environd JDK, JRC,	min ms, H ture ++, nen JVN	g list es o Jav t se I	f Ja a etur	va, D,	CLO 1) \	<i>[</i>					:	3							3
	Chapter and Class Object, D Variables Java Prog Structure Statemen Statemen Construct Wrapper Naming (Array in	ss: Coata s, Opgran e, SC nt, Co nts, ctors Con	las typ pers n)P ont s, ss,	s, oes, ato	rs,	CLG 2	1 1			V			1	2			2	2			14

ſ	Chapter 3 -	1											
	Inheritance: Aggregation, Overloading and Overriding Methods, In boxing and Out boxing Supper and Final Keyword, Polymorphism, Abstract Class	CLO 2,3	V		\checkmark		12	1	13				
	Chapter 4 - Package												
	and Interface: Interface, Package, Access modifiers, Encapsulation	CLO 3					9	2	11				
ı	Chapter 5 -												
	Exception Handling: Types of Exception, Hierarchy of Exception Handling, Try-Catch- Final Blocks, User Defined Exceptions	CLO 4	$\sqrt{}$				10	2	12				
	Chapter 6 - File and												
	I/O: I/O Streams, Hierarchy Chart for byte Streams, File I/O Stream, Date I/O Stream, String Handling and Tokenization	CLO 4	V				8	1	9				
ľ	Chapter 7 - GUI:												
	Java Swing, Window Component, Event Delegation Model, Event-Driven programming and Event Handling	CLO 5	V		$\sqrt{}$		8	2	10				
	Chapter 8: Multithreading: Thread, State of a Thread, Thread API, Synchronization, Inter-Thread Communication.	CLO 5	V		\checkmark		9	1	10				
1													
3	Continuous Assessment	Perc	(50	%)	Γota	1	F2F	NF2F	SLT				
	Test		Į	5			1	3	4				

	Quiz		5	2	0	2								
	Assignment		10	1	3	4								
	Mid Exam		20	1	5	6								
	Project		10	4	10	14								
		Perc	entage Total											
	Final Exam		(50%)	F2F	NF2F	SLT								
	Final Exam		50	3	7	10								
			Grand Total SLT 122											
		al, PBL :	, PBL = Problem based learning, GD = Group Discussion, F2F = Face to Face, NF2F =											
	on Face to Face													
	Note: indicates the CLO based on the CLO's numbering in item 9.													
1	Special requirements	1	Software: JDK	Software: JDK and NetBeans IDE or any Text Editor										
4	and resources to	2	Computer Lab	oratory										
	deliver the course	3												
	(e.g. software,	4												
	computer lab, simulation room etc.)	5												
1	Text book and	1	"Java: How to	Program", P.J. D	eitel & H.M Dei	tel, 11th Edition Pearson								
5	reference:	1	Education, 20	17.										
	(note: ensure the	2		nplete Referenc	e", Herbert Sch	ildt, 11th Edition, Tata McGraw								
	latest edition		Hill, 2019.											
	/publication)	3												
	web sources	1		javatpoint.com,	•									
		2	https://docs.o	https://docs.oracle.com/javase/tutorial/										

	ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY												
1	College: CoEEC					DEPARTME	NT: S	Software Engineering					
2	Course Category:	Major Man	datory										
	Course Title:	<u>Introduction</u>	on to Artifi	<mark>cial Int</mark>	ellige	<mark>1ce</mark>							
	Course Code:	SEng4208											
3	Synopsis:	overview of artificial in paradigms as knowled mechanism explored.	This course is an introductory course on Artificial Intelligence (AI) that presents an overview of AI principles and approaches. It will introduce the basic principles in artificial intelligence research, simple representation schemes, problem solving paradigms, constraint propagation, and search strategies. Areas of application such as knowledge representation, programing in logic, inference and reasoning mechanism, natural language processing, expert systems, vision and robotics will be explored. The PROLOG and others AI programming language will also be introduced.										
4	Academic Staff:	Mr. Rabira	a Geleta			1							
<mark>5</mark>	Semester and Year offered:	Semeste r:	II			Year:	IV						
6			_	L a									
	Credit Hour:	<mark>3</mark>	Lect:	2 b	3	Tut:		0					
<mark>7</mark>	Prerequisite / Co-				•								
	requisite: (if any)	None None											
8	Course Learning Out	come (CLO)	: At the end	d of the	cour	se the student	will	oe able to:					

	CLO- 1	Discus	s the b	oasic p	orincij	oles o	f AI a	nd d	iffer	ent t	type	s of AI age	ents.							
	CLO-	Identif	iv vari	oue Al	l coard	rh ala	arithr	ne												
	CLO-	Apply	know						asoni	ing,	and	machine	learn	ing	tech	niqu	ues t	o rea	ıl-world	d
	CLO-		ıstrate		king k	knowl	edge	of r	easc	nin	g in	the pres	ence (of in	com	plet	e an	d/or	uncerta	ain
	4 CLO-	inform	ation.																	
	5	Develo	•									. *	0 :						3.5 .1	,
)		ig of Coi sessmer		earnır	ıg Out	come	s (CL	Us) 1	to th	e Sti	uden	ıt Learnin	g Out	com	es (S	os),	Tea	ching	Method	ds
	g es		St	udent	t Lear	ning	Outc	ome	s (SC	Os)		Teachin Method					Asso	essm	ent	
	Learning Outcomes (CLOs)	SO-1	S0-2	SO-3	SO-4	SO-5	9-0S	SO-7	8-OS	6-0S		Lec.	Lab	Quiz	nt	Mid Exam	Project		Final	Exam
	CLO- 1																			
	CLO-												$\sqrt{}$							
	CLO-																			
	CLO- 4												$\sqrt{}$							
	CLO- 5																			
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	2	Roboti	cs																	
	3	Expert	_				(Q1 T													
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		Conten					0		L			P	F)							
		ter One al Intell			on to		CL O1		3			5	8	2					10	
	1.1. De	finition	s and \	Views	of				5			J		-						

Artificial Intelligence (Intelligence, AI, AI Thoughts), 1.2. Brief History and foundations of AI 1.3. Roles of AI 1.4.Main Areas of AI 1.5. Achievements and Big Open Questions						
2. Chapter Two:Intelligent Agents 2.1 Definitions(Agent, Intelligent Agent) 2.2. Agent Types(Rational, Omniscience Agent, Ideal Rational Agent, etc.), Properties of an Agent 2.3. Parts of an Agent 2.4. Factors to measure rationality of Agents 2.5. Structure of Intelligent Agents 2.6. Agent types based on their memory and Actions, and Nature of Agent Environments	CL O1	6	6	12	3	15
3. Chapter Three:Problem Solving 3.1. Solving Problems by Searching (informed, Uninformed 3.2. Beyond Classical Search(Simulated Annealing, Genetic algorithms) 3.3. Legitimacy of Intellectual Property Protection for Software	CL 02 ,3	6	8	14	3	17
4. Chapter Four: Knowledge and Reasoning 4.1 Logical Agents 4.1. Logical Agents 4.2. First-Order Logic 4.3.Inference in First-Order Logic 4.4.Classical Planning, Planning and Acting in the Real World 4.5. Knowledge Representation	CL O4	2	4	6	2	8
5. Chapter Five:Uncertain Knowledge and Reasoning 5.1. Quantifying Uncertainty	CL O4	4	5	9	1	10

	5.2. Probabilistic Reasoning5.3. ProbabilisticReasoning over Time5.4.Making Simple Decisions, Making									
	6. Chapter Six: Learning 6.1. Learning from Examples, Knowledge in Learning 6.2. Learning Probabilistic Models, Reinforcement Learning, or Machine	CL O4	4	5	9	1	10			
	7. Chapter Seven: Communicating, Perceiving and Acting 7.1. Natural Language Processing 7.2. Natural Language for Communication 7.3. Perception, Robotics	CL 05	4	5	9	1	10			
1			Ass	essment						
3	Continuous Assessment	P	ercentag	ge Total (50%)	F2 F	NF2F	SLT			
	Quiz		5		1		1			
	Assignment		5		2	4	6			
	Mid Exam		25		2	6	8			
	Project		15		2	10	12			
	Final Exam	P	ercentag	ge Total (50%)	F2 F	NF2F	SLT			
	Final Exam			50	3	10	13			
		rand	120							
	L = Lecture, T = Tutorial, PBL = Proble Non Face to Face Note: indicates the CLO based on the C			-	Discus	sion, F2F = Face	to Face, NF2F =			
1	Special requirements and resources	1	Develo	pment Tools: SWI	I-Prolo	g, and Python				
4	to deliver the course .	2	Compu	ter Lab						
1 5	Text book and reference: (note: ensure the latest edition	1		and P. Norvig. Ar ich. 6th edition. P			Iodern			
	/publication)	2	Prentic	iction to Artificial e Hall of India, 20	09.		·			
		3	Artificial Intelligence: Structures and Strategies for Complex Problem Solving, George Luger; Benjamin Cummings, 2004							
		4	Introduction to AI and Expert Systems, D. W. Patterson; PHI, 2012. Nilsson, Nils (1998). Artificial Intelligence: A New Synthesis. Morgan Kaufmann Publishers Russell, Stuart J.; Norvig, Peter (2003), Artificial Intelligence: A Modern Approach, Prentice Hall NPTEL Videos: Artificial Intelligence							

					F	Adar	na S	cien	ce a	nd T	Γechr	ıolog	gy U	niver	sity					
1	College: CO	DEEC										1			EPCE	•				
	Course Cat	egory				Majo	r Ele	ectiv	e			1								
2	Course Na]	Intr	oduo	ction	ı to (Cont	rol S	yste	ms							
	Course Coo	de:					E330													
	Synopsis:				-	The	cour	se d	eals	with	the f	follov	wing	majo	r poi	1ts: -	intro	ductio	n to c	ontrol
3	J 1					syste	em,	cont	trol	syst	em	mod	ellin	g of	phys	ical	syste	m, ti	me d	omain omain
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4	Name(s) o	f Acader	nic S	Staff												1				
5	Semester/	Year off	ered	l:			Sen	ieste	er:	II		Yea	r	43						
6	Credit Hou	ır:					3(2	hrs I	Lectu	ire, 3	3hrs l	Labo	rato	ry)						
7	Prerequisi	te:					,	E32						<u> </u>						
8	Course Lea		utco	ome	(CL	0): <i>A</i>	At the	e end	d of t	he c	ourse	the	stuc	lent v	vill be	able	to:			
	CLO1																	ents o	f cont	rol
	CLOI		stem																	
	CLO2														ntrol	syste	ms ar	nd for	mulat	e the
	CLO3	CLO4 CLO4 CLO4 the stability analysis of control system Analyze the performance of uncontrolled system by determining system parameter (transient and steady-state parameters)			rmine															
	CLO4 Analyze the performance of uncontrolled system by determining system parameter (transient and steady-state parameters)							r												
	CLO5								_			oller	by u	sing o	differe	ent te				
	CL06	An	alyz	ze th	e pe	rfor	man	ce o	fcon	troll	er									
9	Mapping o	f the cou	ırse	lear	rning	g out	tcom	es to	the	Stu	dent	Outc	ome	s, Tea	ching	Meth	ods,	and A	ssessi	ment:
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	2 Lab demonstration																			
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Course Content Outline	CLO	le	Gui arnin	ded g (F21	F)	Guided learning (NF2F)		
		L	T	P	0			
Chapter One:	GY 0.4						1	
Introduction to control systems	CLO1	4	0	1				6hr
1.1. Definition and importance of control								
systems.								
1.2. Components of control system.								
1.3. Classifications of control system.								
1.4. Types of control system								
1.4.1. Open loop system								
1.4.2. Closed loop system								
Applications of control system in electronics								
and communication.								
Chapter Two:								
Mathamatical modeling of physical	CLO2	8	0	6		2	2	18hr
Mathematical modeling of physical system								
•								
2.1 Differential equations and system								
dynamics 2.2 Control system modelling								
2.1.1. Electrical system.								
2.1.2. Mechanical system.								
2.1.3. Electromechanical								
2.3 Transfer function and impulse response.								
2.4 Block diagram (BD)								
Signal flow graph and Mason's Gain								
Formula								
Chapter Three:	CLOS	1	0			2		21 hm
Time domain Analysis of control system.	CLO3	2	0	6		2		21hr
3.1. Introduction								
3.2. Steady state Analysis								
3.3. Analysis of steady state error								
3.4. Type of Input and steady state error								
3.5. Transient response analysis.								
3.6. Transient response specifications.								
3.7. Analysis and Design of Feedback								
Systems 3.8. Stability Analysis in S-domain.								
3.8.1. Effect of Location of Poles on								
stability								
Routh-Hurwitz Criteria and Special Cases								
Chapter Four:								
	CLO3	8	0	6		2		17hr
Root-Locus Method								

 4.1. Fundamentals of Root-Locus 4.2. Angle and Magnitude Condition 4.3. General methods for Construction of Root locus 4.4. Steps for Solving Problems on Root Locus 4.5. Gain Margin and phase margin 							
4.6. Root Locus with Positive Feedback4.7. Root Contour4.8. Effect of Addition of Poles and Zeros.Advantage of root locus							
Chapter Five: Frequency Domain Analysis.	CLO4	1 2	0	6	2	1	21hr
 5.1. Introduction to Frequency Response 5.2. Introduction to bode plot 5.2.1. Logarithmic Plot 5.2.2. Step to sketch bode plot 5.2.3. Stability analysis using bode plot 5.3. Polar Plot 5.3.1. Polar Plot of Standard Function 5.3.2. Stability determination from polar plot. 5.4. Nyquist Plot Analysis 5.4.1. Basic Definitions 5.4.2. Nyquist Analysis Stability in frequency domain 							
Chapter Six: Controller Design Techniques.	CLO5	1 2	0	6			19hr
 6.1. Type of Compensation 6.1.1. Series compensation 6.1.2. Parallel compensation 6.1.3. Series-parallel compensation. 6.2. Control Systems Design by Frequency-Response Approach (Phase-lead, phase-lag, lead-lag compensation) 6.3. PID controllers, architectures and model 6.3.1.Design of PID Controllers with Frequency-Response Approach 6.3.2.Design of PID Controllers with Computational Optimization Approach 6.4. PID Tuning methods Ziegler-Nichols Rules for Tuning PID Controllers. 	CLO6						
Chapter One:	CLO1	4	0	1			6hr

	Intro	oduction to con	trol syster	ms									
	Intr		er or by beer							T	otal	95hr	
1					Asse	ssmen	nt						
2	Cor	ntinuous Assess	ment		Percenta	ge To	tal-50(%)	F2F]	NF2F		SLT	
	1	Test	(s)			10						1hr	
	2	Assignn	nents			10				$\sqrt{}$		10hr	
	3	Lab re	port			10				$\sqrt{}$		22hr	
	4	Mid ex	kam			20		√				2hr	
								•		Total		35	
	Fin	al Exam	Percen	tage	50(%)		F2F		NF2I	7		SLT	
	Fin	ıal Exam		50%								3hr	
										Total		60hrs	
	L = Lectur	e, T = Tutorial, P	= Practica	ıl, 0 =	Others, I	F2F = F	Face to Fac	e, NF2F	= Non	-Face to	Face.		
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3	•	lab, simulation r		to deliver the course (e.g. software,							B So	ftware	
	computer	iab, Sililulation i	00111	.)	Worksh	юр							
				1	•		Control S	ystems, l	RBA Pı	ublicatio	ns, 2n	ıd	
			_		edition,								
				2			<u>J.Bakshi</u> , C	ontrol Sy	ystems	s, Technic	cal		
					Publicat								
	Text book			3	0 /								
	Reference		_	Education Publishers, 5th edition, 2010.									
	_	ure the latest ed	ition	4 Nagrath I.J. and Gopal M, Control Systems Engineering, N								g, New	
	/publication	on)		_			nal Public						
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			-		Inc., 6 th			2 1	1	DG D 11		2000	
			_	6			trol Syster						
				7	Smarajit	Ghosł	n, Control	Systems	theory	y and app	olicati	on,2007	

				Adama Sci	ence ar	nd Techn	olo	ogy University					
1	Colleg	ge: COEEC			D	epartmer	nt:	EPCE					
	Cours	se Category	Major	Elective									
2	Cours	se Name	Introd	luction to Ele	ctrical	Machine	S						
	Cours	se Code:	EPCE 3	3302									
3	Synop	osis				_		najor points: - Electromagnetic principles; rs; D.C Machines.					
4	Name Staff:	e(s) of Acader	nic										
5	Seme	ster/Year off	ered:	Semester:	3								
6	Credi	t Hour:		3 (2hr Lectui	re, 3hr	Tutorial)							
7	Prere	quisite:		EPCE2101									
8	Stude	ent Outcome	(PO): Ac	lopted from A	BET								
	S01				llate, and solve complex engineering problems by applying								
	301	principles of	of engine	eering, science, and mathematics.									

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	S03									ctors ively		th a	rai	nge	of a	udie	nces.					
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	S05																				dership objectiv	, create es.
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9	Cours				utco	ome	(CL()): A	t the	end	of	the	cou	ırse	the	stuc	lent w	rill be	able t	:0:		
	CLO1																				ng diffe	erent
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electrical machines, (stationary & rotating)								
1.36. Magnetics, magnetic fields and electromagnetic								
relationships								
1.37. Magnetic circuit parameters calculation								
1.38. Saturation and Hysteresis								
1.39. Eddy current and eddy								
current losses								
1.40. Electromagnetic Induction								
1.41. Electromagnetic Forces and								
Torque.								
Chapter Two:	CLO2	6	3	9		1	5	25hrs.
Introduction to Transformers	CLO5	O	3	フ		4	3	251115.
2.1. Introduction,								
2.2. Construction of Transformers								
2.3. Principle of transformer action,								
Ideal Two-Winding transformer								
2.4. Transformer Equivalent Circuit,								
Phasor Diagrams and								
transformer Tests								
2.5. Voltage Regulation of a								
Transformer								
2.6. Transformer Losses and								
Efficiency.								
2.7. Three-Phase Transformers and								
group connections.								
2.8. Construction & Principal								
operation of Autotransformers								
Chapter Three:	CLO3	4	6	9		5	6	28hrs.
Three- phase Induction Machines	CLO5	_						
3.1. Introduction								
3.2. Construction features of								
induction machines								
3.3. Principles of Rotating Magnetic								
field								
3.4. Operation Principle of 3-Phase								
Induction machines								
3.5. Synchronous speed and slip								
3.6. Equivalent Circuit model of induction machine								
3.7. Determination of Equivalent Circuit Parameters and Phasor								
Diagram,								
3.8. Performance Characteristics of					+			
3-phase induction machine								
3.9. Starting methods & speed								
control principles of 3-phase								
control bi incibies of 3-bilase	<u> </u>							

inductio	on mot	ors.										
С	haptei	r Four:		CLO4			0		2	4	251	
DC machine	es -			CLO5	6	b	9		3	4	25hrs.	
4.1. Construc	ction, p	rinciple	of									
operation an	d type:	s of DC M	achines									
4.2. Armatur	e reac	tion and										
commutation	n proce	ess of DC										
machines	•											
4.3. Operatio	n and p	performa	nce									
characteristi	cs of D	C machir	ies									
4.4 Losses ar	nd effic	iency in I	OC .									
machines		-										
4.5. Compari	son of	Motor an	ıd									
Generator Ad	ction											
										Total	92 hrs.	
					Asse	SSI	ment					
Continuous A	Assessr	nent	Perce	ntage T	otal-	50)(%)		F2F	NF2F	SLT	
1	Test(s))		10)				V		2 hr	
2	Assign	ment		5							6 hrs.	
				15	5					$\sqrt{}$	15hrs.	
				20)				V		2 hrs.	
									· ·	Total	25hr	
Final Exam			Perce	ntage 5	0 (%)			F2F	NF2F	SLT	
Final Exam				50		,			$\sqrt{}$		3 hrs.	
									Gı	rand Total SLT	120hrs.	
L = Lecture,	T = Tut	orial, P =	Practical,	O = Oth	ners,	F2	2F = F	ace	to Face, NI	F2F = Non-Face	to Face	
•					1					•	•	
		_	•		2		Lab N	Man	uals			
	1	John Hin	dmarsh, E	lectrica	ıl Ma	ch	ines	and	their Appli	cation, 4 th editio	on.	
				Baksh	i, El	ect	trical	Ma	achines, 4 ^t	h edition, 2018	B, Technical	
		Dr.P.S. BIMBHRA-Electrical Machinery theory, Performance and applications, 6 ^t edition.										
Text book/	4	J.B. Gupt	a, Theory a	and Per	forn	ıar	ice o	f Ele	ctrical Mad	chines, 15 th edit	ion	
Reference:	, <u> </u>	Stephen J. Champman, electrical machinery Fundamentals 2 nd Education Mc, Graw										
			r F Electr	ical Ma	chin	<u> </u>	and T	Fran	sformers F	Principles and A	nnlications	
										•••		
	Continuous 4.1. Construction and 4.2. Armature commutation machines 4.3. Operation characteristic description and the second s	Chapter DC machines 4.1. Construction, poperation and types 4.2. Armature reactommutation process machines 4.3. Operation and poperation and entire services of Dollar services and efficient machines 4.5. Comparison of Generator Action Continuous Assess 1	4.1. Construction, principle operation and types of DC M 4.2. Armature reaction and commutation process of DC machines 4.3. Operation and performat characteristics of DC machines 4.4 Losses and efficiency in I machines 4.5. Comparison of Motor and Generator Action Continuous Assessment 1	Chapter Four: DC machines 4.1. Construction, principle of operation and types of DC Machines 4.2. Armature reaction and commutation process of DC machines 4.3. Operation and performance characteristics of DC machines 4.4 Losses and efficiency in DC machines 4.5. Comparison of Motor and Generator Action Continuous Assessment Perce 1 Test(s) 2 Assignment 3 Lab report and Exam 4 Mid exam Final Exam Perce Final Exam Final Exam Perce Final Exam L = Lecture, T = Tutorial, P = Practical, Special requirements and resources to deliver the course (e.g. software, complab, simulation roometc.) 1 John Hindmarsh, E 2 U.A. Bakshi, M.V. publication 3 Dr.P.S. BIMBHRA-1 edition. Text book/ Reference: 5 Stephen J. Champin Hill. 6 Ryff Peter F. Electric Girma Mullisa, Electric Girma Mullisa, Electric Girma Mullisa, Electric Girma Mullisa, Electric Machines 4 Kosow: Electric Machines 4 Stephen J. Champin Hill.	Chapter Four: DC machines 4.1. Construction, principle of operation and types of DC Machines 4.2. Armature reaction and commutation process of DC machines 4.3. Operation and performance characteristics of DC machines 4.4. Losses and efficiency in DC machines 4.5. Comparison of Motor and Generator Action Continuous Assessment Percentage T Test(s) Assignment Lab report and Exam Mid exam Percentage 5 Final Exam Percentage 5 Final Exam Percentage 5 L = Lecture, T = Tutorial, P = Practical, O = Ott Special requirements and resources to deliver the course (e.g. software, computer lab, simulation roometc.) L = Lecture, T = Tutorial, D = Detail Computer lab, simulation roometc.) John Hindmarsh, Electrication Text book/ Reference: Stephen J. Champman, electrical Mary Girma Mullisa, Electrical Mary Girma Mary Girma Mullisa, Electrical Mary Girma Mullisa, Electrical Ma	Chapter Four: DC machines 4.1. Construction, principle of operation and types of DC Machines 4.2. Armature reaction and commutation process of DC machines 4.3. Operation and performance characteristics of DC machines 4.4 Losses and efficiency in DC machines 4.5. Comparison of Motor and Generator Action Asses Continuous Assessment 1 Test(s) 2 Assignment 3 Lab report and Exam 4 Mid exam 20 Final Exam Percentage 50 (% Final Exam Final Exam Description of Motor and resources to deliver the course (e.g. software, computer lab, simulation roometc.) 1 John Hindmarsh, Electrical Machines 2 U.A. Bakshi, M.V. Bakshi, Elepublication Dr.P.S. BIMBHRA-Electrical Machines Commanded and Perform and Perform and Perform and Exam Description and Exam Description and performance characteristics of DC machines 4 J.B. Gupta, Theory and Perform and Perform and Machines Commanded and Perform and Perform and Perform and Machines Commanded and Perform and Perform and Perform and Machines Commanded and Perform and Perf	Chapter Four: DC machines 4.1. Construction, principle of operation and types of DC Machines 4.2. Armature reaction and commutation process of DC machines 4.3. 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Comparison of Motor and Generator Action Assessment Continuous Assessment Percentage Total-50(%) 1 Test(s) 10 2 Assignment 5 3 Lab report 15 and Exam 4 Mid exam 20 Final Exam Percentage 50 (%) Final Exam Fourier Tutorial, P = Practical, O = Others, F2F = F Special requirements and resources to deliver the course (e.g. software, computer lab, simulation roometc.) 1 John Hindmarsh, Electrical Machines 2 U.A. Bakshi, M.V. Bakshi, Electrical publication 3 Dr.P.S. BIMBHRA-Electrical Machines 2 U.A. Bakshi, M.V. Bakshi, Electrical machines 4 J.B. Gupta, Theory and Performance or Hill. 6 Ryff Peter F. Electrical Machines and 7 Girma Mullisa, Electrical Machines,	Chapter Four: DC machines 4.1. Construction, principle of operation and types of DC Machines 4.2. Armature reaction and commutation process of DC machines 4.3. Operation and performance characteristics of DC machines 4.4. Losses and efficiency in DC machines 4.5. 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	Adama Science	and Technology University
1	College: SOEEC	

2	Course	Catego	ory	Ma	ijor l	Elect	ive												
	Course	Name		Inc	dust	ry Ir	iter	nshi	p-I										
	Course	Code:		EC	Eg32	00													
3																			
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														he student will be able to: mpany's profile, including its history, al structure. erational workflows within the host re used in technical processes. peration and evaluation phase's system and implementing effective problem enship experience, technical tasks reall contributions to the host company. atcomes, Teaching Methods, and Assessment Assessment V V V V V V V V V V V V V V V V V V					
	Synopsi	c.																	
	Бупоры	٥.																	
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4	Name(s Staff:) of Ac	cadei	nic															
5	Semeste	er/Yea	ar off	erec	d:	Sem	ieste	er:	III		Y	'ear	3						
6	Credit H	lour:				3					·								
7	Prerequ	isite:				All I	Prev	ious	majo	r	cour	ses							
9	Course	Learn	ing C)utco	ome	(CLC)): A	t the	end	of	the	course	the student v	will be able	to:				
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	Course Learning Outcomes (CLO)								L	T	P	0	Ac Ac Valu	Coo	Do	res			
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10	Transfer	able S	kills;	(Ski	lls lea	arnec	l in t	he co	urse	of s	stud	y which	n can be useful	and utilized	in other settii	ngs)			
	1 Te	eam w	ork																
11						Dis	trib	utio	n of S	Stu			rning Time (S						
												Γ <mark>each</mark> i:	ng and Learni	ng Activities	s Tota	l (SLT)			

	CLO			iided		Guided	Independent	
Course Content Outline]		rning	3	Learning	Learning	
		т	1) T	F2F) P	0	(NF2F)	(NF2F)	
Chapter one: INTRODUCTION TO INDUSTRIAL INTERNSHIP	CLO1	<u>L</u>	-	4h r	-	-	-	4hr
1.1 Course Overview:1.2 Objectives of the Industrial Internship:1.42. Benefits of Industry Collaboration:								
Chapter two 1.43. HOST COMPANY ANALYSIS	CLO2	-	-	4h r	-	-	-	4hr
2.1 Company Profile and History:.2.2 Organizational Structure:1.44. 2.3 Technological and Technical Structures:								
Chapter Three: 1.45. INTERNSHIP EXPERIENCE AND ACTIVITIES	CLO3	-	-	4h r	-	-	-	4hr
 3.1 Technical Structures & Workflow: 3.2 Project Involvement and Participation: 3.3 Collaboration and Teamwork: 3.4 Skills Development and Training: 1.46. 								
Chapter four: PROBLEM IDENTIFICATION AND PROPOSAL DEVELOPMENT	CLO4	-	-	4h r	-	-	-	4hr
4.1 Identifying Critical Problems:4.2 Analyzing Problems and Context:4.3 Problem-Solving & Innovation:2.9. 4.4 Developing Proposals:								
Chapter five: 2.10. COMPREHENSIVE REPORTING AND REFLECTIVE ANALYSIS	CLO5	-	-	4h r	-	-	-	4hr
 5.1 Technical Reporting: 5.2 Personal and Professional Growth: 5.3 Transitioning to the Workforce: 5.4 Comprehensive Report Preparation: 5.5 Presentation of Findings: 5.6 Conclusion and Recommendations: 								

								Total	92 hrs.				
					Asses	sment							
Continuo	ous A	Assessn	nent	t Percentage T	otal-5	50(%)	F2F	NF2F	SLT				
		isor uation er writi		20)		V		20hr				
		t Comp uation	any	2.5	5		$\sqrt{}$		97hr				
								Total	117hr				
Final Exa	am			Percentage 5	55 (%)	NF2F	SLT						
	Documents and presentation			55			$\sqrt{}$		3 hrs.				
•							Gr	and Total SLT	120hrs.				
L = Lecti	ure, T	$\Gamma = Tut$	oria	al, P = Practical, O = Ot) = Others, F2F = Face to Face, NF2F = Non-Face to F								
Special r	requi	remen	ts a	nd resources to	1	Simulatio	ation Room						
		•	_	software, computer	2	Different	plementation lab						
lab, simı	uiatic	on roor	n	.etc.j	3	Manuals							
Text boo	ok/	1	Ada	nma Science and Techr	Science and Technology University: Internship Guidline								
Referen	•	2	Diff	ferent text book and re	nt text book and references according to their needs.								

		Ada	ıma Science a	nd Tech	nology University	7								
1	College: CoEEC			Depart	ment: ECE									
2	Course	Major Mandator	ry											
	Category													
	Course Name	Computer Arch	itecture and C	rganiza	tion									
	Course Code:	ECEg4201												
3	Synopsis:	This course foc	us on: Compu	iter Arii	hmetic; The Cen	tral Processing Unit: Architecture								
		and Instruction	n Set; Instruc	ction Fo	ormat and Addr	essing Modes; Register Transfer								
		Descriptions; (Organization	of the	Arithmetic and	Logic Unit; The Control Unit								
		Realization: Ha	rdwired and N	Micro pi	ogrammable; Th	e Memory Hierarchy and Memory								
		Management; Ir	nput-Output [evices;	Software of a Co	mputer System; Design of a Small								
		Computer Syste	Computer System Testing											
4	Name(s) of	TBA												
	Academic													
	Staff:													
5	Semester and	Semester:	I	Year	IV									
	Year offered:			:										
6	Credit Hour:	3												
7	Prerequisite/	ECEg3201 Digit	al Logic Desig	n										
	Co-requisite:													
	(if any)													
8	Course Learnin	g Outcome (CLO)	: At the end o	f the co	urse the student v	will be able to do:								

	CLO1					elemei nguage	-		•		•							_	syntax	of
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	CLO4	_										nrs	and	int	er nro	ncess	or co	mmi	ınicatio	n
9	Mapping of																			
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	rnir LO)														Asse	essm	ent	1	1	
	Course Learning Outcomes (CLO)											ach					nt		g	
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	Course Outcon	1	~1	~	₹	10	2				L	T	P	0	it	Z	Assignment	Mid Exam	Final Exam	
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	CLO1																			
	CLO2																$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	
	CLO3		$\sqrt{}$												$\sqrt{}$		$\sqrt{}$		$\sqrt{}$	
	CLO4																			
	Indicate the	relev	elevancy between the CLO and SO by ticking " $$ " on the appropriate relevant box																	
10	Transferable (Skills learn	e Skil ed in	Skills (if applicable) d in the course of study which can be useful and utilized in other settings)																	
	1			y Lan																
	2																			
11	Distribution	of St	uden	t Lea	rning	Time	SLT)													
11	D ISCI IS COLOT	OI DE	uucii	СВС	3			ching	and	Learr	ning	Act	iviti	es				Tota	l (SLT)	
						CLO	Guid			rning		ide			Inde	pend	en		(-)	
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							T	т	Р		(N)	F2F)		1)	NF2F)			
	C) 1 1						L	Т	Р	0										
	Chapter 1: Introductio					CLO	4h				2h	r			4hr			10hr		
						1	r													
	1.1 Organiza architect				and															
	1.2 Compute		olutio	n																
	1.3 Performa	ance																		
	Chapter 2:					CLO	2h	2h		2hr	2h	r			2hr			10hr	ı	
	Computer A	\rith	metic	С		1	r	r		4111	411	I 			ZIII			TUIII		
	2.1 Integer r	epres	senta	tion									_	Ī						_
	2.2 Integer a	rithn	netic																	
	2.3 Floating	-Poin	t arit	hmet	ic												_			

2.4 Floating-Point arithmetic							
Chapter 3: CPU	CLO 2	8h r	6h r	5hr	6hr		25hr
3.1 Instruction sets							
3.2 Instruction format and addressing modes							
3.3 RISC and CISC							
3.4 CPU Structure							
3.5 The Control Unit (Hardwired and Micro programmed)							
3.6 Basic computer Design							
Chapter 4: Memory Systems	CLO 3	6h r	5h r	4hr	5hr		20hr
4.1 Classification and hierarchy of Memory systems							
4.2 Main memory							
4.3 Cache Memory							
4.4 Secondary Memory							
4.5 Other types of memory							
4.6 Memory Management							
Chapter 5:	CLO	6h	4h		4hr	Chr	20h-r
Input and Output Systems	3	r	r		4111	6hr	20hr
5.1 Modes of transfer							
5.2 I/O interface							
5.3 Techniques used for I/O Operations:							
5.3.1 Programmed,							
5.3.2 Interrupt-driven,							
5.3.3 Direct Memory Access							
Chapter 6:	CLO	4h			3hr	3hr	10hr
Advanced Concepts	4	r			SIII	3111	10111
6.1 Pipelining							
6.2 Introduction to parallel pr ocessing,							
6.3 Introduction to operating s ystems							
6.4 Cloud Computing							
6.5 Quantum Computing							
Total							95hr
Assessment			•				

	Con	tinuous Assessmer	nt	Percentage Total-60(%)	F2F	NF2F	SLT							
	1	Quiz		5	1 hr		1 hr							
	2	Test		10	1hr		1 hr							
	3	Project + Presenta	ation	15		8hr	8 hr							
	4	Mid Exam		20	2hr		2 hr							
	Tota	ıl		1	1	- 1	22hr							
	Fina	l Exam		Percentage50 (%)	F2F	NF2F	SLT							
	Fina	ıl Exam			3 hr		3 hr							
	Grai	nd Total SLT		120hr										
12	Note	e: indicates the CL	0 bas 1				= Non Face to Face							
	_	ources to deliver	2											
	the	course (e.g.	3	Choose an item.										
		ware, computer	4	Choose an item.										
	lab, et	simulation room	5	Choose an item.										
13		tbook and	1	William Stalling	s: Computer O	rganization and A	Architecture							
		rence:	2	M.M.Mano: Com	puter System	Architecture								
	(not		3	Barry Wilkinson: Computer Architecture Design and Performance										
	late: /pu	st edition blication)	4	David A Patters tive Approach	David A Patterson and JohnL.Hennessy: Computer Architecture A Quantita									
			5	David A Patterson and JohnL.Hennessy: Computer Organization and Design Hardware/Software Interface										

		Adama Science and Technology University
1	College: CoEEC	Department: ECE
2	Course	Major Mandatory
	Category	
	Course Name	Digital Communication
	Course Code:	ECEg4203
3	Synopsis:	Comprehensive introduction to digital communication principles. The major part of the course is devoted to studying how to translate information into a digital signal to be transmitted, and how to retrieve the information back from the received signal in the presence of noise and inter-symbol interference (ISI). Various digital modulation schemes are discussed through the concept of signal space. Analytical and simulation models for digital modulation systems are designed and implemented in the presence of noise and ISI. Optimal receiver models for digital baseband and band-pass modulation schemes are covered in detail. Baseband transmission and Optimal Reception of Digital Signal will be also covered. This course will also give knowledge on information theory and coding.

4	Name(s)	of	Tl	BA														
	Academic																	
	Staff:																	
5	Semester	and	S	eme	ster:	I				Ye	ar:	IV						
	Year offer	ed:																
6	Credit Ho	ur:	3										1					
7	Prerequis	ite/	In	trod	luctio	n to	Com	ımur	nicat	ion	syste	ems-	ECE	g320)2			
	Co-requisi	ite:																
	(if any)																	
8	Course Le	arni	ng O	utco	me (0	CLO)	: At 1	the e	nd o	of the	e cou	ırse t	he s	stude	ent v	will	be able to do:	
	CLO1	Ap	ply t	he co	oncer	ot of	rand	lom v	varia	able	and	pow	er sp	ect	ral d	ens	ity to analyze the	
			-		ics o							-	•					
	CLO2	Inv	estig	gate	pulse	ed mo	odul	ation	ı sys	tem	usin	g sar	npli	ng a	nd c	uar	ntization methods and analyz	e
		the	ir sy	sten	n peri	form	ance) .										
	CLO3	Ana	alyze	e var	ious	mult	iplex	xing 1	tech	niqu	es.							
	CLO4	Ana	alyze	e diff	erent	t digi	ital n	nodu	ılatio	on so	chem	ies a	nd c	omp	oute	the	bit error performance.	
	CLO5	Des	sign	and	imple	emer	it th	e ma	tche	d fil	ters	or op	otim	al re	eceiv	er t	to enhance the performance o	of
		con	nmu	munication system in presence of noise.														
	CL06	Apj	ply t	the concept of information theory in source coding and channel coding to enhance the														
		per	forn	nanc	ance of digital transmission.													
9	Mapping	of the	e cou	ırse	Learr	ning	Outc	come	s to	the S	Stud	ent C)utc	ome	s, Te	each	ning Methods and Assessment	ţ:
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	iing LO)								_	_				1			Assessment	
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	Course Learning Outcomes (CLO)												Lak	Qui		Mio	Fin	
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	CLO5			$\sqrt{}$					$\sqrt{}$		$\sqrt{}$						$\sqrt{}$	
	CLO6								$\sqrt{}$								$\sqrt{}$	
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10	Transfera	ble S	kills	(if a	pplic	able)	_		_			_	_	_			
										an be	e use	ful a	nd t	ıtiliz	ed i	n ot	her settings)	
	1	MAT	LAB	and	Lab	VIEW	/ sof	twar	e's									
		Digit	tal Co	omm	nunic	atior	ı Sys	tems	s Mo	dule	·							
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11	Distributi	on of	f Stu	dent	Lear	ning	Tim	ie (SI	LT)									
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Course Content Outline	CLO		Guid learı (F2F	ning		Guide d Learni ng (NF2F	Indepen dent Learning (NF2 F)	
		L	Т	P	0)	-)	
Chapter 1:		4	-	_		3	3	10hr
Review on Random and Stochastic Process	CLO1							
1.1 Review of Probability Theory								
1.2 Stochastic Process								
1.3 Mathematical Definition Stochastic Process								
1.4 Mean Correlation, and Covariance Functions of Weakly Stationary Process								
1.5 Ergodic Process								
1.6 Power Spectral Density								
1.7 Narrow Band Noise								
1.8 Poisson Process and Gaussian Process								
Chapter 2: Base Band Pulse Signaling	CLO2	4		3		2	3	12hr
2.1 Introduction								
2.2 The sampling theorem								
2.3 Pulse Analog Modulations PAM PWM PPM								
2.4 Quantizing and								
Encoding 2.1 PCM, DPCM, DM & ADM								
2.2 Effect of noise in Pulse Analog Modulation (PAM) and PCM								
Chapter 3:								10hr
Digital Multiplexers	CLO3	2		3		2	3	
3.1 Introduction								
3.2 Model for data communication								

3.3 TDM and PCM frames						
3.4 Digital carrier systems (T and E						
carrier system) and						
multiplexing						
Chapter 4:		6	6	3		20hr
Digital Modulation	CLO4				_	
Techniques					5	
4.1 Introduction						
4.2 Types of Digital Modulations Techniques: ASK, FSK and PSK						
4.3 Bandwidth and Frequency Spectrum of ASK, BPSK, FSK.						
4.4 Coherent and Non coherent of digital modulation techniques FSK Detector						
4.5 FSK Detection Using PLL, BPSK, Coherent PSK Detection, QPSK, Differential PSK.						
4.6 M-ary Modulation						
Techniques: M-ary FSK						
M-ary PSK, QASK						
Chapter 5:						16hr
Baseband	CLO5					
transmission and	& CLO1	4	6	2	4	
Optimal Reception of Digital Signal	GLOT					
5.1 Pulse shaping for						
optimum						
transmissions						
5.2 Optimum Receiver, Optimal Coherent						
Reception.						
5.3 Signal Space						
Representation and						
Probability of Error,						
eye diagrams, Cross						
talk.		_				101
Chapter 6:	CLO6	2		2	4	10hr
Information and	&					
Theory and Channel coding	CLO1					
6.1 Information and						
entropy, conditional						
entropy, and						

redundancy,													
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4	Mid exam							√		2hr			
										39hr			
			Per	centag	зе 5(J (%)			SLT				
Fina	al Exam							$\sqrt{}$		3hr			
										120hr			
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Indi	cates the CLO ba	ased	on t	he CLO)'s ni	umbe	ring i	in item 9).				
Spe	cial	1	MA	TLAB	Softv	ware							
_		2	Cor	nputer	·lab								
		3	Lat	VIEW	Soft	ware							
		4	Cor	nmuni	catio	on Lal	b						
		5	Cho	ose ar	ı itei	m.							
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/pu	blication)	-											
		4	_		d An	ialog (Comn	nunicati	on Systems -	Sam Shanmugam, John Wiley,			
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	Adama Science and Technology University													
1	College: CoEEC		Department: ECE											
2	Course	Major Mandatory												
	Category													
	Course Name	EM Waves and Guided Structure												

	Course (
3	Synopsis	S:	Volume Integrals; Gra Divergence &Stokes's Vector Fields, Helmho Conditions; Time-Han Electromagnetic Wav Dielectrics; Plane Wav in Good Conductors; Polarization parallel p Oblique Incidence; Su Circuit and Field Ana Power; The Smith Cha lines Waveguides: Re Modes; Power Trans	dient of a Some Theorems of the Theorems of the Propagares in Free Some and the Propagares in Free Some and the Propagares in Free Some Apolarization of the Propagares of the	calar field, , Laplacia rem; Field lds. Posit tion: Wav Space; Plan Poynting standing TEM Wav smission oplication Waveguide nd wave	Divergence & Curle n of a Scalar Field; I Quantities; Maxwe ion's Equations an res in General; Wa ne Waves in Lossles Wector, Poynting T waves Refection of I es, Transmission Line of Transmission Lines; TM Modes; in two	Fields; Line, Surface, & of a Vector Field, the Solenoid &Irrotational ell's Equations; Boundary d Laplace's Equations, we Propagation in Lossy s Dielectrics; Plane Waves Theorem; perpendicular Plane Wave at Normal and nes: Electrical Dimension, but Impedance, SWR, and less. Transients in loss less wo dimensional planar TE atching and Attenuation; et guide. Power dissipation								
4	Name(s)) of													
	Academ	c													
	Staff:														
5	Semeste	r and	Semester:	I	Year:	IV									
	Year offe	ered:													
6	Credit H	our:	3	1	•										
7	Prerequ	isite/	EPCE2202: Electroma	gnetic Field	l										
	Co-requi	isite:													
	(if any)														
8	Course I	Learning	g Outcome (CLO): At the	end of the	course the	e student will be abl	e to:								
	CLO1	physic	cal quantities dealt in el	ectromagne	etic field t	heory as they are fu	spatial variations of the nctions of space and time. oncepts of EM field theory.								
	CLO2	Charac	cterize dynamic EM field	ds & waves	and deriv	e the Maxwell's Equ	ations to analyze & solve								
	CLO3		propagation problems v ze wave propagation				llate parameters such as								
	- CV - C - 4	attenu	ation and propagation o	constants, p	hase velo	city, power density,	etc.								
	CLO4	Describe the polarization of an electromagnetic wave and derive Poynting's theorem for power conservation in electromagnetic systems.													
	CLO5	Discuss the concept of transmission line and describe the mechanism for wave propagation and reflection along a transmission line.													
	CLO6	Solve	practical transmission	line param	eter and	impedance matchin	g through analytical and								
	CLO7		ical tools such as Smith ze waveguides structure		ating mod	es in rectangular wa	aveguides and resonators.								
9		_					ethods and Assessment:								
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													Quiz	Test	Project	Mid exam	Final Exam
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	CLO2								$\sqrt{}$	$\sqrt{}$	$\sqrt{}$					$\sqrt{}$	
	CLO3						$\sqrt{}$		$\sqrt{}$	$\sqrt{}$	$\sqrt{}$			$\sqrt{}$	$\sqrt{}$		
	CLO4	$\sqrt{}$							$\sqrt{}$	V	$\sqrt{}$			$\sqrt{}$	$\sqrt{}$		$\sqrt{}$
	CLO5								$\sqrt{}$	$\sqrt{}$	$\sqrt{}$				$\sqrt{}$		$\sqrt{}$
	CLO6					$\sqrt{}$			$\sqrt{}$	$\sqrt{}$	$\sqrt{}$				$\sqrt{}$		$\sqrt{}$
	CLO7							$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$						$\sqrt{}$
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1	Transferable Skills (if applicable) (Skills learned in the course of study which can be useful and utilized in other settings)																
0	(Skills learned in the course of study which can be useful and utilized in other settings) 1 MATLAB software																
	1 MATLAB software 2 Smith Chart																
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	Major	Topics															
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	1.1 Sca	lar & Ve	ctor Fi	elds													
		e, Surfac	ce, & Vo	olume													
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		olacian o		lar Fiel	d												
		enoid & ctor Field		ional													
	1.7 He	mholtz':	s Theo	rem													

Chapter 2: Maxwell's Equation	CLO1, CLO2	4hr	6hr	1h r	-	3hr	6hr	20hr
2.1 Faraday's Laws								
2.2 Transformer and Motional EMF								
2.3 Displacement Current								
2.4 Time-Varying Boundary Conditions								
2.5 Time Harmonic Fields								
Chapter 3: Electromagnetic Wave Propagation	CLO3, CLO4,	6hr	9hr	2h r	-	1hr	3hr	21hr
3.1 Waves in General								
3.2 Wave Propagation in Lossy Dielectrics								
3.3 Plane Waves in Free Space;								
3.4 Plane Waves in Lossless Dielectrics								
3.5 Plane Waves in Good Conductors								
3.6 Wave Polarization								
3.7 Power & the Poynting Vector								
3.8 Refection of Plane Wave at Normal and Oblique Incidence;								
Chapter 4: Transmission Lines	CLO5, COL6	8hr	12h r	3h r	-	1hr	4hr	28hr
4.1 Introduction								
4.2Transmission Line Parameters								
4.3 Transmission Line Equation								
4.4 Input Impedance, Standing Wave Ratio and Power flow								
4.5 Smith Chart								
4.6Applications of Transmission Lines								
4.6 Transients on Transmission Lines								
4.7 Bounce Diagrams								
Chapter 5: Waveguides	CLO7	4hr	6hr	2h r		1hr	4hr	17hr
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	5.1	Rectangular Wa	veguides	S										
	5.2	Propagations M	odes											
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		• Transverse												
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	1	Quiz				5	%		1	hr				1hr
	2	Test				10)%		2	hr				2hr
	3	Project and Pr	esentatio	on		15	5%		1	hr	1	3hr		9hr
	3	Mid exam				20)%			$\sqrt{}$				3hr
		1		ı.								Total		15hr
	Fina	al Exam			Perce	entage	e 50 (%)	F	2F	N	F2F		SLT
	Fina	al Exam							3	hr				3hr
				I					I	L	Grand	l Total SLT		120hr
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		ver the course	3 I	Lab vi	iew									
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		nputer lab,												
	sim et	ulation room												
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	`	st edition				V.H., E	Enginee	ering l	Electr	omagi	netics, 4t	h ed., McGra	ıw-H	ill, 1981.
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	/pu	blication)		_	Inc., 19		TA7 /		(D	C	1. 1.50			1 1 147
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1	School:	Huma	nitie	es an	ıd Sc								t: Hum						
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2	Course	Name		En	trej	oren	eurs	ship	and Bu	ısin	ies	ss Dev	velopn	nent					
	Course	Code:		SO	SC5	003													
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6	Credit H	lour:				3													
7	Prerequ	isite:				Nor	ie												
9	Course	Learn	ing C)utc	ome	(CL)): A	t the	end of	the	e co	ourse	the stu	ıdent	will be	able to	:		
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10	Assessn	nent:						come	es to th	e pi	rog	gram	Learnii	ng Ou	tcomes	s, Teach	ing	Metho	ods, and
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	CLO3				٧		√			√					V			
	CLO4				٧		√			√		√						
	CLO5				\ \ \									$\sqrt{}$				
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10	Trans	ferable	Skills	s; (Skills	learne	d in t	he cou	ırse	of s	tudy	whi	ch ca	n be u	seful	and uti	ilize	d in o	ther
	settin	gs)																
	1	Critical	Thin	king/Pi	roblem	Solvi	ng											
	2	Organiz	ation	ı/Mana	gement	/Leac	lershir	n/De	cisi	on N	1aki	ng						
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	1.48.			stics of S	uccess	ful	ar 0		2			1		3			6	
	E	ntreprei	neurs	5			CLO-					_						
	1.49.	Entrep	orene	eurial M	otivatio	n	CLO-		2			1		3			6	
	1.4 U	nderstar	nding	gan					2			1		2			5	
	Entre	preneur	ial P	rocess			CLO-	1										
	C	hantar	2. D.	icinocc	Idoo		CLO-	2										
		hapter					&		8			4		11			23	
	G	enerati	ona	na Seie	cuon		CLO-	5										
	D	evelopii	ng sta	art-up id	deas		CLO-	2	2			2		2			6	
	Т	ypes and	d Sou	rces of	start-ur)	CLO-	-2	1				-	2			3	
		leas			•													
	New	Product	Deve	elopmer	nt (NPD)	CLO-	2	2			-		2			4	
	Proce			•	•													
	Value	Analysi	s and	l Revers	se		CLO-	2	2			-		3			5	
	Engin	eering																
		.5 Busin	ess C	oncept	Statem	ent	CLO-	5	1			2		2			5	
			o 1				CLO-	-2										
		hapter :	3: In	novatio	n and	Pre	&		8			4		11			23	
	S	tart-up					CLO-											
	Innov	ation ar	nd its	type			CLO-		2			1		2			5	
		et Resea			rview)		CLO-		1			-		2			3	
		ess Mod		•		ısin	CLO-		3			2		4			9	
		anvas)		r ·														
			sines	ss Plann	ing		CLO-	-2	2			1		3			6	
	Chan	ter 4: St				ion			_			_					0.4	
	S						CLO-	-4	1 5			4		15			34	

	Mark	eting			CLO-4	4 3			2	3	8
	Marketing M		'he 4P's)		CLO-4		1			3	0
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	Marketing S menting, an			ing, seg	CLO-4	4					
	Operations				CLO-4	4 3			-	3	6
	Operations	System			CLO-4	4					
	Finance				CLO-4	4 4			2	3	9
	Financing a	new ve	nture (Ty	pes of fi	CLO	4					
	nance)			•	CLO-4	4					
	Sources and	Use of	Finance		CLO-4	4					
	Human Reso	ource			CLO-4	4 2			-	2	4
	HR P	lanning	5		CLO-4	4					
	Employee H	andling	Ţ		CLO-4	4					
	Legal				CLO-4	4 3			-	4	7
	Forms of Bu	siness	Ownershi	р	CLO-4	4					
	Licensing &				CLO-4	4					
	Intellectual			ghts	CLO-4	4					
					1			ı		Total	101hrs.
						Asse	essr	nent			
	Continuous	Assessr	nent	D		1 - 4 - 1	۲۵	(0/)	FOF	NEOE	CI T
				Perce	ntage T		-50	(%)	F2F	NF2F	SLT
	1	Tests ([1 & 2)		100				√		2
	2	Quiz			100	%			V		1
	3	Individ	dual		100	%					5
		Assign	ment								
	4	Projec	t		200	%					6
		(Busin	ess								
		Model									
			pment								
		&									
		Presen	itation)								4.4
	7. 17					10.60			707	Total	14
	Final Exam			Perce	ntage 5	0 (%	b)		F2F	NF2F	SLT
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40										NF2F = Non-Face	е то насе
12	Special requ					1		Opto La	ıb		
	deliver the c	•	. •	are, comp	outer	2					
3.	lab, simulati	ion rooi	metc.)			3	+				
13		1	Dance D	Donnin ac-	and D		D	Inolan -	L(2017) E-		Cugagafullu
13				_						ntrepreneurship:	. Successibily
		2							arson educa	ation. ement: Launchir	og and Crowing
		2							ess Managi engage Lea		ig allu Growilig
	Text book	3								l Business Man	agament 2nd
	Reference:		Edition.	CDI CHII3d	ie, Liiti	chi	711C	arsinp	and Jilidi	Dusiliess Mall	agement, Zna
				lavid and	d Wills	on	Nic	k (200	06), small	business mana	agement and
		-		neurship,			0	(_0,	- ,,		0
		5				repr	ene	eurshir	in action.	2 nd ed., Prentic	e Hall of India,
		1	· · · · ·							•	,

	New Delhi.
6	Brychan Thomas, et al (2014): Innovation and Small Business, Volume 1, 1 st edition.
7	Brychan Thomas, et al (2014): Innovation and Small Business, Volume 2, 1st edition.

					Adaı	ma So	cience	and Tec	hnol	ogy	Univ	vers	ity					
1	College: C	CoEEC					De	epartme	nt: E	CE								
2	Course Ca	ategor	У	Major	r Man	dato	ry											
	Course N	ame		Engin	eerir	ıg Re	search	and De	veloj	pme	ent M	leth	ode	ology	7			
	Course Co	ode:		ECEg	-4206	5												
3	Synopsis:	res an for De	search d proc mats; velopi	es; pro cessing appli	oblemg; Proceeds	n fori esent ns of) wo	mulation f audi rks an	on, mod skills: r ovisual	eling esea equi	g & ırch ipm	expe and ent;	rim l pr Ma	ent oje na	tation ct pi geme	n; data roposa ent as	a co als; spec	ollection, oral proct of Res	nd levels of /generation esentations search and erty rights;
4	Staff: Name(s)																	
5	Semester offered:	and	Year	Ser	neste	r:	I	Year:	IV									
6	Credit Ho	ur:		2			•											
7	Prerequis	site		Senio	or sta	ndin	g cours	ses										
8	Course Le	earnin	g Outo	come (CLO)	: At t	he end	of the c	ours	e th	ie sti	ıdeı	nt v	vill b	e able	to	do:	
	CLO1	App	ly curi	rent kr	iowle	edge	of quai	ntitative	and	qua	alitat	ive	me	thod	S.			
	CLO2	Ider	itify re	ferenc	ce and	d crit	ically r	eview c	urre	nt e	ngin	eer	ing	deve	lopme	ents	5.	
	CLO3	Ider	ntify a	and fo	rmul	ate	resear	ch prol	olem	ı; d	lesig	n a	nd	con	duct	exp	eriment	ts, devise
															relial	ble	conclusi	ons.
	CLO4							written		_	•							
	CLO5	Woı	k effe	ctively	: dem	ionst	rating	ethical o	cond	uct,	, ada	ptal	oilit	ty and	d resp	ons	sibility.	
9	Mapping Assessme		ne cou	ırse L	earni	ing (Outcon	nes to 1	the :	Stud	dent	Ou	tco	mes,	Teac	chin	g Metho	ods and
	b 0				St	tudeı	nt Outo	comes (S	50)									
	guir (Asse	ssm	nent	
	Course Learning Outcomes (CLO)	S01	S02	S03	S04	S05	908	807			Teach Meth	_		Presentatio n	Quiz	Proposal	Mid Exam	Final Exam
	no On									L	Т	P	0					
	CLO1		V				$\sqrt{}$	$\sqrt{}$	•	$\sqrt{}$	V						$\sqrt{}$	V
	CLO2	$\sqrt{}$								$\sqrt{}$	$\sqrt{}$			$\sqrt{}$			V	V
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		T 7	1 7	1			7	· /				7	· /					· · ·	17
	CLO3	V	V				√	√				V	٧				√	V	√
	CLO4			$\sqrt{}$							1	$\sqrt{}$					√		
	CLO5			$\sqrt{}$	$\sqrt{}$	$\sqrt{}$					1	$\sqrt{}$	$\sqrt{}$				V		V
	The relev	ancy b	oetwee	n the	CLO an	nd S	0 is in	dic	ated	l by	7 ".	√" o	n th	e app	ropr	iate re	eleva	ant box	<u> </u>
10	Transfera																		
	(Skills lea					dy v	vhich	can	be	use	ful	lanc	d uti	lized	in ot	her se	tting	gs)	
	1		entatio																
	2		Manag																
11	Distribut	ion of	Studer	it Leai	rning T	'ime	(SLT)										T	
							a. a						ning		nd	Lear	ning	TotalS	LT
	0 0		0 .1:				CLO						ities		L .				
	Course Co	ontent	Outlin	ıe					ded			Guid				epend	e		
								Lea	rnii	1			ning	5	nt	•			
								g (F2	E)			(NF2	2F)			rning (2F)			
								(rz	T	P	\cap				(111	'4r j			
	Chapter	1.					CLO1	1	1	1		1hr			1h	r		4hr	
	Introduc						CLUI	hr				1111			111	11		7111	
	1.1 Mea	ning	and	Obie	ctives	of													
	Research	_		,-															
	1.2 Motiv	ation	in Rese	earch															
	1.3 Types	of Re	search																
		search		thods	ver	sus													
	Methodol	logy																	
	1.5 Resea	rch ar	nd Scie	ntificN	1 ethod														
	1.6 Resea																		
	1.7 Criter	ia of G	Good Re	esearc	h														
	<u>Chapter</u>	2:					CLO2	2h			,	2hr			5hr	•		10hr	
	Literature	e Re	view	& '	Гесhni	ical		r	1h										
	Reading								r										
	2.1 Litera	iture s	earch,	revie	w and														
	citation p	ractic	es																
	2.2 Techn	nical R	eading	,															
	Chapter							1h	1h			1hr			1hr	ı		4hr	
	Defining I	Resea	rch Pr	oblen	1		CLO3	r	r										
	3.1 What	is a Re	esearcl	h Prob	lem?					H									
	3.2 Select	ting th	e Prob	lem															
	3.3 Nece	essity	of D	efinin	g the	!													
	Problem																		
	Chapter						CLO3	2h				3hr			5hr			12hr	
	Research	Desig	n					r	2h r										
	4.1 Mean	ing of	Resear	ch De	sign					H	1								
	4.2 Need									П	1								
	4.3 Featu									П									
				(_	ı		·	i	<u> </u>								1	

4.4 Developing a Research	Plan								
Chapter 5: Methods of Data Collection		CLO3		1h		1hr	2hr		5hr
5.1 Collection of Primary Da	nta			1					
5.2 Collection of Secondary									
Chapter 6: Processing and Analysis of		CLO3 CLO4		2h		3hr	5hr		12hr
6.1 Elements/Types of Anal	lvsis			1					
6.2 Statistics in Research	., 515								
6.3 Measures of Central Ter	ndency								
6.4 Measures of Dispersion									
6.5 Measures of Asymmetry									
(Skewness)									
6.6 Measures of Relationshi									
6.7 Simple Regression Anal	ysis								
6.8 Other Measures									
<u>Chapter 7:</u> Testing of Hypotheses		CLO4	1h r	1h		2hr	4hr		8hr
7.1 What is a Hypothesis?				1					
7.2 Procedure for Hyp Testing	othesis								
7.3 Different Steps in Wi	riting								
7.4 Layout of the Research	Report								
Chapter 8: Management Aspects of R		CLO5	1h r	1h r		2hr	4hr		8hr
8.1 Intellectual property rig	hts								
8.2 Management of R&D wo									
Total									63hr
Assessments									
Continuous Assessment		entage 50(%)		F2F	Ī	NF2F		SLT	
1 Quiz	5			$\sqrt{}$				1 h	 r
2 Test	10)				V		4 h	
3 Project + Presentation	15			$\sqrt{}$				8 hr	
4 Mid Exam	20			$\sqrt{}$				2 h	r
Total								15 hr	
Final Exam	Percei (%)	ntage	50]	F2F	NF2F		SLT	
Final Exam	50%			-	$\sqrt{}$			2hr	
Grand Total SLT	1					1		80	hr

	L = Lecture, T = Tutor	ial, P :	= Practical, 0 = Others,
	F2F = Face to Face, NI	F2F =	Non-Face to Face
	Note: indicates the CL	0 bas	ed on the CLO's numbering in item 9.
12	Special	1	Presentation Software
	requirements and resources to deliver course (e.g., software, computer lab, simulation	2	Writing Tools
13	roometc.) Text book &	1	C.R Kothari, "Research Methodology methods and Techniques", 2
	Reference:		editionPublisher: New Age, 2004
	(Latest edition		
	/publication)		
		2	Kenneth S. Bordens and Bruce B. Abbott, "Research Design and Methods AProcess Approach"

						Ac	lam	a Sci	ence an	d Techn	olo	ogy Ur	ivers	sity					
1	College	: COEI	EC						De	partmer	ıt:	EPCE							
	Course	Catego	ory	Ma	ijor	Elec	tive												
2	Course	Name		Int	rodi	ıctio	n to	Pow	er Syster	ns									
	Course	Code:		EP	CE 4	309													
3	Synops	is		po tra pe	wer insm rfori	syst iissio nano	ems, on li ce o	Rep	ith the forces of the contract	ion of po cal desig	ow gn	er syst	tem c nsmi:	ompor ssion l	nents lines,	Elec Chai	trical racte	l de rist	esign of tic and
4	Name(: Staff:	s) of A	cadei	mic															
5	Semest	er/Ye	ar of	ferec	d:	Sen	ieste	er:	I	Year	4	1							
6	Credit	Hour:				3 (2	hr L	ectu	re, 3hr T	utorial)		•							
7	Prereq	uisite:				EPC	E21	01											
8	Course	Learn	ing C)utco	ome	(CLO)): A	t the	end of tl	ne cours	e tl	he stu	dent v	will be	able 1	to:			
	CLO1	Discu transı			nent	tals o	of po	wer:	systems	and mod	lell	ling its	com	ponent	s for	powe	r		
	CLO2	Analy paran	•		r trai	nsmi	ssio	n sys	tems rep	oresenta	tio	ns and	l calcı	ılation	of tra	ansm	issioı	n lii	ne
	CLO3	Apply transi					echa	nical	design c	onsidera	itio	ons to	instal	lation	of ov	erhea	d		
	CLO4								transmi									rs.	
9			ie co	urse	lear	ning	gout	come	es to the	Student	0u	ıtcome	s, Tea	aching	Meth	ods, a	and		
	Assessi		٠ ١	. 0	L	(CO)												
	ng nes	Stu	dent	Uu	LCOII	ies (<u>30)</u>							Λο	sessi	nont			
	Course Learning Outcomes)1 (1))2)3)4	2	9(7	Tea	ching	F		N					п	
	Course Learning Outcomes	(CL SO1	S02	S03	S04	S05	90S	20S		hods		Test	Quiz	Assig nmen	Proje	Lab	Mid	exam	Final exam

10		- V			- √ √	√ v	\ \sqrt{\sq}\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}}\sqrt{\sq}}}}}}}}}}\signt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}}}}}}}\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}}}}}}}}\signt{\sqrt{\sqrt{\sq}}}}}}}}\signtiles}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}	T P		0								,
10	CLO2 CLO3 CLO4 Indic Trans	- √ - ate the re	$\sqrt{}$ -elevancy	-	-	√ v	, ', 	1/1/										- r
10	CLO3 CLO4 Indic Trans	√ - ate the re	$\sqrt{}$ -elevancy	-	-	$\sqrt{}$	<i>r</i>	v v		-		-	-	$\sqrt{}$	-	-		
10	CLO4 Indic Trans settir	ate the re		-			1	v V		-		$\sqrt{}$	-		-			
10	Indic Trans settir	ate the re		-		$ \sqrt{ } $	√ √	√ √				$\sqrt{}$	-	V	-	V	-	V
10	Tran: settir					√ \ \	√ √	√ √				-	-	V	-	V	-	V
10	settir	sferable S		y betv	weer	n the Cl	10 and 2	50 b	y ti	ckin	g "√	" on t	he ap	propr	iate r	eleva	ant box	
		igs)	Skills; (S	Skills	lear	ned in	he cou	rse c	of st	tudy	whi	ch ca	n be u	seful	and ι	ıtilize	ed in otl	1er
	1	MATLAI	B softwa	are														
	2	Powerw	orld so	ftwar	e Us	age												
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11					D13	ti ibut		Luu					earnin		ivitio			
							CLO			iided	_		ided		epend		Total	l (SLT)
		Course	Conton	t Out	lino		CLO			rning			rning		earnir		Total	. (311)
		Course	Conten	it Out	.11116					111111 ₂ 2F)	5		F2F)		NF2F	_		
								L	T		0	(111	. 21)		111.71.)		
		Ch	apter ()ne:					1	1				<u> </u>				
	Fun	damenta			SVS	tems	CLO1	4	3	1			1				9	hrs.
		Defination																
		Historic																
		er system		op	01100	-												
	_	Analysis		phas	e cir	cuit												
		nced and																
	-	e concetio																
		Source o		y														
		1.1.4. B			e of													
	p	ower sys	stem															
	1.51.	AC and	DC trai	nsmis	sion	L												
	1.52.	Single-	phase a	nd th	ree-	phase												
		ransmissi																
		Ch	apter 1	ſwo:										2				
		Represen			wer	•	CLO2	4	6	3		2					17hrs.	
	S	ystem Co	ompon	ents														
		gle-phas ee-phase			bala	nced												
		ne-line d		1113														
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					n		1		1									
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	2.13		_				CLO3	6	9	6		3		4			28hrs	
		verhead		-o v	-		3200		^									
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		ne	, , ,															
		Resista	nce of t	ransı	niss	ion												
	li	nes																
	2.14. li	Cha Electri verhead Consta ne	it (PU) s npter T ical Des Lines nts of tr	hree: sign o	o f nissio		CLO3	6	9	6		3		4			28hrs.	

	Skin and										
	Transpo										
	line										
	3.1.Inductar	nce									
	3.1.1. Ind	luctance of single	e-phase								
	two	o-wire line	-								
	3.1.2. Ind	luctance of 3-pha	ase line								
		th symmetrical a									
		symmetrical spa									
	tra	nsmission line									
	Inducta	nce of composite	9								
	conduct	ors									
	Concept										
	GMD										
	Inducta										
	of GMD										
	Capacitance of single phase two										
	wire tra	nsmission line									
		ance of 3-phase									
		h symmetrical a									
F	unsymn	netrical spaced li									
		Chapter Four:								2	
		nical Design of		CLO3	4	5	5		2		18hrs.
-		ad Lines									
		n and tension									
-	calculat										
-		f wind and ice									
F	Stringin	_									
F	Sag tem										
		Chapter Five:		GY 0.4						2	4.01
		nance of transn	nission	CLO4	4	5	6		2		19hrs.
=	lines										
	5.1. Introdu		. 1.								
		iency of transmis	ssion line								
		regulation of ssion line									
-	Represe										
	lines										
-	Short tr										
=	Medium										
-	Long tra										
}	ABCD C							+			
-	Ferrant										
ŀ	1 0110110 211000					1			Ī	Total	91 hrs.
}					Asse	essi	mer	it		10001	, , , , , , , , , , , , , , , , , , , ,
}	Continuous Assessment Porce				Assessment					NEGE	CI TI
	Percei			ntage To	otal·	-5(/(%)	F2F	NF2F	SLT
	1 Tests			10							2hrs.
	2 Assignments									$\sqrt{}$	10hrs.

	3	Lab r	nort	1	.5		1/	1/	12hrs.			
							V /	V				
	4	Mid e	xam		.0		٧		2hr.			
								Total	25hr			
	Final Exam			Percentage .	50 (%)		F2F	NF2F	SLT			
	Final Exam			50					3 hrs.			
							G	rand Total SLT	120hrs.			
	L = Lecture,	T = Tu	torial, P =	Practical, 0 = 01	thers, l	F2F = Face	to Face, N	F2F = Non-Face	to Face			
12	Special requ	ireme	nts and re	sources to	1	Compute	er Lab					
			` `	are, computer	2	Laborato	rv					
	lab, simulati	on roo	ometc.)		3							
13	Text book		D Dag El	lectrical Power S	rictom	C Novy Age	o Intornatio	anal (D) I td Dub	lichara 2006			
13	1 ext book	1	D. Das El	lectrical Fower 5	ystem	s, new Ago	e miternatio	mai (F) Liu Fub	11511615, 2000.			
		1	V.K Meh	K Mehta, Rohit Mehta, Principles Of Power System, S. Chad &company pvt.ltd								
		1	,Revised	Edition ,2015								
		2	C. L. Wad	. Wadhwa, Electrical Power Systems, New Age International Publishers, 2004								
		3	Syed Na	yed Nasar, Electrical Power Systems (Schaum"s Outline Series), McGraw-hill								
		3	Publishi	plishing Company,								
	Reference:	4	W. D. St	D. Stevenson, J.J. Grainger, Power System Analysis McGraw-Hill, New Delhi,								
		4	1994.									
		5	Dr. Geor	ge G. Karady, D	r. Keit	h E. Holb	ert, Electr	ical Energy Cor	nversion and			
		5	Transpo	rt: An Interactive	e Com	outer-Base	ed Approac	ch, Wiley-IEEE F	Press, 2005.			
			J. D. Glo	ver and M. S. Sa	arma,	Power Sy:	stem Analy	sis and Design	, Brooks/Cole,			
		6	Third Ed		I. S. Sarma, Power System Analysis and Design, Brooks/Cole,							

			Adama Sci	ence an	d Techno	ology University					
1	College: COEEC			D	epartmer	nt: EPCE					
	Course Category	Major	Mandatory								
2	Course Name	Electr	ical Measure	ment ai	nd Instru	mentation					
	Course Code:	EPCE3	207								
3	Synopsis	measu charac applic of sig presen	ourse deals with the following major points: - basic concepts of Electrical arement and instrumentation, instrumentation type and performance exteristics (static and dynamic), basic concepts of sensors and their ation, calibration of measuring sensors and instruments, general principles and conditioning and conversion, signal processing elements, output intation element and design some simple Measurement systems using ent sensors, actuators and semiconductors.								
4	Name(s) of Acade Staff:	emic									
5	Semester/Year o	ffered:	Semester:	I	Year	3					
6	Credit Hour:		3 (2hr Lectu	re, 3hr T	'utorial)						
7	Prerequisite:		ECEg2202								
8	Course Learning	Outcome	(CLO): At the	end of t	d of the course the student will be able to:						
	CLO1 (like how accuracy	to use th	ne measuring I n, resolution in	nstrum n the rea	ponent of Electrical Instrumentation and Measurement rument and measure various physical quantities with e real system)						
	CLO2 Discuss of	ifferent e	elements of Me	easurem	ent syste	rement system (Input elements (sensor), signal					

		condi	tioni	ing e	leme	ents,	sign	al pi	oces	ssi	ng e	lei	ment	s &	outp	ut pre	sentir	ıg ele	ment	s)	
	CLO3	Comp			_		cond	ition	ing a	ano	d co	nv	ersio	n sy	ysten	ns to v	ariou	s inst	rume	entation	and
	CLO4																			ring sys	
	CLO5	Analy syster		nd d	esigi	n the	out	put p	orese	ent	atio	n	elem	ents	of ir	ıstrun	nentat	tion a	nd m	easurin	g
	CLO6							nent	atio	n a	nd	me	easur	ing	syste	em (ele	ectrica	al me	ters, l	oridges	,
9		_	ne co	urse	e leai	rning	gout	com	es to	th	ie S	tuc	dent (Outo	come	s, Tea	ching	Meth	ods,	and	
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		Course	e Coi	nten	t Out	tline			CLC	J]	lea	rning		Lea	rning	Le	earnii	ng	Total	(SLT)
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	Mapping of the course learning outcomes to the Student Outcomes, Teaching Methods, and Assessment: Mapping of the course learning outcomes to the Student Outcomes, Teaching Methods, and Assessment: Mapping of the course learning outcomes to the Student Outcomes, Teaching Methods Student Outcomes (SO)																				
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		Senso	rs a			duce	ers		CLO	2	8		6		3					21hr	
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2.2.1. Based on physical effect								
2.2.2. Based on energy source								
2.2.3. Based on physical quantity								
conversion								
2.3 Application of sensor								
2.4 Actuators								
1.55. Transducer								
Chapter Three:							3	
1.56. Signal conditioning,	CLO3							1 T h
Converting & Interfacing	CLO5	6		6				15hr
elements								
3.1. Introduction								
3.1.1. AC and DC bridge Circuit								
3.1.2. Amplifiers								
3.1.3. Operational amplifiers								
3.1.4. Instrumentation amplifiers								
3.1.5. Oscillators								
3.1.6. Filter								
3.2. ADC and DAC Converting								
Element								
1.57. Interfacing circuits								
Chapter Four:	OI OO			0		2		4.01
Signal Processing	CLO2	6		3		3		12hr
4.1. Data acquisition system and data								
logging								
4.1.1. Introduction								
4.1.2.Computer and data								
_								
acquisition system								
2.16. Data logging								
Chapter Five:	CLO6	6		3		3	3	15hr
2.17. Output Representation	0200							2011
5.1 Introduction								
5.2 Display/indicting								
5.2.1. Pointer & scale instruments								
5.2.2.Digital/Alphanumerical								
instruments								
5.2.3. Graphical instruments								
5.3 Recording								
5.1.1. Chart/graphical recorders								
5.1.2. Magnetic tape recorders								
5.4 Display instruments								
5.1.1. LCD								
2.18. LED							_	
Chapter Six:	CLO6	6		4		4	3	17hr
2.19. Design of meters	CLOO	J		Т		1		1/111
6.1. Ammeter design								
6.1.1. Range extension of								
ammeter								
6.2. Voltmeter design								
6.2.1. Range extension of								
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	2	Assig	nments	1	0			V		10hr		
	3	Lab r	eport	1	0			V		12hr		
	4	Mid e	exam	2	0			V		2hr		
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	Final Exam			Percentage !	50 (%)		F2F	NF2F	SLT		
	Final Exam			50						3 hrs.		
				Grand Total SLT 120 h								
	L = Lecture,	$T = T\iota$	utorial, P =	Practical, 0 = 0t	hers,	F2F =	= Fac	e to Face, N	F2F = Non-Face	to Face		
12	Special requ				1	Ins	trum					
			` _	are, computer	2	2 MATLAB Software						
	lab, simulat	ion ro	ometc.)		3	Coı	nput	er Lab				
13	Text book	1	Prithwir	aj Purkait, Electr	ical a	nd El	ectro	nics Measu	rements and Ins	strumentation		
		1	John P. B	entley, principle	s of m	ıeasu	reme	nt system, 1	third edition			
		2	Robert	B. Northrop, In	trodu	ction	to i	nstrumenta	ation and mea	surements, 3 rd		
	Deference		edition	•								
	Reference:	3	Alan S. M	Iorris and Reza I	anga	ri, Me	asur	ement and	Instrumentatio	n, theory and		
			practice									
		4	William	C. Dunn, Introdu	ction	to ins	trum	entation, se	ensors, and proc	cess control		

		Adama Science and Technology University
1	College: CoEEC	Department: ECE
2	Course	Major Mandatory
	Category	
	Course Name	Microprocessor and Interfacing
	ECEg4202	
3	Synopsis:	The Microprocessor and interfacing course intends in getting the concepts to the mastering of basic microprocessors and microcomputers. The discussion of the course will be based around the 8086 Intel microprocessor and selected advanced microprocessors and microcontrollers. However, this is not stiff and could be subjected to change. The fact that the 8086 is the considered basic processor architecture, make the discussion be based on the microprocessors. The discussion of the course will begin by introducing the microcontroller evolution in their historical background. The course will describe and explain the detailed architecture of the processor. Bus, memory, IO, and registers will be highly focused. The assembly language code will be studied, and different programs will be attempted. The most important discussion will be the interfacing of different types of devices and ICs to the microprocessor. This will help students in equipping them with appropriate knowledge in helping them to develop solutions to real world problems. Interfacing of interrupts, IO modules and other important concepts will

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	Year offer	ed:								r:							
6	Credit Hou	ur:	4	1													
7	Prerequisi	ite/	I	ECEg	4201	l: Co	mpu	ter A	Archite	ecture	an	d Organiz	ation				
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	any)																
8	Course Le	arnir	ng O	utco	me (CLO): At	the e	end of	the co	ours	se the stud	lent v	vill be ab	le to do):	
	CLO1	Disc	cuss	abo	ut m	icro	comr	outei	rs and	interi	nal a	architectu	re of	a microp	rocesso	r	
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	CLO5												ropro	cessor			
9	Mapping														aching	Metho	ds and
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	CLO1	V	0,	- 01		0,		- 01	$\sqrt{}$	$\sqrt{}$)	$\sqrt{}$	$\sqrt{}$		$\sqrt{}$
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	CLO4			$\sqrt{}$													
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	1	8086) Em	ıulat	or So	ftwa	ire										
	2																
	3																
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	Course Co	nton	+ ∩ 11	tlina		LL	U	Gui	ided			Guided	In	depende	ent		
	Course CO	iiiCII	ı Ou	CITIE	•			lea	rning	(F2F)		Learning		earning			
												(NF2F)		(NF2F)			

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CHAPTER 1: INTRODUCTION TO MICROCOMPUTERS	CLO1	1 h r	1 hr			1hr	2hr	5hr
Evolution of Microcomputers								
Application Areas								
Introduction to microprocessors								
CHAPTER 2: 8086 MICROPROCESSOR - ARCHITECTURE	CLO2	4 h r		4h r		5hr	7hr	20hr
2.1 Register and Memory Organization								
2.2 Minimum Mode and Maximum Mode bus cycle- Timing Diagram								
2.3 Interrupts & Service Routine.								
CHAPTER 3: PROGRAMMING OF 8086	CLO3	5 h r	6 hr	6h r		8hr	11hr	36hr
3.1 Addressing modes								
3.2 Instruction set								
3.3 Assembly language Programming								
CHAPTER 4: INTERFACING WITH 8086	CLO4	4 h r	4 hr	6h r		8hr	11hr	33hr
4.1 Memory interfacing								
4.2. Interfacing with peripheral ICs 8251- serial I/O								
4.3. 8255-parallel I/O								
4. 8254-programmable interval timer								
4.5. 8279-Keyboard display controller								
4.6. 8257-DMA 4.7. LEDS and LCDs								
4.8. ADCs and DACs								
CHAPTER 5: ADVANCED MICROPROCESSORS & MICROCONTROLLERS	CLO5	6 h r		8h r		9hr	17hr	40hr
5.1 Advanced Microprocessor Architecture Pentium								

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	5.2 Concept of C	ISC a	nd											
	RISC processors													
	5.3 Introduction to	ARM												
	processor and PIC													
	microcontroller.													
	5.4 Controller and													
	Computer Design u	_												
	selected Microproc	essor	•											
	Total												134hr	
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	4 Project +Prese	ntatio	n 1!	5							2 hr.			
	5 Mid Exam		20	0					√		21.5	5 hr.		
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	Grand Total SLT		160hr											
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	L = Lecture, T = Turn Note: indicates the									e, NF	ZF = Non-F	'ace	to Face	
1	Special		8086 e					<i>8</i>						
2	requirements and	2	Compu	ıter lal	b									
	resources to		Choose											
	deliver the course (e.g. software,		Choose											
	computer lab,		Choose											
	simulation room		CHOOSE	t all lu	C111.									
	etc.)													
1	Text book and	1	Dough	lasV.H	all.	"Mici	roproc	esso	rs and	Inte	rfacing, F	Progr	ramming and	
3	reference:		Hardw				горгоо		10 01101	11100	10.011.6)			
	(note: ensure the						licropr	roces	ssor Prog	ramm	ing and I	nterí	facing using	
	latest edition	1	Ramesh S Gaonkar, 'Microprocessor Programming and Interfacing using 8085', Penram Publications, 4th Edition, 2003											
	/publication)		A.K.Ray, K.M.Bhurchandy, 'Intel Microprocessors-Architecture, Programming											
	,,,	1	and Interfacing', McGraw-Hill International Edition, 2004											
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		5	Yu-Che	eng Li	u, G	lenn A	A.Gibso	n, "l	Microcom	puter	Systems:	The	8086 / 8088	
			-				Progra	amm	ing and	Desig	n", Second	d Ed	ition, Prentice	
			Hall of											
			_				•				_	_	ramming and	
		1				Editio	on, Ta	ata N	McGraw-H	Iill P	ublishing	Com	pany Limited,	
			NewDe											
													ns: Intel and	
			Motorola", : Prentice Hall of India, Pvt. Ltd., New Delhi, 2003.											

	Adama Science and Technology University										
1	College: CoEEC	Department: ECE									
2	Course Category	Major Mandatory									
	Course Name	Antenna and Radio Wave Propagation									
	Course Code:	ECEg4204									
3	Synopsis:	Functions. This leads to the development of various types of antennas and their applications in various types of communication systems. Then a detailed characteristic aspect of antennas are described as Antenna Parameters: Radiation Resistance, Radiation Pattern, Radiation Intensity, Directive Gain and Directivity, Power Gain. Later on, this course gives a detailed classification of various types of antennas in different frequency bands as; Wire Antennas: Antenna Types; Hertzian Dipole; Half-Wave Dipole Antenna; Quarter-Wave Monopole Antenna; Small Loop Antenna. Aperture Antennas, Frequency Independent Antennas, Broadband Antennas and Planar Antennas, Antenna Arrays: Two Element Array; N- Element Linear Array; Broadside Array; Ordinary End-Fire Array; Phased (Scanning) Array; Hansen-Woodyard End-Fire Array. This course also describes about the smart antennas required for the future generation wireless mobile communication systems where the signal processing techniques are combined along with array antennas: Beam Shaping Techniques Multi-beam antennas, active antennas, efficient adaptive array control algorithms. This course finally describes about the various problems associated with signal propagating through the wireless channels (both fixed and mobile) as; Radio Wave Propagation: Ground Wave Propagation; Space Wave Propagation; Line of Sight Propagation; Ionospheric Propagation; Noise. The related research areas include Log-Periodic Antennas, Fractal Antenna, Microstrip Antennas, Rectangular Patch & Circular Patch Antenna, Antenna Arrays, Ridge Antennas, the current and future generation wireless communication systems, and the medical industry.									
4	Name(s) of Academic Staff:										
5	Semester and Year	Semester: II Year: IV									
	offered:										
6	Credit Hour:	3									
7	Prerequisite/ Corequisite: (if any)	ECEg4205 EM Waves and Guide Structure									
8	Course Learning Ou	tcome (CLO): At the end of the course the student will be able to:									
	formulate conditions										
	CLO2 Discuss the	ne Array system of different antennas and field analysis under application of									
	216										

		dif	feren	t curr	ents	to tl	ne indiv	idual	anter	ına	eler	nei	nts.					
	CLO3	In	terpr	et op	erati	ons	of fund	damer	ıtal a	inte	nna	ıs l	ike	patch antenr	nas, Ya	gi-Huda	ante	ennas,
		Но	rn an	tenna	as and	d he	lical str	ucture	e and	als	o th	eir	ope	eration metho	dology	in practi	ce.	
	CLO4	De	sign	a lens	s stru	ıctu	re and	also	the b	enc	h s	tep	fo	r antenna pai	ramete	r measu	rem	ent of
		tes	sting f	for the	eir ef	fecti	veness.											
	CLO5	Ch	aract	erize	abou	ıt t	he mea	ans of	fpro	pag	atio	on	of	Electromagne	etic wa	ve i.e. 1	free	space
		pr	opaga	ation a	and a	lso	about fi	reque	ncy c	lepe	ende	ent	lay	er selection, i	ts resp	ective iss	sues	for an
						sior	of info	ormat	ion i	n th	ne f	orn	n o	f EM wave to	a rem	ote loca	tion	and
				issues														
9	Mappi Assess			cour	se L	earı	ning Ou	utcom	es t	o tl	ne	Stu	ıder	nt Outcomes,	Teach	ing Met	hod	s and
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1.4 Current Distribution on thin Wire							
Antenna							
1.5 Radiation Integrals and Auxiliary Potential Functions							
1.6 Solution of the inhomogeneous							
vector potential wave equation							
1.7 Far-Field Radiations							
1.8 Duality Theorem							
CHAPTER 2:		4			2hr	4hr	10hr
FUNDAMENTAL PARAMETERS OF	CLO1	h					
ANTENNAS	0201	r					
2.1 Radiation Pattern							
2.2 Radiation Power Density and							
Radiation Intensity							
2.3 Beam solid angle							
2.4 Directivity and Gain							
2.4 Directivity and Gain							
2.5 Beamwidth and Radiation							
Efficiency							
2.6 Polarization							
2.7 Impedance							
2.8 Reciprocity Theorem							
2.9 Effective Aperture and							
Temperature							
CHAPTER 3:		6	4		3hr	7hr	20hr
LINEAR WIRE AND LOOP	CLO2	h	h				
ANTENNAS		r	r				
3.1 Introduction							
3.2 Modeling							
3.3 Design Techniques and							
Procedures							
3.4 Types and Applications: Wire							
antennas: Short dipole, Radiation							
resistance and Directivity,							
3.5 Half wave Dipole, Monopole,		1					
3.6 Small loop antennas: square and							
circular							
CHAPTER 4:		6	 3	_	4hr	7hr	20hr
ANTENNA ARRAYS		h	h	_	****	,	20111
AND DIVINI AMERICA	CLO3	r	r	_			
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4.1 Antenna Arrays: Linear Array and								
Pattern Multiplication								
4.2 Two-element Array, Uniform								
Array, Polynomial representation								
4.3 Array with non-uniform								
Excitation-Binomial Array								
4.4 Antenna Arrays Two Element								
Array; N- Element Linear Array;								
Broadside Array; Ordinary End-Fire								
Array								
4.5 Phased (Scanning) Array								
4.6 Beam Shaping Techniques								
4.7 Multi-beam antennas								
CHAPTER 5:		4		2	-	4hr	10hr	20hr
ANTENNA STRUCTURES		h		h	_			
	CLO3	r		r	_			
					_			
5.1 Yagi-Uda Antenna								
5.2 Slot antenna								
5.3 Horn Antenna,								
5.4 Reflector Antennas								
5.5 Lens Antennas								
5.6 Planar Antennas								
5.7 Frequency Independent Antennas								
Chapter 6:		2		2	_	1hr	5hr	10hr
ANTENNA MEASUREMENTS		h		h	_			
	CLO4	r		r	_			
	0201				_			
					_			
6.1 Radiation Pattern measurement								
6.2 Amplitude and Phase				+				
Measurement								
6.3 Gain (2 and 3 antenna methods)				+				
and Directivity Measurement								
6.4 Impedance and Polarization				+				
Measurement								
6.5 Antenna Range Design and								
Evaluation								
6.6 Anechoic Chamber measurement				+				
				<u> </u>		41	41	4.01
CHAPTER 7:	CI OF	3		2		1hr	4hr	10hr
RADIO WAVE PROPAGATIONS	CLO5	h		h				

			r		r				
7.1	Frii's Free Space Propagation								
7.2	Ground Wave Propagation								
	Ground Reflection, Surface way	res,							
	Atmospheric Propagation a	and							
	Tropospheric Propagation a pospheric Scatter	and							
Stru skip freq of ic mag	Ionospheric propagation: acture of ionosphere, Sky waves o distance, Virtual height, Critica quency, MUF, Electrical properti onosphere, Effects of earth's gnetic fields, Faraday rotation,	al							
	istlers. Space Waves Propagation								
7.8 Wir 7.9	eless Fading	and and							
7.10	npatibility) O LOS Microwave Propagat	ion							
Tota	tems and Link Design								95hr
	essment								70111
Con	tinuous Assessment	Percent Total-5	_		FZ F		NF2F	SLT	
1	Quiz 1	5				٢		1h	r
	Lab	10						6hr	
3	Project + Presentation	15				<i>r</i>		 2hr	
4	Mid Exam	20						 8h	
Tota	,							20h	r
Final Exam Perce			50 (%) 	FZ F		NF2F	SLT	
Final Exam					√	r		31	ır
Crai	nd Total SLT				ı			120	hr

	L = Lecture, T = Tutorial	, P = Pra	P = Practical, O = Others, F2F = Face to Face, NF2F = Non Face to Face							
	Note: indicates the CLO	based o	n the CLO's numbering in item 9.							
1	Special requirements	1	MATLAB Software							
2	and resources to	2								
	deliver the course (e.g.		Network/Spectrum Analyzer							
	software, computer	3	Computer Lab							
	lab, simulation room	4	Software (PUFF)							
	etc.)	5	Workshop-Microwave Test Bench							
1	Text book and	1	J. D. Kraus, "Antennas and Wave Propagation", McGraw-Hill, 4th ed.,							
3	reference:		2010.							
	(note: ensure the latest	2	E.C. Jordan and K. G. Balmain, "Electromagnetic Waves and Radiating							
	edition /publication)		<i>Systems</i> ", PHI, 2 nd ed., 2000.							
		3	C. A. Balanis, "Antenna Theory", John Wiley & Sons, 3 rd ed., 2005							
		4	F. E. Terman, "Electronic and Radio Engineering", McGraw-Hill, 4th ed.,							
			1955.							
		5	Warren L. Stutzman and Gary A. Thiele, "Antenna Theory and Design",							
			John Wiley & Sons, Inc.							
		6	Thomas A. Millgan, "Modern Antenna Design", McGraw-Hill Ltd, 3rd							
			Edition.							
		7	Chand L. Godara, "Smart Antennas", CRC Press.							
		8	Christopher Haslett, "Essentials of Radio Wave Propagation",							
			Cambridge University Press.							
		9	H. Sizun, "Radio Wave Propagation for Telecommunication							
			Applications", Springer-Verlag Berlin Heidelberg, 2005							
		10	John A. Richards, "Radio Wave Propagation", 2008 Springer-Verlag							
			Berlin Heidelberg							
		11	Les Barclay, "Propagation of Radio Waves", Institution of Engineers,							
			2003							
		12	R. E. Collins, "Antennas and Radio Wave Propagation", McGraw Hill,							
			1985.							

		Adama Science and Technology University
1	College: CoEEC	Department: ECE
2	Course Category	Major Mandatory
	Course Name	Data Communication and Computer Networks
	Course Code:	ECEg-4208
3	Synopsis:	This is a senior level undergraduate course for students who wish to gain a broad
		understanding of data communications, communication networks and Internet
		protocols. Students are expected to have a basic knowledge data transmissions and
		digital communications. There will be several real-life projects related to data
		communications and students will use software for implementation or simulation.

		These projects complement the theoretical aspects and have considerable																
		r	edago	ogic va	alue i	n helj	ping st	udents ı	ındersta	nd c	onc	ept	s an	ıd d	esign	١.		
4	Staff: Name(s)	II .																
5	Semester and Y	Year		Se	mest	er:	II	Year:		IV								
	offered:																	
6	Credit Hour:			7.00			. 10			3								
7	Prerequisite			ECE	g-42(J3 Dig	gital Co	mmunio	cation.									
8	Course Learnin	ng Out	come	(CLO)): At t	he er	nd of th	e cours	e the stu	dent	wil	l be	e ab	le to	do:			
	CLO1								lities int									
	CLO2					nts of	f a data	commi	ınicatior	int	erfa	ce	and	rela	ate it	to a	speci	fic
	ar oo		facesta		,		, ,	.1					,				<u> </u>	
	CLO3		aty sev				a appi	y the e	error de	tect	ion	an	a c	orre	ection	i te	cnnıqı	ues
	CLO4	Analy	ze the	route	ers ai	nd the	eir conf	figuratio	n, static	rou	ting	an	d IP	v6 (config	gura	tion	
	CLO5	_		tures,	, serv	ices a	and ope	erations	of vario	us tr	ans	poi	rt/ a	ppl	icatio	n la	yer	
		proto																
	CLO6								s issues									
9	Assessment:	he course Learning Outcomes to the Student Outcomes, Teaching Methods and																
		Student Learning Outcomes (SO)																
			1	1														
	1g													A	ssess	mer	nt	
	earning s (CLO)									'eacl	nın		ıry			ш	Exam	
		S01	S02	S03	S 04	SO 5	S06	20S	8	s Meth	nnds		ratory		ect	Exam		
	rse						0,	0,	1	·icti	ious	,	labora	Quiz	Projec	Mid E	Final	
	Course L Outcome								L	Т	P	0)	I		I	
	CLO1								$\sqrt{\frac{L}{}}$	1	1	U				V	v	/
	CLO2															V	v	/
	CLO3		√						√								1	/
	CLO4		V						1								1	/
	CLO5		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				\ \ \ \ \	· √	1	1				•	$\sqrt{}$		1	<u> </u>
	CLO6	,					V	· ·		, ·					,			<u>'</u>
		√	√				<u>L</u>	V	√ V	√					√		``	/
	The relevancy					50 is i	indicat	ed by " ⁻	√" on the	app	orop	oria	te r	elev	ant b	OX		
10	Transferable S					1. • •	la a - 1			1	2	- 41			2			
	(Skills learned	in the				whic	n can b	e usetul	and util	ızed	ın (oth	er se	ettir	igs)			
	1	C:	D1	~ F T -	1 Cisco Packet Tracer													

	2	Wireshark								
	3	GNS3								
11	Distribution o	f Student Learning Time (S	SLT)							
							T	eaching and	Learning	TotalSLT
			CLO				A	ctivities		
	Course Conter	nt Outline		Gı	aide	ed		Guide	Independe	
						ing		Learning	nt	
				()	F2F	")		(NF2F)	Learning	
					-	-	0		(NF2F)	
		T . 1	CI O1	L	T	P	0	41	21	01
	<u>Chapter 1</u> :	Introduction	CLO1	2		3h		1hr	2hr	8hr
				h		r				
	110verview	of Data Communications		r						
	& Network									
	1.2 Basic conc									
		ation & Networking								
	1.3 Layering C	oncept-communication								
	Network A	rchitectures								
	1.4 OSI layers	and TCP/IP models								
	Chapter 2:	Physical Layer	CLO2	4		9		2hr	3hr	18hr
	2.1 Analog and	l DigitalSignals								
	2.2 Data Rate	Limits								
	2.3 Transmiss	ionImpairment								
	_	oding Techniques								
	2.5 Physical La	ayer Devices								
	2.6 Digital Tra									
	Chapter 3: D	ata Link Layer	CLO3	4h		6h		2hr	4hr	16hr
				r		r				
	3.1 Data Link									
		ction andCorrection								
	3.3 Media Acc									
		ccess Protocol (MAP)								
		ess Forwarding								
	Mechanism									
		Layer Protocols	CLO4	0		9h		2hr	Fh	24hr
	Chapter 4: Network Laye	ar.	CLU4	8r h		9n r		Znr	5hr	24NF
	4.1 Internetwo			11		1				
	4.1 Internetwo									
		ARP/RARP/ICMP/								
	IGMP	ma / mai / min /								

	4.4 Cla	assful/Classless Addre	ssing								
	4.5 IP	v4 Subnetting									
	Chapt	ter 5: Transport and		CLO5	8	12		2hr	4h	ır	26hr
	Appli	cation Layer			h	hr					
					r						
	5.1 Tr	ansport Layer Protoco	ls								
	5.2 TC	CP congestion Control a	and Flow								
	Contr	ol Techniques									
		TP/RTCP/ Socket Add									
		ient Server Model & Do	omain								
		me System (DNS)									
	-	namic Host Configura	tion								
		otocol (DHCP)									
		TTP/HTTPS/SSL/TLS									
		cure Shell/Telnet									
		CP/SFTP	T - 4 1	CLO6	_			41	21.	_	1.01
	Chapter 6: LAN and WAN Networks				6	6		1hr	3h	r	16hr
	6.1 Local area Networks										
	6.2 Layer 2/Layer 3 Switches										
	6.3 WAN architectures6.4 Routers and Routing Protocols										
	0.4 KC	duters and Routing Fro	tocois					Total			108 hr
	Assess	sments						Total			100 III
		nuous Assessment	Perce	entage		F2F		NF2F			SLT
			Total-	50(%)							
	1	Quiz	5%			1hr				1	lhr
	2	Lab	10%)		3hr	•			3	Bhr
	3	Project/Presentation	15%)		3				3	3hr
	4	Mid exam	20%)		2hr					2hr
								To	tal	ç)hr
	Final 1	Exam	Percentag	ge 50(%	%)	F2I	7	NF2F		S	SLT
	Final	Exam								3 hr	
						3hr					
								Grand Total S	LT	120) hr
	L = Le	cture, T = Tutorial, P =	Others	,				•			
		Face to Face, NF2F = N									
		indicates the CLO base					tem	9.			
12	•	^ <u>_</u>	1 Cisco Pa			er					
	resources to deliver 2 Wireshark, G										
	course (e.g., software, 3 Computer l										
	computerlab, simulation										
	room	etc.)									

13	Text book &	1	Behrouz A. Forouzan, Data Communications and Networking, Tata
	Reference:		McGraw-Hill
	(Latest edition	2	S. Tannenbaum, D. Wetherall, Computer Networks, Prentice Hall,
	/publication)		Imprint of Pearson 5th edition
		3	William Stallings: Data & Computer Communications
		4	Larry L. Peterson and Bruce S. Davie: Computer Networks
		5	Rita Puz manová: Routing and Switching

				Adama Scie	nce and	l Tecl	nology University			
1	Schoo	l: Human	ities and S	ocial Sciences			Department: Hum	anities Unit		
2	Cours	e	General (Course						
	Catego	ory								
	Cours	e Name	Introduc	tion to Econom	ics					
	Cours	e Code:	SOSC200	2						
3	Synop	osis:	and macr students application household also able Specifical and cost of agents with perfect are macroeco	o fundamentals with the prelimination of economic to ds, firm busines to contextualize ly, the course into production. In all be discussed. In the imperfect manning the course into the discussed.	. The minary properties or any the key troduces these there ricket structures as the tructures as the minimal of the tructures as the minimal of the minimal	nain c rincip (pring y oth mace s stud heori more uctur	objective of this coles (theories) and ciples) in the acturer form of enterparticles with theory of the course covers the course covers and income accourse.	nics combining elements of micro burse is to introduce and acquaint d knowledge of economics and the nal world; the daily activities of the rises at micro levels. Students will bles and policy instruments. of consumer behavior, production, are made by different economic is different characteristics of e tries to introduce basic inting, unemployment, inflation,		
4	Name Acade Staff:			<i>y</i> 1						
5		ster and offered:	Semeste r:	II	Year:	2				
6		Hour:	3					<u> </u>		
7		quisite/	N0							
		quisite:	110							
	(if any	_								
8			ng Outcome	e (CLO): At the e	nd of th	ne cou	arse the student w	ill be able to do:		
	CLO -1	Describ	e the major	r economic units	constit	uting	g a given society an	nd their corresponding roles		
	CLO Explain the objective functions of consumers and how they attain this objective under resource constraints									
	CLO			objective functi	ons, des	scribe	e their cost structu	res in the short and the long run,		
	-3							and quantities under different		
			of compet					-		
	CLO	Tabula	te markets	into different ca				nber of buyers and sellers and		
	-4						of each market str			
	CLO				nic mea	sures	are constructed, t	their weaknesses, and alternative		
	-5	measur	es of nation	nal wellbeing						

	CLO														e pool of policy			
	-6	inst	rum	ents	s tha	t car	ı be	dep	loye	d to							of these cri	ses.
					T	ı		ı			St	ude	ent	s Ou	tco	me (SO)		
		.0							_							1	Assessme	nt
	Course Learning	Outcomes SO-1	-2	-3	4.	-Ċ-	9-			ching						В		
	rse rni	com SO-1	S0-2	SO-3	S0-4	SO-5	9-0S		Met	hods		ىد			2	lgn	jec	ort -
	Course Learnir)ut						L	Т	P O		Test			Quiz	Assignm	Project	Lab- report
	CLO-1								_			$\sqrt{}$				7 9	, <u> </u>	
	CLO-2				V			V										
	CLO-3				V			V										
	CLO-4					$\sqrt{}$		1										
	CLO-5	,				$\sqrt{}$									$\sqrt{}$			
	CLO-6																	
	Indica	Indicate the relevancy between the C					CLC	and	SO b	v ti	ck	ing "	√"c	n the api	propriate re	elevant box		
10		Transferable Skills (if applicable)								<u> </u>								
		(Skills learned in the course of study						ly w	hich	can b	e u	sef	ul aı	nd เ	ıtilized in	other setti	ngs)	
	1																	
	0																	
	2	2																
	3	3																
14	Diatail	3 Distribution of Student Learning Time						(CI T)									
]1	Distri	butio	n oi	Stu	aent	Lea	rnın	g H	me (<u> </u>	Т т	1000	.b.i.		- d I	oownin o	A ativiti a a	m + 1 (CL m)
1										CL	1				iu i	Learning		Total (SLT)
	Cours	o Con	ton	4 Δ.,	+line					0				ed		Guided	Indepen	
	Cours	e Con	iten	ιOu	LIIIIE	;								ing		Learni	dent	
												(F2	2F)			ng (NF2F)	Learning	
																(INFZF)	(NF2	
																	F)	
												Ĺ	Т	P	О		-)	
	Chapt	er 0: 1	Intr	odu	ction	1				1	3ł					1h	2h	6h
		Defi					ing	of		1	30					10m	20m	1h
		econ					O				m							
	0.2.	Орр	ortı	unity	yand	dacc	oun	ting		1	1h	ì				10m	20m	1h &30m
		costs						Ü										
	0.3.	Ind	ucti	on a	nd d	edu	ctior	ı in		1	20)				10m	20m	50m
		econ	omi	CS							m							
	0.4.	Part	ial a	and g	gene	ral e	quil	ibri	um	1	20)				10m	20m	50m
		0.4. Partial and general equilibriu analysis								m								
	0.5. The economic circular flow						1	30)				20m	40m	1h&30m			
	model and production							m										
	possibilities frontier																	
	0.6. Economic systems						20)					30m	20m				
								m				Ш						
	Chapt						ıme	r		2	9ł	1				4h	8h	21h
	Behav						-	,					_		\sqcup	41	01	
	1.1. Tl									2	2h		_		\perp	1h	2h	5h
	1.2. Tl	heory	of (Cons	sum	er Be	ehav	ioui	ſ	2	2h	1				40m	1h	3h&40m

1.3 The ordinal utility approach	2	3h	1h	2h	6h
1.4 The budget line	2	30	20m	1h	1h&50m
1.1 The budget line	-	m	20111		
1.5 Optimum of the consumer	2	30	30m	1h	2h
		m			
1.6. Elasticity of demand	2	1h	30m	1h	2h&30m
Chapter 2 : Theory of Production	3	6h	2h	3h	11
2.1 Production function	3	2h	30m	20m	2h&50m
2.2. Short run Production Function	3	2h	1h	2h	5h
2.3. Long Run Production Function	3	2h	30m	40m	3h&10m
Chapter 3: Theory of Costs	3	3h	2h	3h	8h
3.1. Definition and types of costs	3	30	20m	20m	1h&10m
		m			
3.2 Short-run costs	3	30	20m	1h	1h&50m
		m			
3.3 Long-run costs.	3	30	20m	30m	1h&20m
		m			
3.4 Relationship between short run	3	30	20m	30m	1h&20m
cost and production curves		m			-
3.5 Derivation of cost functions from	3	30	20m	20m	1h&10m
production functions		m			
3.6 Dynamic changes in costs- the	3	30	20m	20m	.1h&10m
learning curve		m			
Chapter 4: Perfect Competition	4	4h	3h	3h	10h
Market					
4.1 Assumptions of perfect	4	1h	20m	30m	1h&50m
competitive market					
4.2 .Demand and revenue function in	4	30	1h	1h	2h&30m
Perfectly competitive market	ļ.,	m	41	41	01.000
4.3 Competitive markets, short- run	4	1h&	1h	1h	3h&30m
equilibrium of the firm, industry, and		30			
market	ļ <u></u>	m	10		01.040
4.4 The long-run equilibrium of the	4	1h	40m	30m	2h&10m
firm, industry and market	1	3h	3h	3h	9h
Chapter 5: Pure Monopoly Market	4				
5.1 Characteristics and source of	4	30	20m	20m	1h&10m
monopoly 5.2 Short run and long-run equilibrium	4	m 1h	1h	1h	3h
5.3 Price discrimination					
5.3 Price discrimination	4	50 m	50m	50m	2h & 30m
5 4 Multi plant manapolist	4	40	50m	50m	2h&20m
5.4 Multi-plant monopolist	4	m 40	50111	50111	211&20111
Chapter Six: Monopolistic	4	3h	2h	3h	. 8h
Competition	T	JII	211	311	OII
6.1. Assumptions	4	30	20m	30m	1h&20m
0.1. 1.00umpu0113	1	m	20111	30111	IIIQEVIII
6.2. Product differentiation, the	4	1h	40m	1h	2h&40m
demand curve and cost of the firm	1				
6.3. The concept of industry and	4	30	20m	30m	1h&20m
<u> </u>	1	i -			1

	product	'groun'				m						
	_	t-run and	long run		4	1h			+	40m	1h	2h&40m
			firm exce	cc	4	111				40111	111	211&40111
		and welfa		33								
			nentals of		5	8h	1			3h	9h	20h
	_	conomics	nentais oj								JII	2011
			nentals of		5	40				30m	1h	2h&10m
		conomics	nentais oj			m				John		Ziiccioiii
			of GDP and	GNP	5	1h				30m	2h	3h&30m
			measuring		5	1h				30	1h	2h&30m
			GDP/GNP)	•								
			counts (G		5	40				10m	30m	1h&20m
	NI, PI an			, ,		m						
	7.4.Nom	inal versu	s real GDF)	5	40				20	1h	2h
						m						
	7.5. The	GDP deflat	tor and the	9	5	1h				10m	30m	1h&40m
		er price in										
		and welfa			5	1h				15m	1h	2h&15m
		business c	•		5	1h				20m	1h	2h&20m
	7.8. Uner	nployment	t and inflat	ion	6	1h				15m	1h	2h&15m
				Total		39	h			20h	34h	93h
						Α	sses	sme	nt	1		
	Continuo	ous		Percen	tage -	-	F2	F	N	NF2F		SLT
	Assessm	ent		50(9	%)							
	1	Quizzes		10			3h				3h	
	2	Group		10					7h		7h	
		Assignme										
		Individua		10					8h		8h	
	0	Assignme		20			01				01	
	3	Mid Exan	1	20			3h			m . 1	3h	
	D. 10					0				Total	21h	
	Final Exa	am		Percent	_	U	F2	F	ľ	NF2F		
	Final Exa			(% 50			6h				6h	
	FIIIdi EXa	1111		30	,		OII		rone	d Total	120 hrs	
	I = Locti	120 T - Tu	torial D = 1	Dractical O	- Ot	horo	E21					n Face to Face
				d on the CL							NrZr – NO	ii race to race
			rs and m=n		0 3 11	uiiib	/C1 111	5 III	Itti	1).		
13	Special											
	requiren	nent										
	s and											
	resource	es to										
	deliver t											
	course (e											
	software											
	compute											
	lab,											
	simulatio	on										
	roome	etc.)										

1.4	Torre book	1	Acomogly D. Laibaan D. & List I (2010) Economics 2nd Edition Poston, Doorson
14	Text book	1	Acemoglu, D., Laibson, D., & List, J., (2018). <i>Economics</i> , 2nd Edition, Boston: Pearson
	and		Education.
	reference:	2	C.L.Cole, Micro Economics: year A Contemporary Approach.
	(note: ensure	3	D.N.Dwivedi, 1997, Micro Economic Theory, 3rdEd., Vikas Publishing
	the latest	4	Ferguson & Gould's, 1989, Microeconomic Theory, 6thEd.
	edition	5	Hal R. Varian, Intermediate Microeconomics: A Modern Approach, 6thEd
	/publication)	6	Hubbard, G., & O'Brien, A.,(2019). <i>Economics</i> , 7th Edition, Boston: Pearson
			Education.
		7	Koutsoyiannis, Modern Microeconomics, edition, year
		8	Krugman, P., Wells, R., & Graddy, K., (2016). Essentials of Economics, 4th Edition, New
			York: Worth Publishers
		9	Mankiw, G., (2018). <i>Principles of Economics</i> , 8th Edition, Boston:
		10	N.Gregory Mankiw, 2007, Macroeconomics 4thedition
		11	O'Sullivan, A., Sheffrin, S., & Perez, S.,(2017). Economics: Principles, Applications, and
			Tools, 8th Edition, Boston: PearsonEducation
		12	O'Sullivan, A., Sheffrin, S., & Perez, S., (2019). Survey of Economics: Principles,
			Applications, and Tools, 8th Edition, Boston: Pearson Education.
		13	Parkin, M., (2019). <i>Economics</i> , 13th Edition, Boston: Pearson Education.
		14	R.S. Pindyck& D.L. Rubinfeld, 2013, Microeconomics, 8 th edition
	,	15	Samuelson, P., & Nordhaus, W., (2009). Economics, 19th Edition, Boston: McGraw-Hill
			Higher Education.

		Adama S	cience	and Tec	hnolo	gy University							
1	College: CoEEC			De	partm	ent: ECE							
2	Course Category	Major (Mai											
	Course Name	Integrated	Engine	eering T	eam P	roject							
	Course Code:	IETP4202											
3	Name(s) of Academic Staff:												
4	Semester and Year offered:	Semester:	II	Ye	ar:	4							
5	Credit Hour:	3 (1hr Lect	ure, 0hi	Tutoria	and 6	hr Laboratory)							
6	Prerequisite/Co-requisite:												
7	Course rationale	multidiscip compreher of enterpr writing, p acquire p manageme	linary sive pla ise eng resenta ractical nt plani	teams. ans for the sineering tions, are expering by ingering by i	The ne tech as word end ende ence	ertake engineering projects, particularly in course assists students in developing anical, operational, and project dimensions well as designing, communication, report trepreneurship skills. Students will also in engineering systems and project ting their knowledge, skills, and attitude.							
8	Course Learning Outcome (0	CLO): At the	end of tl	he course	the st	tudent will be able to:							
	solution.					rocess to produce a creative and innovative							
	CLO2 Develop prototype f												
		the principle of project management and team sprit											
	CLO4 Demonstrate effective			_		-							
9	Mapping of the Course Learn	ning Outcom	es to the			omes, Teaching Methods and Assessment:							
				Studen	t Outco	omes (SO)							
	n n g O O S S S	S S S	0			Assessment							

									-	Геас	hing	3			4))r
]	Metł		5	Test	Quiz	Proje ct	Repor t
									L	T	P	0	T	0	Pr	R t
	CLO			$\sqrt{}$							$\sqrt{}$	√			√	V
	CLO			$\sqrt{}$							$\sqrt{}$	$\sqrt{}$			√	V
	CLO											√			√	V
	CLO				√						$\sqrt{}$	$\sqrt{}$			$\sqrt{}$	$\sqrt{}$
10	Trai	nsferable S														
	1															ng of projects
	2	Students	will o	deve	elop skills (of in	tegratir	ng co	mp	onei	its i	nto	a compr	ehensi	ve worki	ng system.
	3	Students	will a	acqu	ire skill of	tea	mwork,	goo	d cc	mm	uni	cati	ion, and p	roject	manager	nent
	4															neering design
					re related :		-						•		0 0	
	5	Students	will ł	nave	skill of tra	ansf	erring e	engir	eer	ing	oroj	ect	s in to bu	ısiness.		
11	Cour	rse	This	s is	an integra	ited	, multic	discij	olin	ary	eng	ine	ering pr	oject ai	ming to	address a special
	Sync	psis:	eng	inee	ring topic	that	t is beir	ıg gu	ıide	d by	a f	acu	lty mem	ber. The	e literatı	ıre review, design,
			proj	ject	managem	ent,	busine	ss pe	erce	ptio	n, n	nult	tidisciplii	nary tea	amwork,	entrepreneurship
			are	all i	ncluded in	the	team p	roje	ct.							
12	Dist	ribution of	Stud	lent	Learning 7	Γime	e (SLT)									
									Te	achi	ng a	and	Learning	g Activit	ies	Total (SLT)
							CLO			ided	_		Guided		endent	
	Cou	rse Conten	t Out	line				learning (F to Learning Learning								
]	F)		(NF to F)	(N	F to F)	
								L	T	P	()		_		
	Intr	oduction														
	•	Overvie	w ab	out	integrate	d										
		and mul	tidisc	ipli	nary Proje	ct										
	•	Team wo	ork													
	•	Overviev	W	of	proje	ct	CLO3	2				3	}	3		8
		managei														
	•	Entrepre		-												
					Contracti	ng										
				eting	g strategy.							-				
		ject propo		٠												
	•	Literatur			£		CLO1									
	•	Problem					CLO4	2		3		2)	15		22
	•	Developn														
	•	Project by Project w	_	•	n											
		ject plann			Docian						+	+				
	110	Technica	_		nesign											
					ction		CLO1									
			wing	5010		nd	CLO2									
			cificat	tion			CLO3	10		50		7	7	8		75
					codes an	d	CLO4									
		_	ıdard	_												
	•	Econom			S											
L	l							1						1		

1				-		,	•			
	•	Component assembly and prototype (Simulation) development Prototype testing Results and discussions Product/process operational manuals						Total	105	
				Λοσ	sessmei	\+		Total	105	
ŀ	Λααα	agama amb	Dorgov				N	F to F		
	Asse	essment	Percer Tota 100(al-	F to) F _	11/	F to F		
	1	Project Proposal Document	10		0		2 (prepara	tion)	2	
	2	Project Proposal oral presentation	10		1	_	1 (prepara	tion)	2	
	3	Project progress report	10		1		2 (prepara	tion)	3	
· [4	Poster Evaluation	5				2 (prepara	tion)	2	
. [5	Prototype Evaluation	30		1				1	
.	6	Project report evaluation	20				2 (prepara		2	
	7	Oral Presentation Evaluation	10		1		1 (prepara	tion)	2	
.	8	Peer Evaluation	5		1				1	
.								Sub-Total	15	
								and Total SLT	120	
		Lecture, T = Tutorial, P = Practica								
13	-	cial requirements and		•				uired for proje	~*	luct
	reso	ources to deliver the course	ng/assembly et	-						
		•	r ar	nd simulatio	n room is neede	ed to simulate a	and			
<u></u>	_	•	design Indust		si <u>t</u>					
14	Text	book and reference:	confer	ence	papers	rela	ated to the p	irnal articles, project topic. ect guideline.	workshop	and
			mtegi	ateu	Liigine	21 111	g ream proj	ect guidenne.		

		Adama Science and Technology University
1	College: CoEEC	Department: ECE
	Course Category	Major Restrictive Elective
2	Course Name	Microwave Devices and Systems
	Course Code:	ECEg-4310
3	Synopsis	Review of Smith Chart applications: impedance, susceptance, VSWR calculations, quarter wave impedance transformer, the slotted line impedance finder. Microwave Network Analysis: impedance matrix, susceptance matrix, hybrid matrix, ABCD matrix, scattering parameters, signal flow graphs. Matching Networks and Tuning: Impedance matching RLC networks, Microstrip matching networks, Single Stub Tuning. Amplified design considerations; stability considerations, power gain considerations, amplifier tuning. Oscillator Design; oscillation conditions, oscillator configurations

4	Name(s Staff:) of A	cade	mic																
5	Semeste	er/Yea	ar of	fere	d:	Sen	neste	er:	II		Y	ear	4							
6	Credit F					3														
7	Prerequ	isite:				EM	Wav	es ai	nd C	Guid	e Sti	ructu	res:E	ECEg ²	1205					
9	Course		ing (Outc	ome											vill be	able	to:		
	CLO1					-	-												ce mat	ching.
	CLO2	Anal;	-							_	_	ance	, adn	nittar	ıce, tr	ansm	ission	1		
	CLO3				_							ng L s	section	on. si	ngle a	nd do	uble	stub		
		and o										0		- , -	0					
	CLO4											and	activ	e mi	crowa	ve cir	cuits	such	as	
	01 O F	coup										. 1								
10	CLO5																	-	report	
10	Mappin Assessn																			
	gı ((Student Outcomes (SO) Assessment																		
	mir CL(Student Outcomes (SO)																		
	am m m lort start and short and shor																			
	S01 S02 S03 S04 S04 S05 S05 S05 S06 S06 S07 S07 S08													eX						
	our								L	T	P	0	E	Ä	O	Sig	Pro	ab 1	ſid	Final exam
		\							,	_	,			,		As				,
	CLO1 CLO2	√ √							1		1			√	1/	1/	1/	1	$\frac{}{}$	1/
	CLO2	V	V						√ √		$\sqrt{}$				√ √		V	√ √	V	√ √
	CLO3	1	V						V	1	V				$\sqrt{}$	$\frac{v}{v}$	$\sqrt{}$	$\sqrt{}$		$\sqrt{}$
	CLO5						, ·	$\sqrt{}$	V		•			•	,	$\sqrt{}$	V	,		V
	Indicate	the r	elev	ancy	bet	weer	ı the	CLO	and	d PO	by	tickir	ıg "√	" on	the ap	propi	riate r	eleva	nt box	[
10	Transfe	rable	Skill	s; (S	kills	lear	ned	in th	e co	urse	of	study	whi	ich ca	ın be ı	useful	and ı	ıtilize	ed in o	ther
	settings	-																		
	1 <u>M</u>	icrow	ave	Offic	e A				•											
11						Dis	trib	utio	n of	Stu					me (S		Airriai a			
									CL	Λ		i eaci Guide		1	Learni iided		epend		Tot	al (SLT)
	(Course	e Cor	ntent	t Out	line			CL	10		earni			rning		earnii		100	ai (SLI)
		Jourse			cour							F2F)	·-o		F2F)		NF2F	_		
											L	T P	0					,		
	Chapter										2 h	2h							1	0hrs
	Introduction $\begin{vmatrix} CLO1 & h & - & 2hr & 4hr \\ r & r & \end{vmatrix}$																			
	1.58. 1.1 Microwave frequencies																			
	1.2 Review of the Smith Chart																			
				•	• In	•														
						peda														
				_		cepta flect														
				•		effici														

1.59. VSWR									
1.60. 1.3 Rectangular Wave	e Guides								
1.4 Wave guide transmission • TE									
TMTEM and									5
Hybrid Modes									
Chapter 2: Microwave Network A	nalysis	CLO2	5 h r				4hr	6hr	15hrs
2.1 Impedance admittan Matrices	ce								
2.2 Scattering Matrix									
2.3 Transmission Matrix									
2.4 Signal Flow Graphs								4.01	0 - 1
Chapter 3: 3.7. Matching Networks and Tuning	d	COL3	6 h r	-	5h r	-	4hr	10hr	25hr
3.1 L-Match Impedance Matching Networks									
3.2 Pi and T Impedance Mato Networks									
3.3 Microstrip Matching Net	works								
3.4 Single Stub Tuning									
Chapter 4:			8		6h	4			30hr
Noise and Microway	e Ampli	CLO4	h		r	h	6hr	6hr	
fier Design			r			r			
Noise in microwave circuits									
Noise Figure Calculat 4.3 Two port Power gains	1011								
Stability considerations									
Low noise amplifier design									
Amplifier Tuning									
Chapter 5: Microwave Transistor Osciesign	illator D	CLO5	6 h r	-	4h r	4 h r	3hr	3hr	20hr
5.1 Oscillation conditions			\forall			1			
Feedback Oscillators									
One-Port Negative Resistance	e Oscilla								
tors						L			
5.2 Two Port Negative Resist	tance Os								
cillators		1	1 1						
cillators 5.3 Oscillator Configurations									
								Total	100hrs.
		As	sses	SSI	ment	·		Total	100hrs.

	1	Quiz		5	5		1hr		1hr				
	2	Lab		1	0		3hr	3hr	6hrs				
	3	Project +		1	5		1hr	7hr	8hrs				
		Presentat	ion										
	4	Mid Exan	ı	2	0		2hr		2 hrs				
								Total	17				
	Final Exam			Percentage 5	50 (%)		F2F	NF2F	SLT				
	Final Exam			50					3 hrs.				
								rand Total SLT					
	L = Lecture,	T = Tutori	ial, P =	Practical, 0 = Ot	hers, I	F2F = Face	to Face, N	F2F = Non-Face	to Face				
12	Special requ				1	Microwa	ve Work B	ench					
		, ,		are, computer	2	Micwave	Office AW	/R Software					
4.	lab, simulati	on room .	etc.)		3								
13		1 Mi	crowa	ve Transistor An	nplifie	rs Analysi	s and Desig	gn, Second Editi	on, Guillermo				
	Text book		nzalez		-	,	`	-					
	Reference:	2 Mi	crowa	ve Engineering, l	Fourth	Edition, I	David M. Po	zar.	_				
		3 Mi	crowa	ve Devices and C	vices and Circuits, Third Edition, Samuel Y. Liao.								

				Adam	ia Scie	ence an	d Technolo	gy Ui	niversity
1	College	e: CoEE			Depa	rtment	:: ECE		
2	Course	!	Major Electi	ve					
	Catego	ry							
	Course	!	Integrated (Circuit Te	chnol	ogy			
	Name								
	Course	Code:	ECEg-4312						
3	Synops	sis:	In this cou	rse, stud	ents v	will st	udy wide r	ange	e of IC technology fabrication process, IC
			technology	industri	al ma	achine	s and tool	s. C	Course covers various internal elements
				_				his c	course student will able to understand the
			vital concep	ts of IC r	nanuf	acturir	ng process.		
4	Name(_							
	Acader	nic							
	Staff:					,			
5	Semest	ter	Semester:	IV	Yea	II			
	and	Year			r:				
	offered								
6	Credit		3						
7	Prereq		Microelectro	onic devi	ces &	circuit	s (ECEg-306	5)	
	/	Co-							
	requisi	ite: (if							
	any)								
8	Course		<u> </u>						udent will be able to do:
	CLO1	Exami	ne the approa	iches of ([rystal	l Grow	th fabricatio	n an	nd silicon wafers properties.
	ar o o								
	CLO2		•	nous epi	itaxial	meth	ods and ad	ivan	ntages of epitaxial over the conventional
		metho	us						

	CLO3	techniques																	
	CLO4	Des	cribe	the c	differ	ent d	epos	itio	n n	netho	ods i	n I(C fabi	rica	tion ι	ısing	g che	mica	l or vapor depositions
	CLO5	Eva	luate	the I	C the	rmal	oxid	latio	n a	nd E)opa	nt-	Diffu	sior	n mar	nufac	cture	and	measurement methods.
	CL06		-	the o				_			metl	nod	l for	dop	ing a	and	grow	ing	of metallization layers in
9	Mappi						Out	com	ıes	to th	e St	ude	ent O	utco	mes,	, Tea	chin	g Me	thods and Assessment:
	gı ((Stu	dent	Outco	mes	(SO)	1								1				
	mir CLC										_				Ass	essn	nent		1
	Course Learning Outcomes (CLO)										each	_	•					п	E
	ie I										etho			-				Mid Exam	Final Exam
	urs itcc	1	7	3	4	Ω.	9	1	_	L		Γ	P	0	Test	iż	Project	d E	Jal
	00 On	S01	S02	S03	S04	S05	908		20/						Te	Quiz	Pro	M	Fig
	CLO1	√ √ √ √ √ √ √																	
	CLO2																		
	CLO3										1	$\sqrt{}$							$\sqrt{}$
	CLO4										4	$\sqrt{}$					$\sqrt{}$		$\sqrt{}$
	CLO5					$\sqrt{}$					1	$\sqrt{}$					$\sqrt{}$		
	CLO6			$\sqrt{}$							1	$\sqrt{}$					$\sqrt{}$		V
							Į.	<u> </u>		ı	I		1		ı				
	Indicat	te the	e rele	vancy	y bet	ween	the	CLO	an	d SO	by 1	ick	ing "	√" c	n the	app	ropr	iate	relevant box
1	Transf																		
0	(Skills	learı	ned ir	the o	cours	se of s	stud	y wh	ich	ı can	be ı	ıse	ful ar	ıd u	tilize	d in	othe	r sett	tings)
	1	Sem	icono	ducto	r fabi	ricati	on n	eth	ods	5									
	2																		
	3																		
1	Distrib	utio	n of S	tuder	nt Lea	arnin	g Tir												
1											nd I		rning					T	otal (SLT)
						C	LO	Gui		-			uided		Indep		ent		
	Course	e Con	tent	Outlir	1e			lea		ng			earni		Learr	_	`		
								(F2	F)			ng	_		(N	IF2F)		
								L	т	P	0	(I	NF2F)					
								ь		1	U								
	<u>Chapte</u>					$\frac{d}{c}$	LO	4	2			21	hr					1	.3hr
	Crysta	l Wa	fer gr	<u>owth</u>	<u>L</u>	1		hr	h r						5hr				
	1.1 Int	egrat	ted Ci	rcuit	s?				-										
	Types																		
	Circuit		Bi u	Jou															
	Jii cuit	٠																	
	1 2 Co	mnlo	vitu (of ICc	Doc	iσ													

	1				1	
n						
1.3 Hierarchical and CAD						
design: Integrated Circuit						
Components and Structures						
1.4 Crystal Lattice, MGS and						
EGS, Crystal Defects and						
Czochralski Crystal Gro						
wth						
1.5 Silicon Shaping and and						
processing consideratio						
n						
1.6 Oxygen and carbon cont						
amination in wafer						
Chapter 2 Epitaxy		_	4			17 hr
* * *	CLO	6	h	2hr	5hr	
	2	hr	r			
2.1 Epitaxy, Types of			H			
epitaxies: Homo, Hetero						
opreamest from o, freed o						
2.2 Advantages of Epitaxy						
2.3 General Epitaxial						
Deposition Requirements						
2.4 Chemical Vapor						
Deposition						
2.5 Types of reactors in						
CVD Devices						
2.6 Molecular Beam Epitaxy						
2.7 Liquid phase epitaxy &						
Solid Phase Epitaxy						
Chapter 3 Lithography and	T	_	3		5hr	17 hr
etching	CLO	6	h	3hr		
	3	hr	r			
3.1 Lithography:			Ė			
Introduction						
3.2 Photoresist types and						
difference						
3.3 Lithography process						
3.4 Optical lithography						
3.5 Exposure Methods						
(Point, proximity and						
projection		L				
3.6 Introduction to Etching						
3.7 Wet Etching and Dry						
etching						
Chapter 4 Deposition,	CLO	6	3	4hr	5hr	18 hr
	4	hr	h			
	4		r			

									1				
	1 Deposition:												
	troduction												
	2 Chemical Vapor	•											
	eposition												
	3 Physical Vapor												
	position												
	4 Sputtering and												
	aporation												
4.5		betw											
	raporation and Sp		ring										
<u>Ch</u>	apter 5 Oxidation	<u>n</u>		CLO	4	2						15 hr	
				5	hr	h			4hr	[5hr		
				כ	111	r							
5.2	1 Oxidation												
5.2	2 Need of Oxidati	on											
5.3	3 Growth Mechan	nism											
	4 Oxide Propertie												
	Dry Oxidation												
	6 Wet Oxidation												
				07.0					47		_,	4 7 1	
	apter 6		_	CLO	4	2			4hr	,	5hr	15 hr	
	ffusion, Ion Impl		tion	6	hr	h							
	d CMOS Fabricat				111	r							
	1 Diffusion theory												
6.2	2 Flicks law of Dif	ffusio	n										
6.3	3 Ion Implantatio	n											
6.4	4 Difference bety	ween	Ion										
	plantation and d												
	5 Metallization												
То	tal											95 hr	
	sessment								l	1		70 III	
	ntinuous		Perce	nto	F2F			NII	F2F		SLT		
	sessment			iita	1 41			141	. 21		311		
AS	SCSSIIICIIL		ge Total										
1	Ouiz 1		60(% 5	J	1hr						1hr		
2	Quiz 1							~ 1.					
	Test		10		3hr			5ł			8hr		
3	Project	+	15		1hr			10)hr		11hr		
	Presentation		20		01						01		
4	Mid Exam		20		2hr						2hr		
	tal	1 _		1				Ι.			22 hr		
Fin	nal Exam		centa	ge	F2F			N	F2F		SLT		
			(%)										
	nal Exam	50				3	3hr				3 hr		
Gr	and Total SLT										120 hr		

	L = Lecture T =	Tute	orial, P = Practical, O = Others, F2F = Face to Face, NF2F = Non Face to Face
	· ·		CLO based on the CLO's numbering in item 9.
	Note. maleates	tiic (and based on the GLO's humbering in item 7.
1	Special	1	The instructor should select the appropriate tool and simulations models
2	requirements	2	
	and resources		
	to deliver the	3	
	course (e.g.	4	
	software,	5	Choose an item.
	computer lab,		
	simulation		
	roometc.)		
1	Textbook and	1	James D.Plummer, Michel D.Deal and Peter B.Griffin, "Silicon VLSI Technology,
3	reference:		Fundamentals, Practice and Modeling", Prentice Hall, 2000.
	(note: ensure	2	NEIL H.E.WESTE, "CMOS VLSI Design A circuit and Systems Perspective". Addison-
	the latest		Wesley,4 th Edition, 2011.
	edition		
	/publication)		

				Adama Scie	ence an	d Techno	olo	ogy University			
1	College	e: SOEEC			D	epartmen	ıt:	ECE			
2	Course	e Category	Major	Elective	,						
	Course	e Name	Indus	try Internship)-II						
	Course	e Code:	ECEg4	200							
3	Synops		Intern course techno Manag includ and In and st compe thinkin acader projec	ship I by engage Deepen Tecologies and me gement: Strenging strategic novation: Taclorategic thinking Strengthen in learning	ging in chnical ethodol gthen splanning le advang. Culting le Indust	more con Proficier ogies releskills in g, execut anced engivate Professore Pr	np ncy maio tio gin fes o,	on foundational skills from Industrial plex and high-impact engineering tasks. The y by Developing expertise in advanced ant to the student's field. Enhance Project anaging substantial engineering projects, on, and evaluation. Refine Problem-Solving neering problems with innovative solutions advanced communication, and strategic ita Ties: Enhance collaboration between etices through involvement in significant			
4	Name(Staff:	(s) of Acader	nic								
5	Semes	ter/Year off	ered:	Semester:	IV	Year	3	3			
6	Credit	Hour:		3		•	•				
7	Prereg	uisite:		All Previous major courses							
9	Course	e Learning C	utcome	me (CLO): At the end of the course the student will be able to:							
	CLO1			n advanced understanding of the host company's technological and structure, including recent developments and innovations.							
	CLO2	_	ontribu				_	ojects, utilizing sophisticated tools and			
	CLO3		nplement, and evaluate complex engineering systems, integrating theoretical								
				·				238			

			_						ical a									
									g tech	nniq	ues	to re	esol	ve intricate	technical c	challe	enges ar	ıd
		levelo							hat c	ntu	roc	adva	ncc	d tochnica	tasks, stra	togic	colutio	nc and
									nat ca during						tasks, stra	tegic	Solutio	iis, aiiu
10															ching Meth	ods	and	
	Assessm			urse	icui	31111	, out	00111	CS CO		, cu	aciic .	out	comes, rea	eming Meen	ous,	arra	
			dent	t Out	tcon	ies (SO)											
	Course Learning Outcomes (CLO)								-	п					Assessn	nent		
	ear es (Геас Metl		_		r n & s	y n	ent		tio
	se L ome	S01	S02	S03	S04	S05	90S	S07		MEU	Iou	.5		Advisoi Iluatioi Paper Writing	Host impar aluatio	Й	ion	inta n
	urs ıtcc		0,		0,	0,		• •	T	T F		0	-	Advisor evaluation Paper writing	Host Company evaluation	p Document	.0	presentatio n
	10 20								L	1 1		U		eva	e C	р		pr
	CLO1	✓	✓	✓	✓	✓	✓	✓		٧				$\sqrt{}$	$\sqrt{}$			
	CLO2	√	✓	✓	✓	✓	√	✓		1				√	$\sqrt{}$		√	√
	CLO3	√	√	√	√	√	√	√		1				√ /	√ /		<u>√</u>	√
	CLO4	✓ ✓	√	√	√	√	√	√		1	,			√	√		<u> </u>	√
	CLO5	hots	AZOOY	tho		and	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	vz ti	ckine	T "1/	" on the an	v propriato r	olowa	vnt hov	V			
Indicate the relevancy between the CLO and SO by ticking "a 10 Transferable Skills; (Skills learned in the course of study wh																nor		
10	settings)																	
	settings) 1 Team work																	
11						Dis	trib	utio	n of S	Stud	ent	Lea	rnir	ng Time (S	LT)			
															g Activities			
									CLO			iided	_	Guided	Independ		Total	(SLT)
	C	ourse	Cor	itent	t Out	line						rning	3	Learning	Learnin	_		
										_	(F2F)		I 0	(NF2F)	(NF2F))		
		<u> </u>	1							L	Γ	P	0					
	INTRO			ter o		ורדו	DIAI		CLO1			4h					1	hr
	INTRO			NSH		0311	MAL		CLUI	-		r	_	_			1	111
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	1.3 Ben		of A	dvai	nced	Ind	ustry	7										
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	HOST CC		-	ter t		S			CLO2	-	-	4h r	-	-	_		4hr	
	2.1 Con						ecent	F I				1						
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				al	Stru	cture	e ar	nd										
	Recent Changes:																	
	1.61. 2.3 Advanced Technological																	
	and Technical Structures:											0.0						
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			caul	<i>7</i> 11	ΟI	U	,111h10	υ Λ										
	2.2 Organizational Structure and Recent Changes:1.61. 2.3 Advanced Technological									-	_	20 hr	-	-	-		20hr	

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		Advan	iced	Pr	oblem	n-Solving										
	Technic					_										
	3.4 Stra															
	3.5 Dev		_	_		posals:										
			Chapte							36						
	PROJEC	T	DEVE	LOP	MENT	AND	CLO4	-	-	hr	-	-		-		36hr
	IMPLEN	MENT.	ATIO	V						111						
	44.1 Pr	oject l	Plann	ing a	and De	sign:										
	4.2	Adva	anced		Deve	lopment										
	Technic	ues:														
	4.3 Proj	ect In	nplem	ienta	ation:											
	4.4 Mor	nitorii	ng and	d Eva	aluatio	n:										
						opment:										
	Chapter five:									20						
	CONCLUSION AND						CLO5	-	_	28	_	-		_		28hr
					TIONS					hr						
	5.1 F	inal	Rep	ort	Prei	oaration:										
			•		•	gs and										
	Strateg					_										
	_		usion		and	Future										
			0.01011		011101	1 010011 0										
	Directions:															
	Directio	ons:													Total	92 hrs.
	Direction)115:						Asse	essi	ment	<u> </u>				Total	92 hrs.
			Assess	men	nt	Dames					-		FOF			
	Continu		Assess	men	nt	Perce	ntage T				-		F2F		Total NF2F	92 hrs.
				men	nt	Perce		otal					F2F √			
	Continu	ious A			it	Perce	ntage T	otal					F2F √			SLT
	Continu	ious A Advi eval	isor	n &		Perce	ntage T	otal			-		F2F √			SLT
	Continu	ous Advi eval Pape	isor uation	n & ting		Perce	ntage T	otal)					F2F √			SLT
	Continu	Advi eval Pape Host	isor uatioi er wri	n & ting pany		Perce	ntage T 20	otal)					F2F √			SLT 20hr
	Continu	Advi eval Pape Host	isor uation er wri	n & ting pany		Perce	ntage T 20	otal)					F2F √			SLT 20hr
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	Continu 1 2 Final Expocume	Advi eval Pape Host eval	isor uation er wri t Com uation	n & ting pany			ntage T 20 25 ntage 5	otal	-50				√ √ F2F √	rand	NF2F Total	SLT 20hr 97hr 117hr SLT
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12	Continu 1 2 Final Expocume present L = Lect	Advieval Pape Host eval eval ation	isor uation er wri t Com uation nd	n & ting pany	y al, P =	Perce	25 ntage 5 55 0 = Otl	otal) 5 (%	-5(6) (6)	2F = 1	Face	e to I	√ √ F2F √ G		NF2F Total NF2F Total SLT	SLT 20hr 97hr 117hr SLT 3 hrs.
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12	Continu 1 2 Final Expocume present L = Lect Special	Advieval Pape Host eval eval ture, Trequit	isor uation t Computation nd \[\Gamma = Tu \] remen	n & ting pany toria	al, P = and res	Perce Practical,	25 ntage 5 55 0 = Otl	otal) 5 (% ners, 1 2	-5(6)	2F = 1 Simu	Face llati ren	e to I	√ F2F √ GFace, N	F2F	NF2F Total NF2F Total SLT	SLT 20hr 97hr 117hr SLT 3 hrs. 120hrs.
12	Continue 1 2 Final Expocume present L = Lect Special deliver	Advieval Pape Host eval eval ture, Trequit	isor uation t Computation nd \[\Gamma = Tu \] remen	n & ting pany toria	al, P = and res	Perce Practical,	25 ntage 5 55 0 = Otl	otal) 5 (% ners,	-5(6)	2F = 1 Simu	Face llati ren	e to I	√ F2F √ GFace, N	F2F	Total NF2F NF2F Total SLT = Non-Face	SLT 20hr 97hr 117hr SLT 3 hrs. 120hrs.
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			Adama Science and Tech	nology University							
	1	College: Electrical	Engineering and Computing	Department: Electronics and Communication Eng.							
Ī	2	Course Category	Major Mandatory								
	Course Name Wireless and Mobile Communication										

	Course	Code:	ECEg5201
3	Synops	sis:	Introduction of wireless and mobile communication systems: History of mobile radio communication, examples of wireless communications (Zigbee, Bluetooth, and Internet of Things), and trends in cellular radio communication systems (1G to 6G mobile networks). Evolution of mobile telephony system: introduction mobile telephony system, GSM mobile telephony system, UMTS/WCDMA mobile telephony system, LTE mobile network, "5G mobile networks". Cellular Concept and System Design Fundamentals: Cellular Concept & Frequency Reuse, Channel Assignment Strategies, Handoff Strategies, Interference and System Capacity, Trunking and Grade of Services. Mobile Radio Channel Modeling & Mitigations: Wireless Channel Models and Signal Propagations, Small Scale Fading and Multipath propagation, Mitigation Techniques for Fading Wireless Channels, Equalization Techniques, Diversity Techniques, Coding Techniques. Multiple Access Techniques for Wireless Systems: Frequency Division Multiple Access, Time Division Multiple Access, Code Division Multiple Access, Space Division Multiple Access, Spread Spectrum Multiple Access, OFDMA wideband systems.
4	Name(Acader	s) of nic Staff:	ТВА
5	Semest		Semester: I Year: V
	Year of	fered:	
6	Credit		3
7	Prereq	•	ECEg4203-Digital Communication
	-	uisite: (if	
8	any)	Learning (Uutcome (CLO): At the end of the course the student will be able to do:
U	Course	Learning (Futcome (GLO). At the cha of the course the student will be able to do.
	CLO1	•	vireless communications system and network performance.
	CLO2		the measures to increase the capacity in GSM, WCDMA and LTE systems-Sectorization
	CI OO		al Filtering for Interference Reduction
	CLO3 CLO4		he effects of shadowing, path loss, and fading on performance. Ellular systems to achieve coverage area, spectrum allocation and quality of service
	CLU4	specificati	
	CLO5	1	he different wireless multiple access techniques, path loss models, wireless sensors
	0200		and cooperative diversity networks.
9	Mappii		ourse Learning Outcomes to the Student Learning Outcomes, Teaching Methods and
	Assessi	ment:	
			Student Learning Outcomes (SO)
	3)		
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	Lea es (
	se l om		
	Course Learning Outcomes (CLO)		

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		Š	S	S	S		Š	Š	S	L	Т	Р	_	Lab	Quiz	Project	Mid exam	Final exam
	CLO1															$\sqrt{}$		
	CLO2	V	V							$\frac{1}{}$				$\sqrt{}$		V	V	V
	CLO3	V	V							1				√	√	√	1	V
	CLO4			V				$\sqrt{}$		√				$\sqrt{}$		$\sqrt{}$		$\sqrt{}$
	CLO5											$\sqrt{}$		$\sqrt{}$				
			ancy betw		CLO	and S	0 by ti	cking "	√"on	the a	pro	pria	te r	eleva	ant b	OX		
1			ls (if applice the course		y wł	nich ca	n be u	seful an	ıd uti	lized	in o	her	sett	ings])			
	1	Wirele	ss Systems	Design	Skill	S												
	2	Wirele	ss Systems	Archite	ctur	e Anal	lysis Sl	kills										
	3	4G/LT	E/5G Stan	dard Sel	ecti	on Skil	lls											
1	Distrib	ution of St	udent Leai	rning Tir	ne (SLT)												
1					Ì		r	Teachin	g and	d Lear	nin	g Act	ivit	ies			To	tal
	Course	Content C	Outline	CLO	0	Guid	ed lear	ning (F	2F)	Le	uide arn NF2	ing		Le	epend earnin (F2F)		(S)	LT)
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	ommun		1															
		mples of no	•															
		ng Wireles nication	55															
	Technol																	
		rnet of Th	ings															
			ular Radio															
		nication S																
	Chapte Evolut		bile	CLO	2	6hr				2hr			4	4hr			121	nr
		roduction																

tolonhony system		I	<u> </u>			<u> </u>
telephony system						
2.2 GSM mobile telephony						
system and details of the						
architecture						
2.3 UMTS/WCDMA mobile						
telephony system details of						
the architecture						
2.4 LTE Mobile networks						
details of the architecture						
2.5 5G Mobile networks						
details of the architecture						
Chapter 3: Cellular Concept	CLO3	6hr		6hr	4hr	16hr
and System Design						
Fundamentals						
3.1 Cellular Concept &						
Frequency Reuse						
3.2 Channel Assignment			 			
Strategies						
3.3 Handoff Strategies			1			
Equalization Techniques						
3.4 Interference and System			+ +			
Capacity Diversity						
Techniques						
3.5 Trunking and Grade of						
Services Coding Techniques	GY O 4	01		01	01	0.41
Chapter 4: Mobile Radio	CLO4	8hr		8hr	8hr	24hr
Channel Modeling &						
Mitigations:						
4.1.C. all Carla Fadina and						
4.1 Small Scale Fading and						
Multipath Propagation						
Concepts						
4.2. Parameters of the						
Mobile Radio Channel						
101						
4.3 Impulse Response Model						
of the Wireless Channel						
4.4 Categorization of the						
Fading Channel						
			<u> </u>			
4.5 Mitigation Techniques						
for Fading Wireless						
Channels						
Chapter 5:	CLO5	8hr		8hr	8hr	24hr
Multiple Access						
Techniques for Wireless						
Systems						
5.1 Frequency Division						
5.1 I Toquelley Division	<u> </u>					

	N #	1.1 - 1 - A -		<u> </u>			Т		 		<u> </u>		 	
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		Code Division Mu	iitipie											
		Cess Spage Division M	امنانيا											
	_	Space Division M cess	iuitipi	е										
	5.5	Orthogonal frequ	iency											
	Div	vision Multiple Ac												
			To	otal									84hr	
						As	sess	ment						
	Coı	ntinuous Assessm	ent			entage -50(%)		F2F		NF2I	7	SI	Т	
	1	Quiz			5							1hr		
	2	Lab		10								18hr		
	3	Project and Pres	entati									12hr		
	4	Mid exam			20							2hr		
											Total	33hr		
		ial Exam		Per	centage	50 (%)		F2F	1	NF21	7	SI	Т	
	Fin	ial Exam			50							3hr		
										Grand To		120hr		
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1	Spe	ecial	1	Con	iputer la	ıb								
2		quirements and sources to	2	MAT	ГLАВ									
		liver the course	3	Cho	ose an it	em.								
	(e.g	g. software,	4	Cho	ose an it	em.								
	cor	nputer lab,	5											
		simulation room Choose an itemetc.)												
1		xt book and	1	Wir	eless cor	nmunicat	ions	princi	ples a	and practice, T	heodor	e S.Rappaj	ort, 2 nd	
3	ref	erence:	edition.											
	(no	ote: ensure the	2	Wir	eless cor	nmunicat	ions	, Andre	ea gol	dsmith, Camb	ridge ur	niversity		
		est edition			ss,2005									
	/pı	ublication)	3 Mobile cellular telecommunications, William C.Y.Lee 3 rd edition											
	4 Mobile communications, Lochen H.schiller, Addison Wesely,2 nd edition,2003											n,2003		

		Adama Science	and Technology University
1	College: CoEEC		Department: ECE
	Course Category	Major Mandatory	
2	Course Name	Capstone Project	
	Course Code:	EPCE5205	

3	Synopsi	S		Co ele red acc	ntro ectric quire quire	ol En cal p es s ed in	gine oowe tude i ear	ering er a nts	g mand of to cour	ajoi con lev	rs is itrol elop	to fam syster a pro	ilia ns ojec	rize as p t ba	them oractionsed o	with ced in	the properties that the thick the th	roces ustry wled	s of de . This ge and	ver and signing course d skills hrough
4	Name(s Staff:) of A	cade																	
5	Semeste	er/Yea	ar of	fere	d:	Sen	neste	er:	I		Y	'ear	5							
6	Credit H	lour:				3 (2	hr L	ectu	re, 3	Bhr	Tuto	orial)	·							
7	Prerequ	isite:				Sen	ior S	Stand	ling											
9	Course	Learn	ing (Outc	ome	(CL	O): A	t the	enc	d of	the	course	the	stu	dent w	vill be	able	to:		
	CLUI	innov	ative	e sol	utio	ns to	real	l-woı	rld p	ro	blem	S.							develo	p
		Condı Capst			_	rese	arch	, ana	lyze	e da	ıta, a	nd syn	the	size	inforn	nation	to in	form	their	
	CLUS	comp	rehe	nsiv	e pr	oject	pla	n.											ecuting	
	CLU4	proje	ct fin	ding	gs an	ıd re	com	men	datio	ons	S.		•						eir Cap	
		Refleo throu								an	d ev	aluate	thei	ir pe	rsonal	and p	profes	ssiona	al grow	rth
10	Mapping of the course learning outcomes to the Student Outcomes, Teaching Methods, and Assessment:																			
	ng (0)	Stu	dent	t Ou	tcon	nes ((SO)		1							Δ.				
	ırni (CL									Τe	eachi	ng					sessn			
	Lea	S01	S02	S03	S04	S05	90S	S07			ethods		ى ا	٦	Z	men ect	ct	oort	ess rt	l :atio
	Course Learning Outcomes (CLO)	SC	SC	SC	SC	SC	SC	SC	L	Т	P	0	-	ıesı	Quiz	Assignment	Project	Lab report	Progress report	Oral presentatio n
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	settings																			
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11						Dis	trib	utio	n of	Stı		t Lear								
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well as				·						Total	
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deliver the delive		` _		are, compu	ter.	2	C	omput	er Lab		
iav, siiiiuidi	1011 100	J111	i.e.c.j			3	Г	ifferen	it practical i	mplementation	lab
Text book/ Reference:	ferent	text book a	and re	feren	ices	accor	ding to thei	Capstone proj	ect titles.		

	Adama Science and Technology University													
1	College: COEEC	Department: ECE												
2	Course Category	Major (Mandatory)												
	Course Name	Final Year Project Phase I												
	Course Code:	ECE5207												
3	Name(s) of	To be assigned												

	Academ	ic Sta	aff:															
4	Semeste	r	an	d Se	emest	er:	I			Ye	ear:		5					
	Year off	ered	:															
5	Credit H	our:		2														
6	Prerequ	isite,	/	A	ccom	plishr	nento	of all n	najor	cour	ses							
	Co-requ	isite:	(if														
	any)																	
7	Course r	atio	nale	!														
8	Course I	oarr	nino	Oute	romo	(CI O). A+1	ho or	od of	thoc	ource	tho	ctudo	nt will	ho ab	lo to:		
O						-	-											
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	CLO2				hyne	nthaci	c and	Cond	duct r	rolii	ninai	17 AVI	nerim	ontal i	nvocti	gations.		
	CLO2												•				h the us	e of
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	CLO4						posa	l follo	wing	stan	dard	prop	osal v	writing	g form	ats and	present i	t in
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9		_	the	cou	rse I	Learn	ing ()utcoi	mes	to tl	ie St	uden	it Ou	tcome	s, Tea	aching I	Methods	and
	Assessm	nent: Student Outcomes (SO)																
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	effect						01 (мсси	umg	mac	pena	CIIC .	tuoit,	mana	5****B 1	cscaren	project	unu
11	Cours	This phase one (I) final year project, led by a faculty member, focuses on individual research																
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	Synop			_			_		-					_	_	_	developn	
	sis:						tion	for pr	oject	s inv	olvir/	ng co	mpon	ent, p	roduc	t, and s	ystem de	sign
4.5	D:				ment.		m·	(0)	7)									
12	Distribu	tion	ot S	tudei	nt Lea	arnıng	Tim	e (SL'I	-	-l- ·	1	I a -		۸ :		m	+-1 (CI TI)	
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		CI	C ·	1.11			C	: 1 - 1	T., J., 1	<u> </u>		
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	,	U	(1)	ш гј				dI III	Learning			
	activity						ng (N	F to	(NF to F)			
							F)	1 10	(NI to I')			
			L	Т	Р	0	1)					
	Introduction											
	 Overview on project 											
	proposal development and											
	research writing.		4	0	0	0	0		2	6		
	• Orientation on the											
	procedures of Phase I final year Project.											
	Problem identification, literature		0	0	0	0	5		10	15		
	review		U	U	U	U						
	Preliminary research work		0	0	0	0	3		12	15		
	Proposal development		0	0	0	0	5		25	30		
	Total		4	0	0	0	13		49	66		
	Assessment											
	Continuous Assessment		rcent	_		F to	F	NF to	F	SLT		
			tal-10	00(%	ó) <u> </u>							
	1 Interim Reports	20				1		4		6		
									aration)			
	2 Seminars	30				2		3		5		
	2 2	F0				4			aration)	2		
	3 Proposal defense	50				1		2	anation)	3		
	Total							threb	aration) 14			
	Grand Total SLT								80			
	L = Lecture, T = Tutorial, P = Practica	1 0 - 4	Othor	rc F	to F	- Fac	o to	Faco		on Face to Face		
13		•							for project			
13												
	and resources to deliver the course. Software, computer and simulation room is needed to simulate and design project works.											
14		evant				searc	·h 1	์ ใกมากร	al articles	, workshop and		
										ch problem areas.		
		culty n						0	-0-00001	F-111111 01 000.		
		ject	guide									

	Adama Science and Technology University												
1	College: CoEEC		Department: ECE										
2	Course Category	Major Elective											
	Course Name	VLSI Design											

	Course	Code:	EC	Eg530	7						
3	Synops Name(restu co the wi ba	alization alization which alization	on of m MOSFE cional a epts and mization	odern I Ts and and sequent d technon of co	Electro their fa uential iques o mbina this cou	nics Systembricatics circuits of mode tional a	stems. The ma on techniques s using CMOS ern integrated and sequential	in objectives in order to Logic. This circuit designation	orime medium of e of this course is the design various course also introduces ign and analysis along ng static and dynamic r designing the
	Acadei	nic Staf	f:								
5	Semes Year o	ter and ffered:	Se	mester	:	I		Y e a r :	V		
6	Credit	Hour:	3			l					
7	_	uisite/ uisite: (Di [if								
8	Course	Learni	ng Out	tcome ((CLO): .	At the e	end of t	he cour	rse the studen	t will be ab	le to do:
	CLO1	Model	comb	ination	al and	sequen	tial dig	gital circ	cuits using VH	DL Progran	nming.
	CLO2	Discus	ss VLS	l desigr	flow,	design	styles a	and the	fabrication pr	rocesses of	MOS
	CLO3	_		•				ld effec designs		nd understa	nd the behavior of the
	CLO4	Design	n and a	nalyze	the sta	atic and	dynan	nic beh	avior of MOS I	nverter circ	cuits.
	CLO5	Design	n CMO	S based	l comb	ination	al and	sequen	tial logic circu	its at transi	stor level.
	CLO6	Design	n and A	Analysi	s of Pas	ss trans	sistor a	nd tran	smission gate	-based circ	uits
		_	e cour	se Lear	ning 0	utcome	es to the	e Stude	nt Outcomes,	Teaching M	ethods and
	Assess										
	se iing	Stude	nt Out	comes	(SO)						
	Course Learning	S01	S02	S03	S04	S05	908	S07			Assessment

9									Teaching Methods							ıtion	m	am
									L	Т	P	0	<pre>Lab</pre>	Quiz	Project	presentation	Mid Exam	Final Exam
	CLO1				V		$\sqrt{}$				V		\(\frac{1}{}\))	$\sqrt{}$	1	$\sqrt{}$	$\sqrt{}$
	CLO2										V		V		$\sqrt{}$			$\sqrt{}$
	CLO3	V			V	$\sqrt{}$			$\sqrt{}$		V		V					$\sqrt{}$
	CLO4										V		V					$\sqrt{}$
	CLO5	V	V								V		V		V			$\sqrt{}$
	CLO6												V					
	Indica	te the r	elevan	cy betwee	n the CLO	and SO) by ti	ickin	ıg "¹	√"on t	he app	ropria	te rel	evar	nt bo	X		
1 0	(Skills	sferable Skills (if applicable) Is learned in the course of study which can be useful and utilized in other settings) Xilinx																
	2	HDL La																
	3	Digital	Design	l														
1 1	Distril	oution (of Stud	ent Learnii	ng Time (S	LT)												
1						Tea	ching	and	l Le	arnin	g Activi	ties						T
	Cours	e Conte	ent Outl	line	CLO		ded ming F)		Gui	ded L	earning	g (NF2	F)		Inde ent Lea (NF	rnin		ot al (S L T)
						L	Т	P	()								
	Chapt VHDL	er 1: Basics	;		CLO1	4h r		6h r		1hr					6hr			1 7 hr
			Introdu 'HDL	iction to														

1.2 Library Declaration, VHDL basics, Syntax, Keywords,						
1.3 Data types and objects						
1.4 Basic operations and expressions						
1.5 Entities and chitectures						
Chapter2: VHDL Modelling	CLO1	4h r	6h r	2hr	6hr	1 8 hr
2.1 Structure of basic VHDL program						
2.2 Dataflow Modelling						
2.3 Structural Modelling						
2.4 Behavioral Modelling						
2.5 Testbenches and simulation model						
Chapter 3: MOS Transistor	CLO2	6 hr		2 hr	7 hr	1 5 hr
3.1 Historical Perspective, VLSI Design Flow and Y-Chart						
3.2 VLSI Design styles, Standard cell-based design, FPGA						
3.3 Introduction, Fabrication processes, NMOS Fabrication, CMOS Fabrication						
3.4 MOS Structure, operation and I-V characteristics						
3.5 MOS Scaling and small						
1	1				<u> </u>	

Chapter 4:	CLO3				
MOS Inverters	and CLO4	8 hr	4 hr	2 hr	6 hr
4.1 Ideal Inverter and its transfer characteristics,					
4.2 Noise Immunity and noise margin					
4.3 Resistive load inverter,					
4.4 NMOS enhancement inverters					
4.5 CMOS Inverters, Ideal Inverters					
Chapter 5: MOS Logic Design	CLO4 and CLO5	4h r		3 hr	8 hr
51 CMOS Logic circuits		+ +			
5.2 Pass transistor Logic		1			
5.3 CMOS Transmission gates		+ +			
5.4 Clocked latch and flip - flop circuits					
Chapter 6: Dynamic Logic Circuits	CLO4 and CLO5	4 hr		3 hr	8 hr
6.1 Clocking methods		+ +			
6.2 Dynamic CMOS circuits		+ +			
6.3 DOMINO and NORA		+ +			
Total					

	Continuous Assess	ment	Percentage	F2F	NF2F	SLT					
			Total-60(%)								
	1 Quiz		5	1hr		1hr					
	2 Project Presenta	ation	10	1hr	7hr	8hr					
	3 Mid exam		20	2hr		2hr					
	4 Lab		15	3hr	3hr	6hr					
	Total			l		17 hr					
	Final Exam	F	Percentage 50 (%)	F2F	NF2F	SLT					
	Final Exam			3hr		3hr					
	Grand Total SLT			I		120hr					
	L = Lecture, T = Tu	torial, F	P = Practical, O = Ot	hers, F2F	= Face to Face, NF2F = Non-Face	to Face					
	Note: indicates the	CLO ba	ased on the CLO's n	umbering	; in item 9.						
1 2	Special requirements	1 2	Xilinx KIT								
2	and resources to	2 I	HDL software								
	deliver the course (e.g.	3 (Computer Lab								
	software,	4 (Choose an item.								
	computer lab, simulation roometc.)	5 (Choose an item.								
1	Textbook and	1 (CMOS Digital Integr	ated Circ	uits Analysis and Design", Sung-N	No Kang, Yusuf					
3	reference:	I	Leblebici, Tata McG	raw-Hill,	Third Edition, 2003	-					
	(note: ensure the latest edition	2 A	A VHDL Primer", Ja	yaram Bh	asker, Pearson Education, 3 rd Edi	tion,2005					
	/publication)		_		ts and Systems", Neil H.E.Weste, I	David Harris,					
	,		Ayan Banerjee, Pea	rson Pub	lication,3 rd Edition, 2011.						
			Introduction to VLS Edition, 2008.	I Circuits	and Systems", John P.Uyemera,V	Viley India, 1 st					
			Digital VLSI Design", Ajay Kumar Singh, Eastern Economy Edition 2011.								
		6	'Digital Integrated (Circuits –	A Design Perspective", Jan M. Ra	baey,					

	Anantha Chandrakasan, Borijove Nikolic, 2nd Edition, Pearson
	Education, 2003.

		Adama Science and Technology University
1	College : CoEEC	DEPARTMENT: CSE
	Course	
2	Category:	MAJOR ELECTIVE
_	Course Title:	ADVANCED COMPUTER NETWORKING
	Course Code:	CSEg5307
3	Synopsis	This course covers latest trends in the various layers of computer networking, emerging networking technologies and network security. At the end of this course, Students will be able to design and implement networking protocols and equipment.
4	Name(s) of Academic Staff:	
5	Semester/Year offered:	Semester: II Year 5
6	Credit Hour:	3
7	Prerequisite:	ECEg4208
8	Course Learning	Outcome (CLO): At the end of the course the student will be able to:
	CLO1 design, n network Different and medi switching Impleme	the various applications running in the network, set of requirements for network etwork architectures that guides the design and implementation of networks, programming interface, and various factors that impact network performance. iate the various solutions for encoding, framing, error detection, error correction, ia access control in different real world technologies. Also differentiate between g mechanisms in a switched local area networks which uses different technologies. Int switching algorithms
	CLO3 defined n space tac	and contrast the network data plane and control plane to implement an software letwork(SDN). Argue how the introduction of hierarchy, and expanding the address likle the issue of network scalability. Weigh how multicast routing and the tion of multiprotocol label swithcing(MPLS) improves the internet capability.
	CLO4 demultip	Insport algorithms in the context of different required services (simple lexing service, a reliable byte-stream service, a request/reply service, and a service ime applications.). Support alternative transport protocols such as QUIC.
	resource	best places to implement congestion control in the network under different allocation scheme.
		why security functionality is needed to be provided in all the layers of the network. ent securing network applications, TCP connections, network layer and wireless
9	Mapping of the co	ourse learning outcomes to the program Learning Outcomes, Teaching Methods, and
	Lear ning 00tc 00tc 20 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	t Outcomes (SO) S ~ S ~ S ~ S ~ ∞
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												Mε	etho	ds				ent	ب ا	ort	E	am
																Test	Quiz	uu.	Project	rep	exs	l ex
											L		Т	P	0	Г	Q	Assignment	Pro	Lab report	Mid exam	Final exam
	CLO1	$\sqrt{}$										-	$\sqrt{}$				$\sqrt{}$	$\sqrt{}$	$\sqrt{}$			
	CLO2	$\sqrt{}$		$\sqrt{}$	$\sqrt{}$							-	\checkmark									
	CLO3	$\sqrt{}$		$\sqrt{}$	√	√							\checkmark			√		√				
	CLO4	$\sqrt{}$		√	√	√			√		√		,			√	√	√	√			
	CLO5	$\sqrt{}$		√	√	√		√	1		√		V			$\frac{}{}$		1	√			r
	CLO6	V		√	√	٧		1	1		√		V			٧		1	V			V
	Indicate			_							_		_				_					
10	Transfer settings)		Skill	ls; (S	kills	learr	ned in	the	cou	ırse (of st	udy	wh	ich	can b	e u	ısef	ul ar	ıd ut	ilize	d in o	ther
11						Dis	tribut	ior	ı of													
											nd I	Learr	ning	g Ac	tivit	ies						
					_			-	CL	Gui			nin	_	Guid							
	C	ourse	e Coi	nten	t Outl	ine			0		(F	2F)			Lear			_	ende		Tota	al (SLT)
												ng				rning	5					
													(NF	4 F		(111)	F2F)					
										L	T	P	0)								
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	1.2. Netv	vork	Req	uirer	nents	5																
	1.3. Netv	vork	Arcl	nitec	ture																	
	1.4. Netv	vork	Prog	gram	ming	Inte	erface															
	1.5. Netv	vork	Perf	orma	ance																	
	2. Chapte	er Tw	70: T	he L	ink L	ayer	and	2	2	4		6			5		5				20Hr	S
	LANS																					
	2.1. Bit E	incod	ling																			
	2.2. Bit F	'rami	ng																			
	2.3. Erro	r Det	ecti	on ai	nd Co	rrec	tion															
	2.4. Mul	•	Асс	ess L	inks a	and																
	Protocol																					
	2.5.Wire																					
	2.6. Swit			rks																		
	_	3. Chapter Three: Advanced								4		6			5		5				20Hr	S
		Internetworking 3.1. The Network layer Control Pla																				
	and Data	Plan		iaye	ı con	uroi	riane															
	3.2. SDN																					
	3.3. IPV6																					
	3.4. Multicast																					
	3.5. Mult (MPLS)	iprot	oco]	l Lab	el Sw	itchi	ng															

	3.6. R	outing in M	ohile	Devices								
		pter Four:			4	4		6		5	5	20Hrs
		imple Demu		-	1	1				3	3	201113
		eliable Byte		• •								
		emote Proc										
		eal Time Tr										
				stion Control	5	4		6		5	5	20Hrs
		esource Allesues in Res										
		ueuing Disc										
		CP Congesti										
				tion Control								
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				ork Security	0	8		9		/	8	30Hrs
		rinciples of										
			grity	and Digital								
	Signa	nd-point Au	thon	tication								
		curing E-Ma		lication								
				nections: SSL								
				curity: IPSec								
		irtual Priva										
		ecuring Wir										
				rity: Firewalls								
		ntrusion De										
											Total	120 hrs.
						Ass	essr	nent	-			
	Conti	nuous Asses	sme	nt		Perce	nta	ge T	otal-	Par	NEOE	CLT
							50(_		F2F	NF2F	SLT
	1	Assignmen	t				15	%			30Hrs	30Hrs
	2	Labreport i	in Gr	oups			15	%		36Hrs		36Hrs
	3	Project (Gr	oup l	Based)			15	%			15Hrs	15Hrs
	4	Mid Exam					20	%		3Hrs		3Hrs
						_					Total	
	Final	Exam				Pe		ıtage	e 40	F2F	NF2F	SLT
								%)				
	Final	Exam					į	50		3	7	10
											rand Total SLT	120hrs.
			utor	ial, P = Practical,	0 = 0	thers	s, F2	F = 1	Face t	o Face, N	F2F = Non-Face	to Face
12	Specia		1	computer lab								
	_	rements	Software: Wire	shark	, Min	inet	, NS	3, GNS	3			
		esources	3	Visit: Ethio Tel	ecom							
		iver the		,								
	softw	e (e.g.										
		are, uter lab,										
	simul											
		etc.)										
	100111		<u> </u>									

13		1	Computer Networks: A System Approach (Peterson and Davie)
		1	https://github.com/SystemsApproach/SystemsApproach.github.io
		2	Computer Networking: A TOP-DOWN APPROACH (Kurose and Ross), Seventh
	Text book and		Edition
	Reference:	3	Computer Networks 5th By Andrew S. Tanenbaum
	Reference:	1	Larry L. Peterson, Bruce S. Davie, 2021, "Computer Networks: A Systems Approach", 6th edition, Elsevier/Morgan Kaufmann.
		4	Approach", 6th edition, Elsevier/Morgan Kaufmann.
		_	Behrouz A. Forouzan, 2017, "DATA Communications and Networking", McGraw-
		3	Hill Education, 5th edition

						Ac	lam	a Sci	enc	e and	1 T	echno	ology Uı	nivers	sitv				
1	College	: CoEE	C										t: ECE		, <u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>				
_	Course			Ma	ajor	Elec	tive				1								
2	Course	Ŭ						real	l-tim	e sy	ste	ms							
	Course	Code:		<u> </u>	Eg5														
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4	Name(s Staff:	s) of A	cadei	mic															
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7	Prerequ	uisite:				Mic	ropr	oces	sor	& Int	ter	facing	-ECEg4	202					
9													the stu				to:		
	CLO1	_											systems						
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	CLO3 CLO4												scale en		iea sy	stems	<u> </u>		
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	Assessr	_	10 00	ui sc	icui	311111	, out	COIIIC	<i>cs co</i>	tire j	рго	grain	Dearmin	5 Out	comes	, reac	······6	··········	oas, ana
			dent	Out	tcon	nes (SO)												
	nin CLC									_					A	ssessr	nent		
	Course Learning Outcomes (CLO)	S01	S02	S03	S04	Teaching L., L.												Final exam	
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	CLO1							√											√	V
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10	Transfer	able S	Skills	; (Sk	tills l	learne	d in t	he co	urse	e of	stu	dy '	whi	ch ca	n be ເ	ıseful	and ı	ıtiliz	ed in o	ther
	settings)																			
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11						Distr	ibuti	on of	Stu	deı	nt L	eai	nir	ng Ti	me (S	LT)				
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								CLO			_				ided	Inde	epend	lent	Tota	al (SLT)
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	2.1	Struct	ure	of a	ba	sic														
	com	puter	syst	em																
	2.2 CP	U fan	illies	use	d in															
	micr	ocont	rolle	rs																
	2.3 Basi	-	devi	ces a	and															
	technolo																			
	2.4 Inte																			
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4.1 Introduction to RTC)S							
4.2 Switching m	echanisms							
4.3 Scheduling policies								
4.4 message passing	and share							
d memory com								
4.5 inter-process comm	nunication							
Chapter 5: Low-pow	er	CLO4		3h	-	3hr	6hr	15hr
Computing			h r	r				
5.1 Introduction								
5.2 Sources consumption	of energy							
5.3 instruction	on-level							
strategies for management	power							
5.4 memory system p	ower							
5.5 system-level powe	r		\top					
management								
Chapter 6:		CLO4	6	3h		5hr	6hr	20hr
Networked Embedde	ed Systems		h	r				
ems	of bedded syst							
6.2 Interfacing and Mi								
systems	ongiona harr		\dashv		+			
6.3 D/A and A/D conv to partition A/D pr								
interfaces								
							Total	110hrs.
		I	Asses	ssmer	nt		I	T
Continuous Assessment	Percer	ntage To		50(%)	F2F	NF2F	SLT
1 Quiz		5%				V		1hr
2 Lab		15%				√		2hr
3 Mid exam		20 %				√	,	2hr
4 Project+Pr entation	es	10%	6			\bigvee	V	2hr
						T ===	Total	7hrs
Final Exam	ntage 50	U (%))		F2F	NF2F	SLT	
Final Exam	50				 	1 1 1 0 7 7	3 hrs.	
I I a shows T. T	0 04		rar	Г :		Grand Total SLT		
L = Lecture, T = Tutoria			_				e to Face	
Special requirements at deliver the course (e.g. s			1			Simulation	1 Software	
lab, simulation room	•	Z Simulation Room						
·	,		3	Con	nput	er Lab		

				4	Microcontroll	er Kit				
13		1	Tammy Norgaard:	Е	mbedded	Syste	ms	Architec	ture:	Α
			Comprehensive Guide	for	Engineers	and	Progra	mmers,	Embedd	led
			Technology							
		2	Wayne Wolf: Computers	as C	omponents: Pi	rinciple	es of Em	bedded C	Computing	5
	Torre hools		System Design, Morgan K	aufma	an					
	Text book Reference:	3	Frank Vahid / Tony Giva	rgis:	Embedded Sys	tem De	esign:			
	Reference:		aunified hardware/softwa	ire in	troduction, Wi	iley &	Sons			
		4	Qing Li, Caroline Yao: R	leal-T	Time Concepts	for E	mbedde	d Systen	ns	
		5	Arnold S. Berger: Embedd	ed Sy	stems Design					
		6	Stuart R. Ball: Embedded	l Mic	roprocessor S	ystems	: Real V	Vorld des	sign	
		7	Michael Barr: Programmir	ng Em	bedded Systen	ns in C	and C ++			

			Ac	lama	Scie	nce	and Tec	hnology	University	y
1	College: CO	EEC						Depart	ment: EPC	E
	Course Cate	gory	Ma	or El	ectiv	e				
2	Course Nam	ie	Pro	gran	nma	ble L	ogic Cor	trollers	and Robo	tics
	Course Code	2:	EPO	E430)2					
3	Synopsis:		Cor ind tect lear exp em the	itrolle ustria nniqu n ho lore	ers al aut ies, a w to the zes h	(PLC) toma ind i desi kine ands	s) and tion. It contegration is given to the content of the context of the contex	Robotics overs the on of PLO ram, and con	s, focusing e fundamer Cs and rob l troublesh trol of ro	ding of Programmable Logic g on their applications in ntal principles, programming potics systems. Students will noot PLC systems, as well as botic systems. The course tt-based learning to reinforce
4	Name(s) of	Academic S	taff:							
5	Semester/Y	ear offered	:	Sen	neste	er:	II	Year	4	
6	Credit Hour	:		3(2	hrs I	Lectu	re, 3hrs	Laborato	ry)	
7	Prerequisite):		EP(CE32	04				
8	Course Lear	ning Outco	me (CLO)): At	the e	end o	f the cou	rse the s	tudent will	l be able to:
	CLO1	Apply kno	wledge	of ro	botic	s to a	analyze a	nd solve	industrial	automation problems.
	CLO2	Motion Co	ontrol fo	r rob	otics	man	ipulator			
	CLO3	Apply kno		of PL	.Cs aı	nd ro	botics to	analyze	and solve i	ndustrial automation
	CLO4	Design an	d progr	am PI	LC sy	stem	s using l	adder log	gic progran	nming language.
	CLO5	Integrate	PLCs an	d rob	otics	syst	ems for i	ndustria	l automatio	on applications.
	CLO6	Demonstr	ate an u	nder	stano	ding	of safety	consider	ations whe	en working with PLCs and
9			learning	outc	ome	s to t	he Stude	nt Outco	mes, Teach	ing Methods, and
	Assessment						(20)			
	ng nes	Studen	t Learn	ing O	utco	mes	(SO)		1	A
	Course Learning Outcomes	S01 S02	SO3 SO4	S05	908	S07		ching hods	Test Quiz	Assignation of the Assignation o

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	$CLO2$ $\sqrt{}$ $\sqrt{}$, , , , ,		√	$\sqrt{}$		√	· · · · · ·	$\sqrt{\frac{1}{1}}$
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	Indicate the relevancy between the CLO an	d SO by	tick	 inσ "¹	√" on 1	-he	annronriate	•	•
10	Transferable Skills (Skills learned in the co								
10	settings)	urse or	Jua	y vv11	icii ca	11 15	c asciai aiia	utilizeu ili o	circi
	1 ETAP, MATLAB, Usage and Other p	orogran	nmir	ıg Ski	ill				
11	Distribution of Student Learning Time (SLT			<u> </u>					
				Tea	ching	anc	l Learning A	ctivities	
							Guided	Indepen	
					ded		learning	dent	SLT
	Course Content Outline	CLO	le	arnin	ıg (F21	7)	(NF2F)	learning	
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	Chapter One:	CLO1			√		V		15hr
	Introduction to Robotics								
	4.1. Introduction								
	1.1.1. Types of robots and their								
	applications								
	1.1.2. Robot components and								
	kinematics								
	Robot programming languages	CLO2	1/		1/		1/		13hr
	Chapter Two:	CLUZ	√		√		V		13111
	Robot Motion Control								
	2.1. Joint and Cartesian coordinate								
	systems								
	2.1.1. Trajectory planning and								
	interpolation								
	Path programming for robots Chapter Three:								
	chapter Three:	CLO3							9hr
	Industrial automation and PLC	0200			•		,		7
	3.1. Overview of industrial automation								
	Introduction to PLCs and their								
	components		1						
	Chapter Four	CLO4							9hr
	PLC Hardware and Wiring	LLU4	·V		V		V		7111
	3.2. Types of PLCs and their features								
	3.3. PLC wiring and input/output (I/O)								
	modules								
	Sensors and actuators for PLC systems								

		Chapter F	ive:	CLO	-							30hr
		PLC Progran	nming	CLO	5							30111
	4.1. I	PLC Programmin										
		Introduction to la	-									
	Į	orogramming	_									
	4.1.2. (Creating simple la	adder logic									
		diagrams										
		Addressing and d	ata types in P	LC								
		orogramming	-									
		ed PLC Programi		_								
		Timer and counte		S								
		Comparison and a nstructions	aritimetic									
		nta manipulation	instructions									
			111001 40010115									
		Chapter	Six:									
												24hrs
		tion and Indust		CLO			'	'				2 11115
	Applica	ations of PLCs ar	iu Robotics									
	5.1. Into	egration of PLC:	s and Robotic	cs								
		Communication										
		between PLCs ar	nd robots									
	5.1.2.	Programming PI	Cs for roboti	c								
		control										
		Case studies of P	LC-robotics									
		integration	· CDIO									
		lustrial Applicat d Robotics	tions of PLCs									
		Automation in m	anufacturing									
		processes	ianuiactuinig									
		Robotic assembl	v and materia	al								
		handling	,									
	PLC a	and robot safety	consideration	ıs								
										Т	otal	95hr
12	_		 1		essme						Г	
		ntinuous Asses		Percenta		tal-5()(%)	F2F		NF2F		SLT
	1	Proje			20					<u> </u>		12hr
	3	Lab rep Mid ex			10 20			$\frac{}{}$		√		8hr 2hr
	3	Miu ex	alli		20			V		Total		Total
	Fi	nal Exam	Percentag	e 50(%)		F2F			NF2F			SLT
		inal Exam	50%			$\frac{121}{}$			21			3hr
		- 		-		•				Total	1	60hrs
	L = Lect	ture, T = Tutorial	, P = Practical	l, 0 = Other:	s, F2F	= Fac	e to Fa	ice, NF2	2F = N			
13		requirements an							1	Compu		
	•	er lab, simulatio				`			2	Works	hop	
14	Text bo	ok	1	Petruzella,		_			_	ntroller	s," 5tł	ı ed.,
			1	New York,	NY, U	SA, M	cGraw	-Hill, 20	017.			

	2	Siciliano, B., Sciavicco, L., Villani, L., and Oriolo, G., "Robotics: Modelling, Planning and Control," 2nd ed., London, UK, Springer, 2010.
	1	Groover, M. P., Weiss, M., and Nagel, R. N., "Industrial Robotics: Technology, Programming, and Applications," 2nd ed., Upper Saddle River, NJ, USA, Pearson Prentice Hall, 2008. Hugh Jack. Automating Manufacturing Systemswith
	2	PLCs(Version 5.0, May 4, 2007)
	3	Dunning, G., "PLC Programming using RSLogix 5000," New York, NY, USA, Wiley, 2016.
	4	C.T. Jones; STEP 7 in 7 Steps – A Practical Guide to Implementing S7-300/S7-400 ` Programmable Controllers; 5th edition
Reference: (note: ensure the latest edition	5	Ned Mohan, MNPERE.Electric DrivesAn Integrative Approach
/publication)	6	Herman Bruyninckx, Robot Kinematics and Dynamics, August 21, 2010
	7	B. Siciliano, L. Sciavicco, et al, Robotics modeling planning and control, Springer, 2009
	8	J. J. Craig, Introduction to robotics ,3rd edition, Pearson Education,2005
	9	W. Bolton; Programmable Logic Controllers; 5th edition
	10	International
	11	Bimalk. Bose.Power Electronicsand Variable FrequencyDrives. IEEE Press

			Adama Scie	ence an	d Techno	ology University
1	College: COEEC			D	epartmei	nt: EPCE
	Course Category	Major	Elective			
2	Course Name	Introd	luction to Me	chatron	nics	
	Course Code:	EPCE4	306			
3	Synopsis	technother the following the following Motors	o-Mechanical ology to mecha llowing; electr are program d	System atronic s onics A esign, ev nd robu	s) and system d /D, D/A vent-driv	the techniques necessary to apply this esign. The topics includes but not limited to converters, op-amps, filters, power devices; en programming; hardware and DC Stepper g. Lab component of structural assignments
4	Name(s) of Acader Staff:	mic				
5	Semester/Year off	ered:	Semester:	II	Year	4
6	Credit Hour:		3 (2hr Lectur	re, 3hr T	utorial)	
7	Prerequisite:		EPCE3204			
9	Course Learning C	utcome	(CLO): At the	end of t	he cours	e the student will be able to:

	CLO1	Discu	ss th	e ba	sic c	once	epts a	and a	archi	ite	ctur	e c	of me	cha	tron	ic syst	em.				
	CLO2	Comp	ute a	abou	it co	ntrol	l syst	tem	mod	eliı	ng a	nd	repr	ese	ntat	ion of	mech	anical	l, hyd	raulic	and
	CLUZ	other	syst	em																	
	CLO3	Analy	ze al	bout	diffe	eren	t sen	nicoi	nduc	tor	· de	vic	e wh	ich	are ı	ısed in	mecl	natro	nics s	ystem	
	CLO4	Write	and	uplo	oad a	a pro	grar	n for	diff	ere	nt a	app	olicat	ion							
	CLOF	Integr	ate	mec	hani	cal, c	contr	ol aı	nd co	m	pute	er (engir	ieer	ing i	n the o	desigr	n of m	echa	tronic	
	CLO5	syster	n.										_								
	CLO6	Desig	n an	d de	velo	pme	nt pr	oces	sses	of r	nec	ha	troni	ics r	eal a	pplica	tion				
10	Mappir	ng of th	ie co	urse	lear	rning	gout	com	es to	th	e St	uc	lent (Out	come	es, Tea	ching	Meth	ods,	and	
	Assessi	_															Ū				
	1g ()	Stu	dent	t Ou	tcon	nes ((SO)														
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	e L.	S01	S02	S03	S04	S05	90S	S07		M	etho	oa	S	١,	,	<u>Z</u>	me	Project	od	Mid exam	(Xa)
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		1LO2													√ √						
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10																					
10		cate the relevancy between the CLO and SO by ticking " $$ " on the appropriate relevant box asferable Skills; (Skills learned in the course of study which can be useful and utilized in other settings) Setting up laboratory experiments of electrical machines and analysis of test results																			
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									CI C	,						earnin	_			Т	l (CI Tr)
		Course	. Car	aton	+ O	Hino			CLC)			ided			ided		epend		Tota	l (SLT)
		Course	COL	пеп	ı Oui	шпе					1		rning 72F)	3		rning F2F)		earnir NF2F	_		
											L	r) T	P	0	(11	1.71.)		111.71.	<u>) </u>		
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	1.3. Ele	ments	of M	1ech	atro	nic S	yste	m													
	1.63.	Applic	atio	n of i	Mecl	hatro	nics														
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		54. Physical System Modelling																			
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	2.2 Ele		•																		
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3.1 Analog to Digital (ADC) 3.2 Digital to Analog (DAC) 3.3 OP-amp 1.67. Filter Chapter Four: Power Devices 4.1 BJT Application Circuit 4.2 (1GBT Application Circuit 4.3 MOSFET Application Circuit 4.4 TRIAC Application Circuit 4.5 SCR Application Circuit 4.5 SCR Application Circuit 4.5 SCR Application Circuit 2.2.1. Power Transistor Circuit 2.2.2. Mechatronic Sensors RACtuators 5.1 Introduction 5.2 Sensors 2.1.1. Light Sensor 2.1.2. Voltage Sensor 2.1.2. Voltage Sensor 2.1.3. Current Sensor 2.1.1.DC motor 2.1.3. Stepper motor 2.2.3. Solenoid Chapter Six: 2.2.4. Event-driven programming. 6.1. Flow Charting 2.25. 6.2 HMI Chapter Swen: Control system Vs Mechatronics system 7.1 PLC 7.2 PID controller Introduction 7.3 Microcontroller 7.3 Microcontroller 7.3 Microcontroller 7.3 Microcontroller 8 Sessment Percentage Total-50(%) F2F NF2F SLT 1 Tests 10 √ √ 7hrs 3 Lab report 10 √ √ 7hr 7hr 3 Lab report 10 √ √ 7hr 7hr 3 Lab report 10 √ √ 7hr 7hr 4 Mid exam 20 √ √ 10hr Final Exam Percentage 50 (%) F2F NF2F SLT								 		
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Control system vs Mechatronics system 7.1 PLC 7.2 PID controller Introduction 7.3 Microcontroller 3.10. Application of mechatronic system Total 97 hrs. Assessment Continuous Assessment Percentage Total-50(%) 1 Tests 10 $\sqrt{}$ 1hr Assignments 10 $\sqrt{}$ 7hr Assignments 10 $\sqrt{}$ 7hr Lab report 1 Mid exam 20 $\sqrt{}$ 2hr				CLO5					4	17hr
	_	tem Vs Mecha	itronics		4		6	3		
7.2 PID controller Introduction 7.3 Microcontroller 3.10. Application of mechatronic system Total 97 hrs. Assessment Continuous Assessment Percentage Total-50(%) F2F NF2F SLT 1 Tests 10 $\sqrt{}$ 1hr 2 Assignments 10 $\sqrt{}$ 7hr 3 Lab report 10 $\sqrt{}$ 7hr 4 Mid exam 20 $\sqrt{}$ Total 20hr				GEOO						
7.3 Microcontroller 3.10. Application of mechatronic system Total 97 hrs. Assessment Continuous Assessment Percentage Total-50(%) F2F NF2F SLT 1 Tests 10 $\sqrt{}$ 1hr 2 Assignments 10 $\sqrt{}$ 7hr 3 Lab report 10 $\sqrt{}$ $\sqrt{}$ 10hr 4 Mid exam 20 $\sqrt{}$ Total 20hr										
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			ction							
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		7.3 Microcontroller								
	3.10. App									
	system									
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4 Mid exam 20 √ 2hr Total 20hr						,	√			
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Final Exam Percentage 50 (%) F2F NF2F SLT	E de la companya de l									
	Final Exam	ntage 50) (%)		F2F	NF2F	SLT		

	Final Exam		50			$\sqrt{}$		3 hrs.					
						G	rand Total SLT	120hrs.					
	L = Lecture, 7	Γ = Tu	torial, P = Practical, O = Ot	hers, l	F2F = Face	to Face, N	F2F = Non-Face	to Face					
12	• •		nts and resources to										
	deliver the colling lab, simulation		(e.g. software, computer	etc.)									
6.	iab, Silitulatio)11 1 OC	IIIetc.j	3 Proteus professional software									
13	Text book/	1	Godfrey C. Onwubolu, Me	chatro	onics princ	ciples and a	application.						
		1	D. G. Alciatore and M. B. Histand , Introduction to Mechatronics.										
	Reference:	2	R. Bishop, Mechatronic Sy	ystems	s, Sensors,	and Actuat	tors.						
		3	Arduino Community Web	sites				·					

			Adama	Science and Technolog	y Universit	y	
1	College	e: CoEEC		Department: ECE			
2	Course	e Category	Major Electiv	re			
	Course	e Name	Biomedical in	strumentation and ana	lysis		
	Course	e Code:	ECEg5321				
3	Synop	sis:			-	•	ology of the human body,
			-				healthcare technologies,
				-			nis course also shows how
			-	•		-	ret bioelectrical data (e.g.
			_			_	to the working principles ratory and cardiovascular
			•		•	•	l as biochemical sensors.
				•			cs and therapeutic devices
			are covered.	solono on modical imag	,g ua pr		es and merapeatic acrices
4	Name((s) of					
	Acade	mic Staff:	_				
5	Semes		Semester:	I	Year:	V	
	Year o						
6	Credit		3				
7		quisite/ Co-	none				
0		ite: (if any)	etaama (CLO).	At the end of the course	the estador		a ablata da
8	Course	e Learning Ot	itcome (CLO): <i>F</i>	At the end of the course	the studer	it Will D	e able to do:
	CLO1	Explain the	structures and	functions of the human	organs.		
	CLO2	_		of electrical engineerin	g as it relat	tes to b	ioelectric phenomena and
		neural stimi					
	CLO3	_		-	-	_	ern the measurement of a
			ariable or syste	em by a transducer which	ch converts	s the va	riable into an electrical
	CI O4	signal		agungmant Jarrians -	ad an	ah a = '	noludina the and dediction
	CLO4	Cnaracteriz	e various me	asurement devices ai	na approa	cnes 1	ncluding the underlying

		biol	ogical	proc	ess th	at ger	ierate	s the c	luar	ntity t	o be	mea	ası	ared or o	cont	rolle	ed		
	CLO5	Acq	uire tł	ne rol	e of tl	ne bio	medic	cal eng	ine	er in	socie	ty. l	lnc	cluding r	esp	onsi	bility f	or pro	tecting,
		spec	cificall	ly, pat	tient s	afety	, and, g	genera	ılly,	the b	road	er p	out	olic inter	est.				
9	Mapp	ing o	f the	cour	se Le	earnin	g Out	tcome	s to	the	Stu	den	t (Outcome	es,	Tead	ching	Metho	ds and
	Assess	sment	:																
	ing ()	Stuc	lent O	utcon	nes (S	50)													
	Learning s (CLO)												As	sessmen	t				
	Lea Ss ((Те	eachir	ıg							п	ш
	se ome								M	ethod	s		Test				ಕ	xaı	Exa
	Course Learnir Outcomes (CLO)	S01	S02	S03	S04	S05	90S	202	L	Т	P	0	F		Quiz		Project	Mid Exam	Final Exam
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	CLO1	4/	V .					V .	V	-	1		_	/	V		V	$\sqrt{}$	V
	CLO2	V V	V					√ √		√ √	V		1	/	<u>.</u> /		V .	V V	V
	CLO3	V	V V			V	V	',		V	V		_	ſ	v 1		V	V	1
	CLO4	V	V				V	V √	V √	V	1	-	1	/ /	V		V		√ √
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10				-		-	ıdv wł	nich ca	n h	e 115e	ful ar	nd 11	til	ized in o	the	r set	tings)		
			EW so			01 500	iay Wi	11011 00		e ase	- ur ur			1200 111 0	-	1 500	enings)		
	2																		
	3																		
11	Distri	butior	n of St	udent	t Lear	ning [Γime (SLT)											
									eac	hing a	and L	ear	niı	ng Activi	ties	;			Total
							CLO	G	uid	ed	lear	nin	g	Guided		Inde	epende	ent	(SLT)
	Cours	e Con	tent 0	utline	9			(1	F2F])				Learnir	ng	Lea	rning		
														(NF2F)			(NF2F)		
								L		T	P	1	0						
	Chapt	er 1:																	5hr
	Anato		nd ph	vsiol	ogv		CLO1	1 2	hr	1hr				1hr		1hr			
	Introd			-3	- 67														
				<u> </u>															
	.2		ılar Oı	rganız	zation														1
	1.3	Tissu		C	*****														
	1.4		or orga eosta		stems														
			eusta	212															18hr
	Chapt BASI (CEDT	יכ חב	Mod	lical	CLO2	,	hr	3hr				3hr		7hr			TOIII
	Instru				MEC	ııcal		- 3	111	JIII				3111		/ 111			
	2.1 Ge				cal														+
	Instru																		
	2.2 Or			-															+

	1					
2.3 Medical Measurement						
Constraints						
2.4 Classification Of Biomedical						
Instruments						
2.5 Interfering And Modifying						
Input 2.6 Compensation Techniques						
2.7 Design Criteria						
2.8 Commercial Medical						
Instrumentation Process						
2.9 Regulation Of Medical						
Devices						0.01
Chapter 3: Bioelectric Signals	CLO3	5hr	4hr	4hr	7hr	20hr
3.1 Origin Of Biopotentials						
3.2 Biopotential Electrode						
3.3 Biopotential Amplifiers						
3.4 Signal Characteristics: ECG,						
EEG						
3.5 Lead System Artifact						
Chapter 4:	CLO4	4hr	3hr	3hr	7hr	17hr
Biochemical Sensors						
4.1 Blood-Gas And Acid-Base						
Physiology 4.2 Electrochemical Sensors						
4.3 Blood Gas Monitoring Chapter 5:	CLO4					15hr
Applications	CLOT	2hr	3hr	3hr	7hr	
5.1 Measurement of Blood						
Pressure, Flow And Volume						
5.2 Measurements Of						
Respiratory System						
5.3 Overview of Laboratory		1				
Instrumentation						
Chapter 6:	CLO4	6hr	3hr	3hr	7hr	19hr
Medical Imaging System	0201		Jiii	5111	,	
6.1 Radiography						
6.2 Computed Tomography						

	Imaging	Resona	nce							
	6.4 Ultrasonography									
	6.5 Contrast Agents									01
	Chapter 7:	D .1		21		,	21	01		8hr
	Therapeutic and Devices		etic CLO5	2hr	1	hr	2hr	3h	r	
	7.1 Implantable Devi	ces								
	7.2 Ventilators									
	7.3 Hemodialysis									
	7.4 Laser									
	Total									102hr
	Assessment			l l	L	L				
	Continuous Assessme	ent	Percentag	ge Total-50	(%)	F2F		NF2F	SLT	
	1 Quiz		5%						1hr	
	2 Test		10%						3hr	
	3 Project and Prese	ntation	15%						7hr	
	4 Mid exam		20%			1			4hr	
	5									
	Total		1			•		•	15hr	
	Final Exam	Per	centage 50	(%)		F2F		NF2F	SLT	
	Final Exam								3hr	
	Grand Total SLT								120hr	
	L = Lecture, T = Tutor							F2F = Nc	n Face to Fa	ce
	Note: indicates the CI	LO base	d on the CL(O's number	ring in	item	9.			
12	Special	1 I	ABVIEW So	ftware						
	requirements and	2 (Computer la	b						
	resources to deliver	3 (Choose an it	em.						
	the course (e.g.	4 (Choose an it	em.						
	software, computer	5 (Choose an it	em.						
	lab, simulation									
13	roometc.) Text book and	1 V	Vehster Ma	edical Inst	riimei	ntatio	n Annlica	ation an	d Design, W	/ilev 4th
10	reference:		dition, 2009		i aire		птррпсс	acioni un	a besign, v	ney, ren
	(note: ensure the	2 5	chreiner,	Bronzino,	Pete	rson,	Medical	Instrun	nents and	Devices:
	latest edition	F	rinciples ar	nd Practice	s, CRO	2 Pres	s, 1st Edit	ion, 201	.5	
	/publication)	'		ster (Edit	or), B	ioinst	trumentat	tion, Joh	n Wiley & S	Sons, Inc,
		2	2004							

						Ada	ma S	cien	ce a	nd	l Te	chnolo	gy Univ	ersit	y				
1	College	e: COE I	EC							I) Оера	artmen	t: EPCE						
	Course	Catego	ory	Ma	ijor l	Elect	ive												
2	Course	Name		Po	wer	Ele	ctro	nics											
	Course	Code:		EP	CE3	202													
3	Synops	sis		ele an red mo	ectro d the ctifie odula	nics eir d ers, c atior	, an ynar pera tec	over nic c ation	viev hara and ues	v o acto l sv	f dif erist vitch	fferent tics, opening tea	major j types o eration a chnique ters, op	of pow and constants	ver sei haract C-DC s	micor eristi switcl	nducto cs of hing r	or dev contro egula	vices olled tors,
4	Name(Staff:	s) of A	cadei	nic															
5	Semes	ter/Yea	ar of	erec	d:	Sen	neste	er:	II		Ŋ	Year	3						
6	Credit	Hour:				3 (2	hr L	ectu	re, 3	hr	Tut	orial)							
7	Prereg	uisite:				ECE	Eg22	02											
9	Course												the stu	dent v	will be	able	to:		
	CLO1											er elect							
	CLO2 Explain principle of operation of power semiconductor devices and switching characteristics CLO3 Analyze various controlled rectifiers characteristics and evaluate their performance																		
	CLO3 Analyze various controlled rectifiers characteristics and evaluate their performance																		
	CLO4																		
	CLO5												of volta	ge an	d curr	ent sc	urce	invert	ters
	CL06	Evalu				-													
10	Mappi Assess	_	ie co	urse	lear	ning	gout	come	es to	th	e Sti	udent C	Outcome	es, Tea	aching	Meth	ods, a	and	
	1g ((Stu	dent	Out	tcon	nes ((SO)												
	earning									т	o ala				Asse	essme	nt		
	earning (CLO)	' .	۵,								each etho	O			ent	ىد	ort	m	m
	se I	S01	S02	S03	S 04	S05	90S	S07		171	Cuic	,us	Test	Quiz	шс	jec)də,	еха	exe
	Course Le								L	Т	P	0	Ĕ	Q	Assignment	Project	Lab report	Mid exa	Final exa
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	CLO ₄	$+\frac{1}{2}$	V	- -	_	√ √	√ √		√ √		$\frac{v}{}$		$\frac{V}{V}$	_	_ v	_	$\sqrt{}$	_	\ \sqrt{\sqrt{\color{1000000000000000000000000000000000000
	CLO6	-	\ \sqrt{\sqrt{\sqrt{\sqrt{\colored}}}	√	V	√	\ \sqrt{\sqrt{\sqrt{\sqrt{\colored}}}	v √	√	-	v √		-	-	$\sqrt{}$		V		\ \frac{1}{\sqrt{1}}
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	setting	s)																	
		MATLA																	
	2 I	Design	and e	expe	rime	ental	lly ve	erify	the	pei	forr	nance							

1 Distribution	of Stud	lent	Le	earn	ing	Time (SLT)	
			Тε	eachi	ng a	ınd Learnin	g Activities	Total
	CLO		Gu	iided		Guided	Independent	(SLT)
Course Content Outline]	lea	rning	3	Learning	Learning	(311)
				2F)		(NF2F)	(NF2F)	
		L	T	P	0			
Chapter One:	CLO1	2				3	1	6hr
Introduction to power electronics 1.68. Introduction								
1.69. Types of power								
semiconductor devices								
1.70. Types of power converters								
1.71. Application of power								
electronics								
Chapter Two: Power semiconductor devices.	CLO2	4		6		2	3	15hr
2.1. Power semiconductor devices								
2.1.1. Power Diodes								
2.1.2. Thyristors: SCR, TRIAC,								
DIAC, GTO and MCT								
Power Transistors: BJT, MOSFET								
and IGBT								
Chapter Three: Phase controlled Rectifiers.	CLO3	6		9		4	6	25hr
3.8. Single and Three phase uncontrolled rectifiers								
3.9. Single and Three phase semi- controlled rectifiers								
3.10. Single and Three controlled rectifiers								
Chapter Four:	CLO4	4		6		4	4	18hr
DC-DC converters.	CLOT	1		0		1		10111
4.1. Introduction	ļ							
4.4. Control strategy								
4.5. Switched mode converters								
4.5.1. Buck converter								
4.5.2. Boost converter								
4.6. Buck-Boost converter		L			L			
Chapter Five:	CLO5	4		6		5	7	22hr
Inverters.	CLUS	4		U		J		
5.4. PWM techniques								
5.5. Single phase voltage source in verter								
5.6. Three phase voltage source in verters (both 120° and 180° mode)								

	_		three phas verters	se curren									
		_	ter Six: verters.		CLO6	4	3		2	3	12hr		
	rection 6.2. Single cyclo	ge reg al and e phas conve	ulators (bo bidirections se and thro rters (bot	oth unidi onal) ee phase									
	and s	tep-de	own)							Total	98 hrs.		
					As	sessr	nent			Total	70 III S.		
	Continuous	Assess	ment	Davisson					FOF	NESE	CI TI		
				Percer			50(%)		F2F	NF2F	SLT		
	1	Test(10				√		1hr		
	2		nments		5				√	V	6hr		
	3		eport		15				√	V	10hr		
	4	Mid e	xam		20)			√		2hr		
										Total	19hr		
	Final Exam			Percen	itage 5	0 (%))		F2F	NF2F	SLT		
	Final Exam				50						3 hrs.		
										rand Total SLT	120hrs.		
						ners,	F2F = 1	Face	to Face, N	F2F = Non-Face	to Face		
12	Special requ					1							
	deliver the c			vare, compi	uter	2	2 MATLAB Software						
7.	lab, simulati		3 OrCAD/ Pspice Software										
13	Text book	1	Power E	lectronics l	оу М.Н	.Rash	id, 3 rd	edit	tion, 2014.				
	Deferre	1	Power E	lectronics b	tronics by P.S.Bhimpra, 3 rd edition, 2003.								
	Reference:	2	Power E	lectronics b	y Ned	Moh	an, 3 rd	edit	tion, 2003.				

		Adama Science ar	nd Technology University
1	College: Humai	nities and Social Science	Department: Humanities Unit
2	Course	Core Elective/focused Ar	ea Module
	Category		
	Course Name	Project Management for I	Engineers
	Course Code:	SOSC5011	
3	Synopsis:	formulations, appraisal, market and demand and environmental assessme engineering study, finar financing, documentation helps to ensure that projects related to your	to equip students with fundamental concepts of project planning and analysis of projects, the project cycle, plysis, raw material and supply study, location, site, and ent, production plan and plant capacity, technology and incial & economic analysis, appraisal criteria, project in, implementation monitoring and evaluation. This in turn exts are successfully completed. Sected to take part in the initiation, planning, execution of the profession at years to come. Accordingly, the course basic knowledge of project management.

4	Name(s)																		
_	Academic			C			TT		V	2									
5	Semester Year offer			Sen	nester:		II		Year:	3									
6	Credit Ho		2																
7	Prerequis		No	nο															
,	Co-requis		110	iic															
	any)	100. (11																	
8	Course Le	earning	Outo	come ((CLO)	: At th	e end	of tl	ne cour	se the	st	ude	nt	wil	l be a	ble t	to do	:	
	CLO1	Defin activi		core	projec	ct man	ageme	ent d	concept	s and	dif	fer	ent	iate	e pro	ject f	from	non	-project
	CLO2				_		-		approactivities		_	-		-	-				vledge of
	CLO3					roject ect pro			ntify ar	ıd scr	utii	nize	e w	ort	hy pr	ojec	t ide	as ar	nd
	CLO4	Defin	ie and	d initia	ate a p	roject	and v	erif	y the pr	oject	sco	pe.							
	CLO5			easibil d resc			apprai	ise a	ınd sele	ct the	W	ortł	ıw	hile	proj	ect i	deas	. Est	imate
	CLO6		_	-	_	ment _j k proje	-	_		pts, to	ools	an	d t	ech	niqu	es to	plai	ı, exe	ecute the
	CLO7		dule j							requ	ire	me	nts	s. M	onito	r an	d coı	ıtrol	project
	Mapping Assessme		cours	e Lear	ning (Outcon	nes to	the	Studen	t Out	con	nes	, Т	eacl	ning l	Meth	iods	and	
	7133C33111C	111.						Stuc	lent Ou	tcome	25 (SO))						
	1g (((l) 00	.00)					SSES	sme	nt
	Course Learning Outcomes (CLO)										Τe	eacl	nin	g					
9	es (\vdash	2	3	4	2	9	7				eth		_		Ш	ent		ort
	Course Learr Outcomes (C	S01	S02	S03	S04	S05	90S	S07		_	т	т	n	0		Mid Exam	Assignment	ct	Lab-report
	urs										L	T	P	0	Test	id E	Sig	Project	p-r
	J O														Te	M	As	Pr	Га
	CLO1																		
	CLO2																		
	CLO3	√																$\sqrt{}$	
	CLO4										$\sqrt{}$								
	CLO5										$\sqrt{}$								
	CL06		$\sqrt{}$								$\sqrt{}$				$\sqrt{}$,		
	CLO7			√							$\sqrt{}$								
	Indicate t						and	PO b	y tickir	າg "√"	'on	the	ap	pro	opria	te re	leva	nt bo	OX
10	Transfera (Skills lea						hich c	an b	e usefu	l and	<u>ut</u> i	lize	<u>d</u> i	n o	ther s	<u>setti</u> r	ngs)		
	1	Feasib	ility	studie	S							_		_					

	2 sk scheduling and resource	estimat	ion						
	3 PERT/CPM application for			ng an	d so	hedu	ıling		
11	Distribution of Student Learning Tim	ne (SLT)							
							Learning Ac	ctivities	Total
		CLO	Guio	led le		ng	Guided	Independe	(SLT)
	Course Content Outline			(F2F)		Learning (NF2F)	nt Learning (NF2F)	
			L	Т	P	0	(141 21)	(141 21)	
	Chapter 1: Overview of project management	1	4h					4h	8h
	1.1. Meaning and definition of project								
	1.2. Features of a project								
	1.3. Project Parameters								
	1.4. Classification of projects								
	1.5. Project Management- Meaning, Roles and Skills								
	1.6. Project environment and stakeholders								
	Chapter 2: Project Cycle	2	4h					6h	10h
	2.1. Meaning and definition of Project Cycle								
	2.2. World Bank Project Cycle								
	2.3. UNIDO Project Cycle		_					_	
	Chapter 3: Project Identification	3 & 4	4h					4h	8h
	3.1. Project Idea – Meaning								
	3.2. Sources of Project Ideas 3.2.1. Macro sources 3.2.2. Micro sources								
	Chapter 4: Project Evaluation and Analysis	5	9h					14h	23h
	4.1. Market Analysis								
	4.2. Engineering and Technological								
	analysis								
	4.3. Economic Analysis								
	4.4. Environmental Analysis								
	4.5. Financial Analysis								
	Chapter 5: Project Management	6 &7	5h					6h	11h
	5.1. Introduction								
	5.2. Project planning and								
	scheduling (CPM and PERT)								

	5.3. Project imple	menta	tion and									
	control		Total	26h			34h	60h				
				Assessme	ent							
	Continuous Asses	sment	Percentage Total-50(%)	F2F		NF2F		SLT				
	1 Test(1)		10%	,				2h				
	2 Mid Exam		20%				2h					
	3 Assignment	S	10%			V		2h				
	4 Project prop	osal	20%			$\sqrt{}$		10h				
	Total		60%	4h		12 h		16h				
	Final Exam		Percentage 40 (%)	F2F	7	NF2F		SLT				
	Final Exam		40%					4h				
					Gr	and Total SLT	•	80h				
.2	Special requirements and resources to deliver the course	3	Choose an item. Choose an item. Choose an item.									
	(e.g. software,	4	Choose an item.	e an item.								
	computer lab, simulation room etc.)	5	Choose an item.	Choose an item.								
Text book and reference: 1 Albert Lester (2014), Project Management, Planning and Con Elsevier Ltd.												
	(note: ensure the latest edition	2		ewis. (2007), Fundamentals of project management, 3rd ed. he United States of America								
	/publication)	3	Implementation	a Chandra, Projects – Planning Analysis, Financing, entation, and Review.								
		4	Singh, Narendra Delhi, Himalaya			nagement and	control, 3 rd	^l edition, New				
		5	New Delhi: Tata MCGraw-hill companies, Inc., India.									
		6	UNIDO, A Manua	al for the Pre	paration	ns of Industria	l Feasibility	y Studies.				

		Adama	Science and Technology University
1	College: CoEEC	1	Department: ECE
2	Course	Major Elective	
	Category		
	Course Name	Optics and Optical	Communication
	Course Code:	ECE 5302	

3	Synop	sis:		Introdu	uction	of o	ptical c	ommu	nica	tion: propaga	atior	of lig	ht, ra	ay th	ieo	ry and mo	del.
				Differe	nt typ	es of	fibers	: Single	and	d multimode f	fibei	s, ste	p ind	ex fil	ber	rs. Signal	
				degrad	ation	due 1	to scatt	tering,	atte	nuation and d	disp	ersion	and	its lo	oss	ses. Optical	l
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				electro	-absoi	rptio	n. Opti	cal rec	eive	rs:	_						
				Photod	liodes	p-i-	n, aval	anche,	res	ponsively, cap	pacit	ance,	trans	sit tii	me	. Optical r	eceiver
				perfori	mance	: Q fa	actor, b	it erro	r ra	tio, sensitivity	y de	grada	tion.	Non-	-Li	near effect	ts:
				solition	ı base	d coi	nmuni	cation.	Opt	cical communi	icati	on sy	stem	arch	nite	ecture: opt	ical
				amplifi	er, Fib	er o	ptic lir	ık desi	ign,	and amplifie	ed W	DM s	yster	ns. I	Fre	e Space O	ptics
										pplications							
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	Staff:							T									
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8			rning	g Outcome (CLO): At the end of the course the student will be able to:													
	CLO				-					ber communi						tion of opt	ical
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	2						ication										
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	6		1														
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9	Mappi	ng of	the o	ourse	Learn	ing C	utcom	es to tl	ne St	tudent Outcor	mes,	Teac	hing	Meth	hod	ds and	
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				of Option	cal														

Fiber								
Communications								
1.4 Disadvantages of Optical Fiber Communications								
Chapter 2:								
The Principles of Fiber Optics Communications and Characteristics	CLO 2	4hr	-	2h r	1	1hr	5hr	12hr
2.1 Ray Transmission Theory								
2.1.1. Reflection.								
2.1.2. Refraction								
2.2. Light Propagation								
2.2.1. Total Internal Reflection								
2.2.2. Mode Propagation								
2.2.3. Acceptance Angle								
2.2.4. Numerical Aperture								
2.3. Types of Optical Fibers								
2.3.1 Multimode Fibers								
2.3.2 Single Mode Fibers								
Chapter 3: Signal Degradation in Optical Fibers	CLO 3	4hr		4h r		2hr	7hr	17hr
3.1 Splices and Connectors.								
3.2 Dispersion								
3.2.1 Intermodal dispersion								
3.2.2 Material dispersion								
3.2.3 Waveguide dispersion								
3.3 Losses.								
3.3.1 Scattering losses								
3.3.2 Absorption losses								
3.3.3 Bending losses								
3. 4 Fiber Optic Couplers								
Chapter 4: Optical Sources	CLO	4hr	-	4h	-	2hr	7hr	17hr

	4			r				
4.1 Introduction to	T			1				
Optical Sources								
4.2 Diode and Light-								
Emitting Diode (LED)								
4.2.1 Working Principle								
of LEDs								
4.2.2 Advantages and								
Disadvantages of LEDs								
4.2.3 Applications of								
LEDs								
4.3 Diode Laser (DL).								
4.5 Diode Laser (DL).								
4.3.1 Structure of Diode								
Laser								
4.3.2 Homo- and Hetero- structure diode lasers								
4.3.3 Operating Wavelengths								
4.4 Fiber Laser (FL)								
4.4 FIDEI Lasei (FL)								
Chapter 5:	CLO							
Optical Detectors in	5	2hr	_	4h	_	2hr	6hr	14hr
Fiber Optic		2111		r		2111	Om	1 1111
Communications								
5.1 Introduction to								
Photo-detectors								
5.2 Basic Requirements								
for detectors in Fiber								
optics								
5.3 Types of Photo-								
detectors								
5.3.1 Positive-Intrinsic-								
Negative (PIN)								
5.3.2 Avalanche Photo-								
Detector (APD) diodes								
5.3.3 APD Verses PIN								
5.4 Optical Detection								
Principle								
5.4.1 Photo-detectors								
5.4.2 Photodiodes								
5.4.3 Materials for								
Photo-detectors								
5.5 Applications of								
Photo-detectors	CT C							
Chapter 6: Applications	CLO	16		4h		2hv	6hr	16hn
and communication	6	4hr	-	r	-	2hr	6hr	16hr
system								270

6.3 Medical Applications	:						
	·						
6.4 Endoscope							
6.5 Soliton Pulses							
6.6 General Applications of optical fiber communication based or the characteristics							
Chapter 7: Modulation and Multiplexing 7.1 Modulation	CLO 7	4hı		7h r	3hr	7hr	21hr
7.1.1 Amplitude							
Modulation (AM)							
7.1.2 Frequency							
Modulation (FM) 7.1.3 Phase Modulation							
(PM)							
7.2 Multiplexing							
7.2.1 Time Division							
Multiplexing							
7.2.2 Frequency Division							
Multiplexing 7.2.3 Wavelength							
Division Multiplexing							
Tota	al						103hr
				Asses	sment		
Continuous Assessment	Percenta	ag	F	F2F	NF2F		SLT
	e Total- 50(%)						
1 Quiz	5		1hr				1hr
2 Lab	10			3hr	3hr		6hr
3 Project + presentation	15			1hr	6hr		7hr
4 Mid Exam	20		2	2hr			2hr
						Total	16hr
Final Exam Per	centage 5 (%)	0	F	F2F	NF2F		SLT
Final Exam				3hr			3hr
<u>, </u>					Grand Tota	al SLT	122hr

1	Special	1	optisystem Software
2	requireme	2	Computer lab
	nts and resources	3	Choose an item.
	to deliver	4	Choose an item.
	the course	5	Choose an item.
	(e.g. software,		
	computer		
	lab,		
	simulation		
	room		
	etc.)		
1	Text book	1	Fiber-Optic Communications Technology, Djafar K. Mynbaev and Lowell L.
3	and		Scheiner
	reference:		Prentice Hall, 2001
	(note:	2	Light wave Technology: Telecommunication Systems, Govind P. Agrawal John
	ensure the		Wiley
			and Son, Inc., 2005
	latest	3	Light wave Technology : Components and Devices by Govind P. Agrawal John
	edition		Wiley
	/publicatio		and Son, Inc., 2004
	n)	4	AGRAWAL, G. P. (2001). Nonlinear Fiber Optics (3rd ed.)
		5	. Palanisamy P.K., Materials Science, Scitech Publications Pvt ltd., (2002)
		6	Optical Electronics; by A. Yariv, 3rd Edition. Holt, Rinehart & Winston, 1991.
		7	Optical Communication by John M Senior

		Adama Science and Technology University							
1	College: CoEEC	Department: ECE							
	Course Category	Major Elective							
2	Course Name	Satellite Communication							
	Course Code: ECEg-5310								
3	Synopsis	This course aims at providing thorough information of the conventional and upcoming satellite communication technology. The course covers the History of Satellite communication, Basic concepts of Satellite Communications, Communication Networks and Services, Comparison of Network Transmission technologies, Orbital and Spacecraft problems, Growth of Satellite communications, Orbital mechanics, Look angle determination, Orbital perturbations, Orbital determination, Launchers and launch vehicles, Orbital effects in communication system performance, Satellite Subsystems, Attitude and Control Systems (AOCS), Telemetry, Tracking, Command and monitoring, Power systems, Communication subsystems, Satellite antennas, Equipment reliability and space qualification, Basic transmission theory, System noise temperature and G/T Ratio, Design of downlinks, SatelHrsite systems using small earth stations, Uplink design, Design of specified C/N: Combining C/N and C/I values in satellite links system design examples.							
4	Name(s) of Acade	mic							

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5	Semeste	er/Yea	ar of	ferec	d:	Sen	ieste	er:	II		7	Yea	ar	5							
6	Credit H	our:				3							'								
7	Prerequ	isite:				ECE	g-42	204-	Ante	enna	aar	nd	Radi	o W	/ave	Propa	gation	1			
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Chapter 2: ORBITS AND LAUNCHING METHODS	CLO2	٧			V		20hr
2.1 Introduction, Kepler's First							
Law,Kepler's Second Law, Kepler's Third Law							
2.2 Definitions of Terms for Earth-							
Orbiting Satellites, Orbital Elements,							
Apogee and Perigee Heights							
2.3 Orbital mechanics, Look angle							
determination							
2.4 Orbital perturbations,							
Orbital determination,							
2.5 Orbital effects in communication							
system performance							
2.6 Orbit Per turbations, Effects of a							
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non spherical earth, Atmospheric							
drag		\vdash					+
2.7 Geostationary Orbit, The Polar							
Mount Antenna, Limits of Visibility		\vdash					
2.8 Near Geostationary Orbits, Earth							
Eclipse of Satellite							1
2.9 Sun Transit Outage, Launching							
Orbits.							
Chapter 3:	CLO2	1				$\sqrt{}$	20hr
SATELLITE SUB SYSTEMS	CLOZ	V	v		V		
3.1 Satellite Subsystems							
3.2 Attitude and Control Systems							
(AOCS),							
3.3 Telemetry, Tracking, Command							
and monitoring, Power systems							
3.4 Communication subsystems,							
3.5 Satellite antennas, Equipment							
reliability space qualification							
3.6 Spinning satellite stabilization,							1
Momentum wheel stabilization							
3.7 Station Keeping, Thermal							
Control, TT&C Subsystem,							
Transponders							
3.8 The wideband receiver, The		\vdash					1
input demultiplexer							
Chapter 4:		\vdash					13hr
RADIO WAVE PROPAGATION AND	CLO3	٧	$\sqrt{}$				13111
POLARIZATION 4.1 Introduction		\vdash					1
4.1 Introduction		\sqcup					1
4.2 Atmospheric Losses, Ionos pheric Effects							
4.3 Rain Attenuation, Other Propagat							
ion Impairments				1	Ī	i	i

4.4 Antenna Polarization 4.5 Polarization of Satellite Signals 4.6 Cross Polarization, Discriminatio n, 4.7 Ionospheric Depolarizaon 4.8 Rain Depolarization, Ice Depolari zation Chapter 5: SATELLITE COMMUNICATION LIN K DESIGN 5.1 Introduction, Basic transmission theory 5.2 Equivalent I sotropic Radiated Po wer, Transmission Losses 5.3 Free-space transmission theory 5.5 Paespace transmission 5.5 Phe Link-Power Budget Equation 5.5 System noise temperature and G /T Ratio 5.5 The Link-Power Budget Equation 5.6 System noise temperature and G /T Ratio 5.7 Design of downlinks, SatelHrsite systems using small earth stations 5.8 Uplink design, Design of specified C/N: Combining C/N and C/I values i satellite links system design examp les. Chapter 6: CLO4 CLO5 6.1 Introduction, Single Access 6.2 Preassigned FDMA, Demand-Assi gned FDMA 6.3 Spade System, TDMA, Preassigne dTDMA 6.4 Demand-assigned TDMA, Satellit e-Switched TDMA 6.5 Code-Division Multiple Access 6.6 Satellite Mobile Services, VSATS 6.7 Radarsat, Global Positioning Satel lite System (GPS), 6.8 Orbcomm, Iridium. Total 95hrs Assessment Percentage Total F2F NF2F SLT SLT SlT Quiz 59% √ 1.5hr F2F NF2F SLT F3F NF2F SLT F	111	ntonno Dolovinoti on	1		1				<u> </u>
4.6 Cross Polarization, Discriminatio n, 4.7 Ionospheric Depolarizaon 4.8 Rain Depolarization, Ice Depolari zation Chapter 5: SATELLITE COMMUNICATION LIN K DESIGN 5.1 Introduction, Basic transmission theory 5.2 Equivalent Isotropic Radiated Power, Transmission Losses 5.3 Free-space transmission 5.4 Feeder losses, Antenna misalign ment losses, Fixed atmospheric and ionospheric losses 5.5 The Link-Power Budget Equation 5.6 System noise temperature and G /T Ratio 5.7 Design of downlinks, Satelltrsite systems using small earth stations 5.8 Uplink design, Design of specified C/N: Combining C/N and C/I values in satellite links system design examples. Chapter 6: SATELLITE ACCESS AND SPECIALI ZED SERVICES 6.1 Introduction, Single Access 6.2 Preassigned FDMA, Demand-Assigned FDMA 6.3 Spade System, TDMA, Preassigned TDMA, Satellit e-Switched TDMA 6.4 Demand-assigned TDMA, Satellit e-Switched TDMA 6.5 Code-Division Multiple Access 6.6 Satellite Mobile Services, VSATs 6.7 Radarsat, Global Positioning Satel lite System (GPS), 6.8 Orbcomm, Iridium. Total 95hrs Assessment Continuous Assessment Percentage Total- 50(%) ✓ 1.5hr Continuous Assessment Percentage Total- 50(%) ✓ 1.5hr									
A.7 Ionospheric Depolarizaon A.8 Rain Depolarization, Ice Depolarization Chapter 5:									
4.7 Ionospheric Depolarizaon 4.8 Rain Depolarization, Ice Depolarization Chapter 5: SATELLITE COMMUNICATION LIN K DESIGN 5.1 Introduction, Basic transmission theory 5.2 Equivalent Isotropic Radiated Power, Transmission Losses 5.3 Free-space transmission ment losses, Fixed atmospheric and ionospheric losses 5.5 The Link-Power Budget Equation 5.6 System noise temperature and G // T Ratio 5.7 Design of downlinks, Satellirsite systems using small earth stations 5.8 Uplink design, Design of specified C/N: Combining C/N and C/I values in satellite links system design examples. Chapter 6: SATELLITE ACCESS AND SPECIALI ZED SERVICES 6.1 Introduction, Single Access 6.2 Preassigned FDMA, Demand-Assigned FDMA 6.3 Spade System, TDMA, Preassigned dTDMA 6.4 Demand-assigned TDMA, Satellit e-Switched TDMA 6.5 Cocle-Division Multiple Access 6.6 Satellite Mobile Services, VSATs 6.7 Radarsat, Global Positioning Satel lite System (GPS), 6.8 Orbcomm, Iridium. Total 95hrs Assessment Continuous Assessment Percentage Total- 50(%) 7 V √ V √ V √ V √ V √ V √ V √ V √ V √ V		iarization, Discriminatio							
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Chapter 5: SATELLITE COMMUNICATION LIN K DESIGN 5.1 Introduction, Basic transmission theory 5.2 Equivalent Isotropic Radiated Power, Transmission Losses 5.3 Free-space transmission 5.4 Feeder Iosses, Antenna misalign ment losses, Fixed atmospheric and ionospheric losses 5.5 The Link-Power Budget Equation 5.6 System noise temperature and G 7/ Ratio 5.7 Pesign of downlinks, Satellirsite systems using small earth stations 5.8 Uplink design, Design of specified C/N: Combining C/N and C/I values in satellite links system design examples. Chapter 6: SATELLITE ACCESS AND SPECIALI ZED SERVICES 6.1 Introduction, Single Access 6.2 Preassigned FDMA, Demand-Assigned FDMA 6.4 Demand-assigned TDMA, Preassigned TDMA 6.5 Code-Division Multiple Access 6.6 Satellite Mobile Services, VSATs 6.7 Radarsat, Global Positioning Satellite System (GPS), 6.8 Orbcomm, Iridium. Total 95hrs Assessment Percentage Total- 50(%) F2F NF2F SLT 1 Quiz 5% √ 1.5hr	-								
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	4 Mi	d exam			20%	, 0	$\sqrt{}$		5.5hr					
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	Final Exam		Perce	entage 5	50 (%)		F2F	NF2F	SLT					
	Final Exam			50					3 hrs.					
							(Grand Total SLT	120hrs.					
	L = Lecture,	T = Tu	torial, P = Practical	, O = Ot	to Face, N	IF2F = Non-Face	e to Face							
12	Special requ	iremer	nts and resources t	0	1	MATLAB	Software							
			[e.g. software, comp	puter	2	Compute	Computer lab							
	lab, simulati	on roo	metc.)	-	3									
					4									
13		1	Timothy Pratt, Cl		Bostiai	n, Jeremy A	Allnutt, —S	Satellite Commu	nications,					
			John Wiley & Son											
		2	Dennis Roody, —S	atellite	Comn	unication	s , McGra	w Hill						
	Text book	3	Wilbur L. Pritcha	ard, He	nri G	. Suyderh	oud, Rob	ert A. Nelson	Satellite -					
	Reference:		Communication Systems Engineering, Pearson. (Second Edition),											
	Reference.	4	Anil K. Maini,	Varsha	Aga	rwal- Sa	tellite Te	echnology, Prir	nciples and					
			Applications, Wiley. (Second Edition)											
		5	G. Maral, M. Bous	squet, Z	z. Sun	-Satellite	Communi	cations System	s: systems,					
			techniques and te	chnolog	gy, Joh	n Willy an	d sons.(5	th edition)						

1 Colle	ge: CoEEC	-											
	College: CoEEC Department: ECE Course Major Floative												
2 Cours	se Major Elec	ctive											
Categ	gory												
Cours	se Analysis &	design of Digital inte	grated circ	cuit									
Name	9												
Cours	se ECEg-5304	4											
Code	:												
3 Syno	psis This course	explores on the lates	t CMOS an	d relate	ed recent technologies.								
:	The empha	sis of the course will	be on desi	igning a	and analysis of CMOS circuits.								
	This course	e will provide an exc	ellent intr	oductio	on to digital circuit design for students								
4 Name	e(s) of												
Acad	emic Staff:												
5 Sem	ester and Year	Semester:	Year:	II									
offer	red:												
6 Cred	lit Hour:	3											
7 Prer	equisite	Microelectronics De	vices & Cir	cuits (E	CEg-3206)								
8 Cou	rse Learning Ou	tcome (CLO): At the e	end of the o	ourse t	he student will be able to:								
CLO	1 Define the b	oasic knowledge abou	t the unde	rstand (of MOS transistor								
CLO	2 Elaborate b	asic IC fabrication pr	ocess step	s, also	fabrication methods of MOS, PMOS, NMOS								
	and CMOS.	-	·										

	CLO3	Dis	cuss a	about S	tatic and	d Dyn	nami	ic b	ehavi	our	s of M	OS (devi	ce.				
	CLO4				structur elated t					of	CMOS	in'	vert	er, E	nergy	, Po	wer diss	ipation and
	CLO5	Des	ign a	nd anal	ysis of s	seque	ntia	ıl ci	rcuit	usir	ng CM(OS						
	CL06	Con	npare	the Im	pact of	Inter	con	nec	t Para	asiti	c like	Cap	acit	ive, R	esistiv	ve an	nd Inducti	ive
	CLO7	Des	ign a	n arithr	netic bu	ıildin	g bl	ock	using	g M(OS tra	nsis	tors					
9	Mappi	_		cours	se Lear	ning	Out	tcoı	nes 1	to t	he St	ude	ent	Outco	mes,	Tea	ching M	ethods and
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	Course Learning Outcomes (CLO)	S01	802	803	S04			908	807		Геа chi ng Met hod s			Test	Quiz	Project	Mid Exam	Final Exam
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10		learr	ned in	the co	oplicable urse of s	study	wh	ich	can b	e us	seful a	nd 1	utili:	zed in	othe	r set	tings)	
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11					Learnin					CIIV	Luits							
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Chapter 1:						6 hr
Review of MOS	CLO	2hr		1 hr	3 hr	
device and its	1					
scaling						
1.1 A Historical						
Perspective of IC						
Technology						
1.2 MOS & CMOS						
device operation &						
Characteristics						
1.3 Scaling down of	:					
MOS						
1.4 Secondary effects						
of Scaling MOS device		2 h	2 hr	2 h	3 hrs	12hr
Chapter2:	CLO	∠ nr	2 III	2 hr	3 III'S	12ΠΓ
	2					
2.1 Steps of IC						
fabrication						
2.2 Patterning,						
layering and						
Etching						
2.3Fabrication of						
NMOS & PMOS						
2.4 Fabrications of						
CMOS						
2.5 Latch-up in						
CMOS and its						
remedy						
Chapter 3:	CLO	2 hrs	2hr	1 hr	3 hrs	8hr
CMOS Inverter	3					
3.1 CMOS Inverter						
3.2 CMOS inverter						
working and						
region of						
operations						
3.3 The Static						
CMOS inverter						
behavior						
3.4 The Dynamic						
CMOS inverter						
Behavior						
3.5 CMOS inverter						
Power, Energy,						
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and Energy-Delay						
Chapter4: Designing	CLO				4	12 hr
Combinational Logic		2 hr	2hrs	4		
Gates in CMOS						
4.1 Introduction to						
designing of						
combinational						
circuits in CMOS						
4.2Gate designing						
using CMOS						
4.3 Static CMOS						
Design						
4.4 Static CMOS						
Design						
4.5 Rationed Logic,						
PassTransistor Logic						
Chapter5: Designing	CLO	2 hrs	2hrs	2 hrs	3 hrs	9 hr
	5					
Circuits						
5.1 Introduction						
5.2 Static Latches						
and Registers						
5.3 Dynamic						
Latches and						
Registers						
5.4 Designing of						
SRAM						
5.5 Designing of						
DRAM						
Chapter 6	CLO	2 hrs	2 hrs	3 hrs	4 hrs	10hr
Interconnect	6					
Parasitic						
6.1 Introduction						
Interconnects						
Parasitic						
6.2 Resistance						
Parasitic						
6.3 Capacitance						
Parasitic						
6.4 Inductance						
Parasitic		0.1	0.1	4 1	4.1	401
Chapter:7			2 hrs	4 nhrs	4 hrs	12hr
Designing	CLO					

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	7.3 The Shifte	r								
	Total									80hr
	Assessments									
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	Assessment		50(%)						
	1 Test			10	%					2 hr
	2 Quiz			50	%					2 hr
	3 Project and			15	5%					15 hr
	Presentation	1								
	4 Mid exam			20	%					3 hr
	Total		l			<u> </u>		I		22 hr
	Final Exam	Percent	tage 5	0 (%))		F2F	NF2F		SLT
	Final Exam	50%	, o							3hr
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	L = Lecture, T	= Tutoi	rial, P	= Pra	ctical, (0 = 0t	hers, F	F2F = Fac	e to Face, NF2F = Noi	n Face to
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1	Special requir			1	VHDL					
2	resources			2	VLSI I	LAВ				
	, ,	, softv								
	computer lab	, simula	ation							
	roometc.)									
			I.		<u> </u>					
1	Text	1	l l				ıı ınteg	grated ci	rcuits _ a design pe	rspective-Pearson
3	book		_		n (2003)					
	and	2				-			n, PHI 2015	
	referen	3				_	"Physi	ics of Sen	niconductor Devices,	' 3rd edition, John
	ce:				ons, 20					
	(Note:	4	A. S	S. Se	dra an	d K.	C. Si	mith, "M	licroelectronic Circu	its: Theory and
	ensure		App	licatio	ons", 6t	h edit	ion <u>,</u> 02	kford Pre	ss, 2013.	
	the latest	5	CMC	S: Cii	cuit De	sign,	Layout	t, and Sin	nulation, 4th Edition	
	edition		by R	l. Jaco	b Bakeı	r				
	/publication)									

				Adama Science and	l Technolo	ogy University	
1	College	e: CoEE(2		Departm	nent: ECE	
2	Course		Major Elect	tive			
	Catego	ry					
	Course	Name	Telecomm	unication Networks a	ınd Switcl	ning	
	Course	Code:	ECEg-5306				
3	Synops	is:	integrating engineerin demands, develop re- like switc Networks. telephone	g perspectives from g and communication quality of service, so quirements and arch hing systems, time ISDN, voice data intenetworks. The Co	computen enginee calability, itectures e division gration are als	er science, electring. Students we performance at They will be about my witching synd importance of oprovides a	ms view of communications, trical engineering, electronic ill learn to consider tele-traffic and cost into consideration to le to understand recent topics estems, data communication telephone traffic analysis and good understanding of the works i.e. PSTN, PDN and ISDN.
4	Name(s) of					
	Acaden	nic					
	Staff:						
5	Semest	er	Semester:	V	Year:	II	
	and Ye	ar					
	offered						
6	Credit	Hour:	3				
7	Prereq	•	ECEg-4203	S - Digital Communica	tion		
	Co-req						
	(if any)						
8	Course	Learni	ng Outcome	(CLO): At the end of t	the course	e the student wil	l be able to do:
	CLO1			_			tion systems and describe the
				systems and their ev			
	CLO2			witching techniques,	types an	nd roles in the c	ontext of Telecommunication
		Netwo					
	CLO3	Under	stand clear l	knowledge regarding	telecom	nunication signa	ling system and their types
	CLO4	Create	the knowle	dge about telecommi	unication	traffic and analy	ze how a telecommunication
		netwo	rk handles t	raffic			
	CLO5	To ex	pose through	h the evolution of te	lephone 1	network, data ne	etwork and integrated service
		digital	network				

9	Mappii Assess	_	e cour	rse Leai	ning Ou	tcomes	to th	e St	uden	t Lea	arni	ng C	utc	ome	es, Te	eachi	ng Me	ethods	and
						Stu	ident	Lea	rning	g Ou	tcor	nes	(SO)					
	arning (CLO)										Т	Ceac	hin	g		A	Assess	sment	
	Course Learning Outcomes (CLO)	S01	S02	S03	804	S05		90S		S07		Metl		ı			ect	Mid Exam	n n
	CLO1	V									L √	T √	P	0	Test	<- Lab	Project	/Mid	Final Final Exam
	CLO2	· √									√	· √				· √	· √	√ 	· √
	CLO3																		√ √
	CLO4	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$							$\sqrt{}$				$\sqrt{}$	$\sqrt{}$	$\sqrt{}$		$\sqrt{}$
	CLO5	$\sqrt{}$	$\sqrt{}$				$\sqrt{}$				$\sqrt{}$	$\sqrt{}$				$\sqrt{}$	$\sqrt{}$		$\sqrt{}$
	Indicat	e the re	elevan	ıcy betv	veen the	CLO an	id SO	by	tickin	ıg "ν	or"	the	e ap	pro	priat	e rele	evant	box	
10				(if appli e cours	cable) e of stud	y which	ı can	be	usefu	l and	d uti	ilize	d in	otł	ier se	etting	s)		
	1	Teleco	mmu	nicatio	n Netwo	rk Anal	ysis a	and l	Desig	n Sk	ills								
	2	Teleco	mmu	nicatio	n Netwo	rk Oper	atior	ıs Sk	kills										
	3	Teleco	mmu	nicatio	n Netwo	rk Stan	dard	Sele	ection	Ski]	lls								
11	Distrib	ution o	f Stud	lent Lea	rning Ti	me (SL'	Γ)	m	1 .		1.7			Α				.	1 (QI m)
					CLO)	Guid		eachi earni			iear Guid		g Ac		es pend	lent	1 ota	al (SLT)
	Course	Conte	nt Out	line				(F2		J		earr NF2	_		Le	arnin NF2F	ıg		
							L	T	P	0									
	Chapte	er-1:Int	trodu	ction	CLO1		6hr				4hı	r			5hr			15 h	r
		olution ecomm	_	tion															
	1.2 Int	roducti nifican	ion an																
	Te	lecomn tworks	nunica	ition															
		twork l		•															
		ramete affic Me																	
	lar co	ning dia nd line t mmunic ce versa	to mol	bile															

CLO2	6hr		8hr	6hr	20 hr
CLO3	6hr	8hr	6hr		20 hr
CLO4	6hr	8hr	6hr		20 hr
					1
	CLO3	CLO3 6hr	CLO3 6hr 8hr	CLO3 6hr 8hr 6hr	CLO3 6hr 8hr 6hr

	4 7	Blocking Mod	lels and	Н									
		s Estimates	icis air										
	4.8	TST switching	g										
	Dig	ipter 5: ital Subscrib thnology	er Lin	e CI	LO5	6hr	8	hr	6hr			20 hr	
	Dig Tec	Introduction ital subscribe hnology & blications											
	Sub Tec	Advanced Dig scriber line hnology											
		High-bit rate y-High-Bit-Ra											
-	,۷61	y-mgn-bit-K		tal								95 hr	
						A	ssessi	ment					
-	Con	ntinuous Asse:	ssmen		Percen	аде	F	72F	NF2F			SLT	
	don			•	Total-50	Ü			141 21			021	
	1	Lab			10%	, O					10	hr	
ŀ	2	Quiz			5%				V		1 h	ır	
	3	Mid exam			20%	,)						2 hr	
-	4	Project and I	Presen	tation	15%	,)			√			9 hr	
-										Γotal	:	22 hr	
-	Fina	al Exam		Perc	entage 50	entage 50 (%)		F2F	NF2F			SLT	
-	Fina	al Exam			50							3 hr	
-									Grand Tota	l SLT	1	20 hr	
	L =	Lecture, T = 7	Γutoria	ıl, P = P	ractical, 0	= Othe	rs, F2	F = Fa	ce to Face, NF2	F = No	n Face to	Face	
		e: indicates tl											
2	Spe	cial	1		SWITCHIN								
	_	uirements I resources	2	Compi	uter lab								
		leliver the	3	Wir	eShark, Pa	cket Tr	acer						
		rse (e.g. ware,	4										
		nputer lab,	5										
		ulation metc.)											
3		t book and	1	Thiaga Netwo	nrajan Vis orks"; PHI F	hwana Publicat	-	"Tel	ecommunicatio	on Sw	ritching	Systems and	

reference:	2	J. E. Flood, "Telecommunications Switching, Traffic and Networks", Pearson
(noto, oncuro		Education.
(note: ensure	3	John C. Bellamy, "Digital Telephony", Third Edition; Wiley Publications.
the latest		
	4	Behrouz A. Forouzan, "Data Communications and Networking," TMH, 2nd
edition		Edition, 2002.
/publication)	5	Tomasi," Introduction to Data Communication and Networking," Pearson
/ publication)		Education, 1 st Edition, 2007.

			Ada	ama Science a	ınd Technology	University						
1	College:	CoEEC	i		Department: I	ECE						
2	Course		Major Electi	ve								
	Categor	у										
	Course	Name	Introduction	to Computer	·Vision							
	Course	Code:	ECEg5308									
3	Synopsi	s:		•	•	mputer vision. Topics	•					
			_		nary vision, gray-level vision, Imaging optics, sensors and ge pre-processing, Frequency domain image processing,							
				_								
			_		linear and nonlinear operations on 2D and 3D images indamentals of semantic image processing, practical							
			_			emantic image proce	ssing, practical					
	N. C) C	applications	of imaging sy	rstem.							
4	Name(s Academ											
	Staff:	IIC										
5	Semeste	er and	Semester:	II	Year:	V						
	Year off		Jeniester.	11	Tear.	'						
6	Credit H		3									
7	Prerequ			inear Mather	natics .ECEg32(05: Digital Signal Prod	cessing					
	Co-requ	-			,	8 8	8					
	(if any)											
8	Course	Learnir	ng Outcome ((CLO): At the e	nd of the course	e the student will be a	able to do:					
	CLO1	Unde	rstand fundan	nental techno	logies for digita	al image, compression	n, analysis, and					
		proce	0									
	CLO2					d practical implemen	tations of various					
			l 2D and 3D ii									
	CLO3	_	· ·	· ·	•	l manipulated in a cor	mputer, including					
	av c :				e, and displayin							
	CLO4		-	programs wh	ich implements	s fundamentals of Coi	mputer Vision					
	CLOF	algori										
	CLO5					uter vision technique	es and know how					
0	Mannin		from the equa			t Outcomes Tooching	Mothods and					
9	Mappin Assessn		course Learn	ing Outcome:	s to the Student	t Outcomes, Teaching	methous and					
	ASSESSII	ient:										

		Stude	nt Outc	omes	(PO)													
														Ass	sessm	ent		
	지 Course Learning Outcomes (CLO)	801	<	803	S04	805	, c	2006	807		thoo	_	0	Lab	Quiz	<pre></pre>	✓ ✓ Mid Exam	Final Exam
	CLO3			$\sqrt{}$											V	V		
	CLO4								$\sqrt{}$									
	CLO5				V							$\sqrt{}$				$\sqrt{}$		
	Indica	te the re	levancy	betw	een the	CLO a	nd SC	by t	icking	₹"√"	on tl	ie ar	pro	pria	te rele	vant b	OX	
1	Trans	ferable S	kills (if	applic	able)													
0	(Skills	learned	in the c	ourse	of study	whic	h car	ı be u	seful	and	utili	zed i	n ot	her s	setting	s)		
	1	MATLAB	progra	mmin	g													
	2																	
	3																	
1	Distril	oution of	Studen	t Lear	ning Tir	ne (SL	T)											
1						-	Tea	ching	and	Learı	ning	Acti	vitie	S			Tot	al
					CLO		Gu	ided	learni	ing	Gu	ided			Indep	enden	(SL	T)
	Cours	e Conten	t Outlin	e				(F2	2F)		Le	arnii	ng		t Lea	arning		
										T	(N	F2F)			(N	F2F)		
							L	T	P	0								
	_	er 1: uter Vis amentals			CLO1		2h r	2h r			2h	r			4hr		101	ır
		al of con	_															
		, Vision a																
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		ction pro	_															
	-	ning poin	_															
		ective dis		,														
	_	ing proje																

1.2 Homogonoous								
1.3 Homogeneous								
coordinates, Perspective								
Projection Matrix,								
Building a real camera,								
Lens Flaws-Chromatic								
Aberration, Capturing								
light								
1.4 Image formation,								
Radiometry-Measuring								
light, Solid Angle,								
Radiance, Irradiance,								
Radiometry of thin lenses,								
1.5 Bidirectional								
reflectance distribution								
function (BRDF), Diffuse								
reflection- Lambert's law,								
Photometric stereo,								
1.6 Image model, Least								
squares problem, Finding								
the direction of the light								
source								
Chapter 2:		21.	4h			5hr	15hr	
Chablet 4.		1.3n	1 411)	1500	
_	CLO 2	3h			3hr	JIII	15111	
Image Details in 2D	CLO 2	r	r		3hr	Jiii	15111	
Image Details in 2D 2.1 Digital image and	CLO 2				3hr	Jili	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image	CLO 2				3hr	Jili	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key	CLO 2				3hr	Jili	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image	CLO 2				3hr	Jili	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing	CLO 2				3hr	Jili	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual	CLO 2				3hr	Jili	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and	CLO 2				3hr	JIII	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic	CLO 2				3hr	Jili	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum	CLO 2				3hr	Jili	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum 2.3 Image Sensing and	CLO 2				3hr	Jili	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum 2.3 Image Sensing and Acquisition Image	CLO 2				3hr	JIII	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum 2.3 Image Sensing and Acquisition Image Sampling and	CLO 2				3hr	Jili	15111	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum 2.3 Image Sensing and Acquisition Image Sampling and Quantization	CLO 2				3hr	Jili	Toni	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum 2.3 Image Sensing and Acquisition Image Sampling and Quantization 2.4 Some Basic	CLO 2				3hr	Jili	15mr	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum 2.3 Image Sensing and Acquisition Image Sampling and Quantization	CLO 2				3hr	JIII	15mr	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum 2.3 Image Sensing and Acquisition Image Sampling and Quantization 2.4 Some Basic	CLO 2				3hr	JIII	Tonir	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum 2.3 Image Sensing and Acquisition Image Sampling and Quantization 2.4 Some Basic Relationships between	CLO 2				3hr	JIII	15mr	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum 2.3 Image Sensing and Acquisition Image Sampling and Quantization 2.4 Some Basic Relationships between Pixels, Linear and	CLO 2				3hr	JIII	15mr	
Image Details in 2D 2.1 Digital image and pixel, Digital image representation, Key stages of digital image processing 2.2 Elements of Visual Perception Light and the Electromagnetic Spectrum 2.3 Image Sensing and Acquisition Image Sampling and Quantization 2.4 Some Basic Relationships between Pixels, Linear and Nonlinear Operations	CLO 2				3hr	JIII		

Chapter 3: Color Image	CLO3	3h r	2h r	2hr	3hr	10h:	r
3.1 Color Fundamentals, Color Models, Electromagnetic spectrum, The Physics of							
Light, The Eye details 3.2 Standardizing color experience							
3.3 Linear color spaces, Linear color spaces: CIE XYZ							
3.4 Chromatic adaptation, White balance							
3.5 Uses of color in computer vision							
Chapter 4: Spatial Filtering	CLO3	4h r	3h	3hr	5hr	15h:	r
4.1 Spatial Filtering,							
Linear Spatial Filtering,							
4.2 Spatial Filters –							
convolution, Correlation							
4.3 Nonlinear Spatial							
Filtering, Smoothing							
Spatial Filters, Order-							
statistics filtering							
4.4 Spatial filtering for image sharpening, Laplacian for image							
sharpening							
4.5 Smoothing Filters (low-pass), Sharpening Filters (high-pass)							
Chapter 5:						18h	 r
Image edge detection in the Spatial Domain and	CLO4	4h r	4h r	4hr	6hr		
fitting		1	1				
5.1 Edge detection,							
Derivatives with							
convolution, Finite							
difference filters,Image							
gradient,							

		1		ı			l
5.2 The Canny ed	ge						
detector,Feature							
extraction, Charac	eteristics						
of good features,							
5.3 Corner Detec	tion:						
Mathematics, Cori	ner						
response function	,						
Invariance and							
covariance,							
5.4 Blob detectio	n, Scale						
selection, Scale							
normalization, Blo	ob						
detection in 2D, So	cale-						
space blob detecto							
5.5 Affine norma							
Fitting, Least squa	•						
fitting, Least squa							
likelihood maximi							
Random sample	ŕ						
consensus (RANSA	AC)						
5.6 The Hough tra	-						
Parameter space	,						
representation, Ef	fect of						
noise, Generalized							
transform							
Chapter 6:						15hı	 r
Image alignment	. CLO4 a	nd 4h	3h	3hr	5hr		L
	CLO5	r	r	Jiii	Sili		
6.1 Image alignme	ent 2D		1				
transformation m							
Homography, Dire							
linear transform							
6.2 Robust and la	rgo-						
scale alignment, R	_						
feature-based alig							
Feature descripto							
_							
6.3 Scalability: Ali	_						
to large databases							
6.4 Voting for geo	metric						
transformations						207	
Total						83hı	r I
Assessment							

	Con	tinuous Assessm	nent	Percentage Total-60(%)	F2F	NF2F	SLT
	1	Programming 1	Lab	15%			16hr
	2	Assignment 1		5%			8hr
	3	Project		10%			8hr
	4	Mid exam		20%	$\sqrt{}$		2hr
	Tota	1			1		34hr
	Fina	l Exam		ercentage 50 %)	F2F	NF2F	SLT
	Fina	l Exam					3hr
	Gran	nd Total SLT	I		1		120hr
	L = I	ecture, T = Tuto	orial, P	= Practical, 0 =	Others, F2F =	Face to Face, NF2F = N	on Face to Face
	Note	e: indicates the (CLO ba	sed on the CLO	's numbering i	n item 9.	
1	Spec	cial	1	MATLAB Sof	tware		
2	requ	iirements and	2	Computer la	b		
	reso	urces to					
	deli	er the course					
	(e.g.	software,					
		puter lab,					
	simu	ılation room					
	eto	_					
1		: book and	1	Forsyth & Po	once, Compute	r Vision: A Modern App	roach
3		rence:	2	Richard Szel	iski, Computer	Vision: Algorithms and	l Applications
	`	e: ensure the		(available or	ıline)		
		st edition	3	Digital Image	e Processing T	hird Edition, by Rafael (C. Gonzalez and
	/pul	olication)		Richard E. W	oods		
		d by Dr. Satyasis					

		Adama Science and Technology University
1	College: CoEEC	Department: ECE
2	Course	Major Elective
	Category	
	Course Name	Digital Image Processing
	Course Code:	ECEg-5314
3	Synopsis:	The course basically designed in the areas of Imaging optics, sensors and sampling
		patterns, image pre-processing, Frequency domain image processing, Color image
		processing, linear and nonlinear operations on images, enhancement fundamentals of
		semantic image processing, practical applications of imaging system, image
		segmentation and its application to biomedical imaging, satellite imaging etc. This

			(cours	e focu	ses the stu	ıden	ts al	oility i	in an	alyz	zing	tecl	nnolo	gies fo	r digi	tal im	iage,
			•	comp	ressio	n, writing	and	dev	elopir	ng of	falg	orit	hms	, imp	lement	tation	s of v	arious digital
			j	image	e appli	cations, In	nage	erep	resen	tatio	n a	nd (conv	ersai	nt with	the i	mage	processing
			1	techn	iques.													
4	Name(s	s) of																
	Acaden	nic																
	Staff:																	
5	Semest				Semes	ter:	II	Ye	ar:	V								
	Year of	fered:																
6	Credit I			3														
7	Prerequ	•	']	Math:	2201:	Linear Ma	ther	natio	es ,EC	Eg32	205:	Dig	ital	Signa	l Proce	essing		
	Co-requ																	
	(if any)				60			1 0	•					-11				
8						LO): At the												0.1100
	CLO1		-	_	_		ıniq	ue, r	eadin	g an	d w	ritin	ig of	new	images	s, anal	lysis (of different
	CLO2					chniques.	inσ	algo	rithm	s an	alvi	tical	too	le an	d nract	tical in	nnler	mentations of
	GLOZ				olve image processing algorithms, analytical tools, and practical implementations of ral image applications.													
	CLO3	Deve	elop	and w	vrite programming code which simplifies the complex image processing													
			rithn		rite programming code which simplifies the complex image processing nathematical analysis of image processing techniques and know how to develop													
	CLO4						ılysi	s of i	image	pro	cess	sing	tecl	ıniqu	es and	know	how how	to develop
	CLO5			• •		purpose	mc a	nnli	cation	ac to	diff	oro	nt co	mple	v mod	ical in	nagin	g problems
	CLOS		_		-	her versio						ere	III CC	nipie	ex illeu	icai II	nagin	g problems
9	Mannin		•									com	ies '	<u> </u>	ning Me	ethod	s and	Assessment:
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	our													Lab	Project	Quiz	Mid Exam	Final Exam
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10	Transfe						and	<i>a</i> 50	by tit	KIIIB	, v	OII	1110	ihhi (priate	1 010 0	unt D	<u> </u>
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11	Distr	ibution of Student Le	earning	Time	(SLT)					
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			CLO	Gı	ided l			Guided	Independent	rotar (obr)
	Cour	se Content Outline	OLC		(F2		-6	Learning	Learning	
					()		(NF2F)	(NF2F)	
				L	Т	P	0			
	Chap	oter 1:								
	Digit	tal Image	CLO1	2hr	-	-	-	1hr	3hr	6hr
	Func	damentals								
		igital image and ixel								
		igital image epresentation								
		ey stages of digital nage processing								
	1.8 E	lements of Visual								
		erception Light								
	_	nd the								
		lectromagnetic								
		pectrum.								
		nage Sensing and								
		isition Image								
		oling and itization								
		oter 2:								
	_	ge Enhancement in	CLO2	4hr	_	5hr	_	2hr	5hr	16hr
		patial Domain							U 111	20112
		ome Basic								
		ionships between								
	Pixel									
		inear and								
		inear Operations.								
		asic Gray Level sformations								
		istogram								
		essing.								
		asics of Spatial								
	Filter	_								
		moothing Spatial								
	Filter									
	2.7 Sl	harpening Spatial								
	Filter									
	_	oter 3:								
	_	ge Enhancement	CLO3	4hr	-	5hr	-	2hr	5hr	16hr
	in Fr	requency								

domain								
3.1 Frequency Domain Methods								
3.2 Two Dimensional								
Fourier Transform and its Inverse, Discrete								
Cosine Transform,								
Complex wavelet								
Transform, Discrete								
Orthonormal S-								
Transform 3.3 Frequency Domain								
Filtering								
3.4 Image Smoothing								
Using Frequency								
Domain Filters								
3.5 Image Sharpening								
Using Frequency Domain Filters								
Chapter 4:								
Color Image	CLO3	6hr	_	4hr	_	3	7	20hr
Processing	GLOS			1111		3	,	20111
4.1 Color Fundamentals,								
Color Models.								
4.2 Pseudocolor Image								
Processing.								
4.3 Basics of Full-Color								
Image Processing. Color								
Transformations 4.4 Smoothing and								
Sharpening.								
4.5. reading and								
writing of color images								
4.6 Color image								
Segmentation								
4.7 Extraction of R,G,B								
Components from color image using								
programming and								
equations								
Chapter 5:								
Morphological	CLO3					_		
Image Processing	and	7hr	-	6hr	-	4hr	10hr	27hr
and Image	CLO4							
segmentation								
5.1 The Hit-or-Miss Transformation								
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	5.2 Basic Morphological									
	Algorithms 5.3 Gray-Scale									
ľ	Morphology									
	5.4 Point, Line, and Edge									
	Detection 5.5 Thresholding									
	5.6 Segmentation Using									
t	hreshold and									
	Morphological									
	Watersheds 5.7 Dilation and Erosion.									
	Opening and Closing.									
-	Chapter 6:	CLO4								
	Project based Image	and	3hr	-	3hr	-	3hr	ϵ	bhr	15hr
	orocessing Applications	CLO5								
	5.1 Complex Wavelet	-								
t	ransform image feature									
	detection and image									
	segmentation 6.2 Satellite , sonar,									
	adar image									
	segmentation to identify									
	he road lines and blocks									
	6.3 K-Means, Fuzzy c									
r	neans segmentation for									
	CT SCAN medical									
	maging 6.4 EnFCM, FCM_S1 and									
I	FCM_S2 segmentation									
	or cancer detection									
	From MRI imaging 6.5 FLICM, FGFCM and									
	NDFCM segmentation									
	or noise reduction,									
	letection of region of nterest from MRI									
	maging									
	Total									100hr
				1		essi	ment		T	
	Continuous		entage		F2F		NF2F			SLT
	Assessment 1 Ouiz		·50(%) 5		1hr					1hr
	1 Quiz 2 Lab		5 10		inr 3hr		3hr			6hr
	3 Project		10		1hr		7hr			8hr
									1	

	Presentatio	n				
	4 Mid Exam		25	2hr		2hr
					Total	17hr
	Final Exam	P	ercentage 50 (%)	F2F	NF2F	SLT
	Final Exam			3hr		3hr
					Grand Total SLT	120hr
	L = Lecture, T	= Tutoria	al, P = Practical, O =	Others, F2F	= Face to Face, NF2F = N	Ion Face to Face
	Note: indicates	s the CLO) based on the CLO	s numbering	g in item 9.	
12	Special	1	MATLAB Software			
	requirements	2	Computer lab			
	and resources to	3	Choose an item.			
	deliver the	4	Choose an item.			
	course (e.g.	5	Choose an item.			
	software,					
	computer					
	lab, simulation					
	roometc.)					
13	Text book	1	Digital Image Proce	essing Third	Edition, by Rafael C. Gon	zalez and Richard E. Woods
	and	2	Digital signal proce	ssing ,Fourt	h edition by JOHN G. PRC	AKIS , DIMITRIS G.
	reference:	1	MANOLAKIS			
	(note: ensure	I I		l Image Proc	essing, Advanced Metho	ds,Wilhelm Burger, Mark J.
	the latest		Burge,2013		December 1 Alex C. Dec	1 2005
	edition				Processing by Alan C. Boy	· · · · · · · · · · · · · · · · · · ·
	/publication)		Fundamentals of Di Matlab, Chris Solon		•	pproach with Examples in

		Adan	na Science and Te	chnology	University								
1	School: Electric					ommunication Eng.							
2	Course Category	Major Elective	е	-									
	Course Name	Semiconducto	or Devices										
	Course Code:	ECEg5316											
3	Synopsis:	semiconducto	his course explores semiconductor physics, and operation & applications of emiconductor devices such as p-n junctions, BJTs, JFETs and MOSFETs. Also rmation of metal -semiconductor is discussed.										
4	Name(s) of Academic Staff:												
5	Semester and Year offered:	Semester:	V	Year:	II								
6	Credit Hour:	3			-								
7	Prerequisite/ Co-requisite: (if any)	Electronics cir	rcuit I (ECEg2201)									

8	Course	e Lea	rning	Outc	ome	(CLO): At	the e	nd o	f th	e c	ours	e the	studen	t will b	e able	e to do:		
	CLO1									_			he ph eir dev	-	princi	ples a	ind ope	eratio	nal
	CLO2					istribı terial		of c	harg	де с	arr	iers	and _]	oositio	n of F	ermi	level ir	ıside	the
	CLO3					enom mech			ırre	nt f	low	ing	inside	the se	micon	ducto	r mate	rial us	sing
	CLO4					ion of		•		dei	rive	the	poter	ntial ba	irrier a	ınd sp	ace cha	irge w	vidth
	CLO5	Exp		he m	etal -	semi	condi	uctor	jun	ctic	n.I	Diffe	rentia	te betv	veen t	he Scl	nottky a	and ol	hmic
9	Mappi Assess	_		ourse	e Lea	rning	Outo	come	s to	the	Stu	ıden	t Outo	omes,	Teach	ing M	ethods	and	
									Stu	den	t 0	utco	mes (SO)					
	ing .0)								т	'eac	hin	ıσ			As	sessn	nent		
	es (CI	S01	S02	S03	S04	S05	90S	S07		Metl		_					ort	E .	am
	se l	Š	S	S	S	S	S	S	T	т	D					ct	də.	эха	ex
	Course Learning Outcomes (CLO)		S02 S03 S04 S04 S05 S05 S05 S06 S06																
	CLO1	$\sqrt{}$					$\sqrt{}$	$\sqrt{}$											V
	CLO2	$\sqrt{}$		$\sqrt{}$									$\sqrt{}$	$\sqrt{}$					V
	CLO3																		
	CLO4																		
	CLO5																		
								LO a	nd S	0 b	y ti	ckin	g "√"	on the	appro	priate	releva	nt box	K
10	Transf								_										
	(Skills					se of s	tudy	whic	h ca	ın b	e u	sefu.	l and ı	utilized	l in oth	ier set	ttings)		
	1	MAT	'LAB :	softw	<i>r</i> are														
	2	PSpi	ce so	ftwar	·e														
	3																		
11	Distrib	outio	n of S	tuder	nt Lea	arnin	g Tim	ie (SL	T)										
											T	each	ing ai	nd Lea	rning A	Activit	ies		Total
							C	LO	G	uid			ning	Gu	iided	In	depend	lent	(SLT)
	Course	e Con	tent (Outlir	1e						(F	2F)			rning F2F)		Learnir NF2F)	_	
									L	r	Γ	P	0						
	Semi		Chapt uctor		daily	life:	CL	01	✓						✓		✓		15 hr
	•			luctin prope	ng erties	3													
	•				in ato					1									
	•				ormat					1									
	•				nater					+									
	, •	Dan	ugap	unu l	natel	ıuı	1		1	- 1			Ī	Ī		1			

classification								
 Electrons and holes 								
Effective mass								
<u>Chapter 2:</u> <u>Carrier Properties</u>	CLO2	✓			✓	,	/	20 hr
Intrinsic carrier density								
Distribution of Charge CarriersDonor and acceptor								
 impurities Fermi level in intrinsic and extrinsic semiconductors 								
Position of Fermi Level								
Temperature dependence of carrier density								
 Generation and recombination of carriers 								
<u>Chapter 3:</u> <u>Carrier Transport:Drift and</u> <u>Diffusion</u>	CLO3	✓			✓			20 hr
 Drift Current density 								
Mobility Effects								
• Conductivity								
Velocity Saturation								
Diffusion carrier density								
 Total current Density 								
Excess Carrier Lifetime								
<u>Chapter 4:</u> The P-N Junction	CLO4	√			✓			20 hr
 Basic structure of the PN Junction 								
 Zero Applied Bias: Built in Potential, space charge width 								
 Applied Bias : Space charge Width and junction capacitance 								
One sided Junctions								
Non uniformly Doped Junctions								

	Chapter Metal-Semicor Iunction	<u>ıducto</u>	or_	CLO5	~				,	/			20 hr		
	Schottky Bar junction curr	rier rent vo	oltage												
	 relationships Ideal Junction Properties a effects on the heights 	n nd nor													
	Comparison barrier diod junction dio	e and t													
	Metal Semicohmic conta	onduc	tor												
	Homojunction Heterojunction	on and													
	Differentiati Schottky and contact	on bet													
			Total										95 hr		
	Continuous Assessr	nent		Percenta Total-50	ige	sessm	ent F2	2F		NF2F		SI	LT		
	1 Quiz			5%						,		2	hr		
	2 Test			10%				-		$\sqrt{}$			hr		
	3 Mid exam			20%			1	/					hr		
	4 Project and Pres	sentation		sentation		15%						√ Total NF2F			hr hr
	Final Exam		Perce	entage 50	ntage 50 (%)		F2) F			T.				
	Final Exam		1 0100	intage 50	(70)	1	$\sqrt{\frac{1}{}}$			141 21			hr		
									Gran	d Total	SLT) hr		
	L = Lecture, T = Tut Note: indicates the	CLO b	ased o	n the CLO	's nui					NF2F =	Non	Face to F	ace		
12	Special requirements and	1		e Softwar	e										
	resources to	2		uter lab											
	deliver the course	3		se an item											
	(e.g. software,	4		se an item											
	computer lab, simulation room etc.)	5	Choo	se an iten	1.										
13	Text book and reference:	1		amen an on, McGra						or Phys	sics an	nd Devic	es", 4th		
	(note: ensure the latest edition	2	B.G. S editio	treetman on, Pearso	and n, 20	S. K. B 16.	ane	rjee, "	'Solid St						
	/publication)	3									dition,				

4	A. S. Sedra and K. C. Smith, "Microelectronic Circuits: Theory and
	Applications", 6th edition, Oxford Press, 2013.
5	S. Wang, Fundamentals of Semiconductor Theory & Device Physics,
	Prentice Hall, 1989

Ada	ıma Science	and '	Techno	ology U	nivers	ity								
1	College: Co	EEC					Dep	artment	: ECE					
2	Course		Major	e Electi	ve									
	Category													
	Course Nar	me	Digita	l Hardv	vare D	esign								
	Course Cod	de:	ECEg5	312										
3	Synopsis:		_			U		•		medium of				
					-	_				udy hardware		•	•	
									_	ıtomation en				
						_				s. This cours				
			•	•		•		•		cuit design a		•		•
			_					_		it using HDL l	_	_	his c	ourse
			is one	of the	vital co	ourse fo	or designir	ig the pr	ocesso	rs and verifica	atio	ns.		
4	Name(s)	of												
	Academic													
_	Staff:		0	Waster II Vace V										
5	Semester a		Semes	iter:	II			Year:	V					
	Year offere													
6	Credit Hou		3	1.C1	D'	· · (ECI	7-2201)							
7	Prerequisit	-	_	-			Eg3201)							
	Co-requisit	.e:	MICTO	electro	nics (E	ECEg33	06)							
8	(if any)	rnin	a Outa	omo (C	Ι ()). Λ	t the or	nd of the a	ourgo the	o ctudo	ent will be able	0 to	do		
0	CLO1									L Programmin		uo.		
	CLO1									ited approach				
	CLO2									igital design				
	CLO4		-							igitai aesigii				
	CLO5		npare and analysis architectures of different FPGAs. velopment of prototype of circuit design											
9									dent (Outcomes, Te	each	ing Me	thod	s and
	Assessmen		-			5 5 4 6 6		Dear		10				
			dent O	utcome	es (SO)									
	g				. ,						As	ssessmer	nt	
	rse nin									Teaching)ct		
	Course Learning Outcome	Ontcomes Assessment Teaching Methods Methods Mid												

			S01	S02	803	S04	COE	coc	908	S07	L	Т	P	0					
	CLO1						√	•			√	1							$\sqrt{}$
	CLO2					√					√				٧				$\sqrt{}$
	CLO3						√	•			√	•			٧				$\sqrt{}$
	CLO4										√	•			7				
	CLO5		•				1	-							7				
		e the	rele	vancv	between 1	the CLC	and S	SO by ti	cking	"√"on 1	the ar	nro	pria	ite i	rele	evar	ıt bo)X	
1					applicable			30 27 0	*******	, 011		Pro	P			-	1000		
0				-	course of st		nich ca	an be u	seful a	and util	ized i	n ot	her	set	tin	gs)			
•	1	Xilii		-												5-7			
	2			guage	, 														
	3			esign															
1		U			t Learning	Time (SLT)												
1	2100110							hing an	d Lear	ning Act	tivities	<u> </u>							Total
						CLO		ed learr			Guio				Inc	depe	nder	nt	(SLT)
	Course	Con	tent (Outlin	e					,	Lear	ning	5			arnii			
	300130	0011		0.01111							(NF	2F)			(N	F2F))		
							L	T	P	0									
	Chapte	r 1·																	25hr
	VHDL		GUAG	E		CLO1	6hr		6hr		5hr				8h	r			
	1.1 Mo	dellir	ng coi	ncept	s. Levels														
	of a	bstra	actio	n. Des	sign														
	me	thod	ologie	es.															
	Bas	ic coı	ncept	S.															
	1.2 Mo	dule,	mod	ule h	eader														
	for	mat.	Lexic	al															
	con	vent	ions:	comn	nents,														
	ide	ntifie	ers, ni	umbe	rs,														
	stri	ngs.																	
	1.3 Dat	a typ	es: n	ets, re	egisters,														
			-		rameter														
					perator														
			eced	ence															
	Chapte					CLO2													25hr
	Behav		and	l Da	ata Flow	and	6hr		6hr		5hr				8h	r			
	Model					CLO3													
	2.1 Beh				_														
				odelii	_														
			_	s bloo															
				iming															
	contro	l.brai	nch si	tatem	ents.	I	1	1	Ī	1	1								1

case, casex, casez.								
2.2 Procedural assignments: blocking and nonblocking								
2.3 Data flow modeling. Assign statements. Delays. Regular, implicit continuous assignment and net declaration delay.								
2.4 Logic statement implementation. The conditional operator.								
Chapter 3: Gate and Switch Level Modeling and Looping	CLO3 and CLO4	6hr		6hr	5hr	81	nr	25h
3.1 Gate level modeling Gate delays. Specify block.								
3.2 Switch level modeling. Primitives. Test bench creation. Initial block.								
3.3 Looping constructs: while loop, for loop, repeat, forever loop. Tasks and functions.								
Chapter 4: FPGA Implementation	CLO4 and CLO5	3hr		3hr	3hr	6ł	nr	15h
4.1 Introduction, FPGA Architecture, Interconnects, FPGA Design flow,								
4.2 System-Level Design, Different categorization of FPGAs,								
4. Architecture study of some popular FPGA families.								
Total								90ł
Assessment Continuous Assessment	Percen	_	F	2F	NF2F		SLT	
1 Quiz	5%	70 (70)	√	/			2hr	
2 Lab	15%		1	r			1hr	

	3	Mid exam			20%	V		2hr				
	4	Project and Pre	sent	ation	10 %		V	15hr				
	To	tal					,	20 hr				
	Fir	nal Exam		Percent	age 50 (%)	F2F	NF2F	SLT				
	Fir	nal Exam				V		3hr				
	Gra	and Total SLT						113hr				
		Lecture, T = Tut te: indicates the					to Face, NF2F = No m 9.	on Face to Face				
1 2	_	ecial quirements and	1 2	Simulat HDL sof	ion Room							
		sources to liver the course g. software,	3	Choose	er Lab							
	coi	mputer lab, nulation room	5	Choose	an item.							
1 3	Te: ref	xt book and erence:	1	M. Cile	ti. Advanced I	Digital Design v	vith the Verilog HD	L. Prentice Hall; 2 nd				
	`	ote: ensure the	2	A VHDL	Primer", Jayara	am Bhasker, Pea	rson Education, 3 rd Ec	dition,2005				
		est edition ublication)	3		erger, Edr., Fi nic Publications	O	able Gate Array Te	echnology, Kluwer				
			4	_	Verilog Digital System Design RT Level synthesis TestBench and verification by Zainalabedin Navabi							
			5		no, C. Ciletti. Dig n edition, 2012"		h an Introduction to	the Verilog HDL. Prentice				

		Adaı	ma Science ar	nd Technology	University
1	College: COEEC			Depa	rtment: ECE
2	Course Category	Major (Manda	tory)	·	
	Course Name	Final Year Pro	ject Phase-II		
	Course Code:	ECEg5202			
3	Name(s) of	To be assigned	d		
	Academic Staff:				
4	Semester and	Semester:	II	Year:	5
	Year offered:				
5	Credit Hour:	4			
6	Prerequisite/	Final Year Pro	ject Phase I (ECE5207) and	d Capstone Project (ECE5205)
	Co-requisite: (if				
	any)				
7	Course rationale	This course is	s essential be	ecause it pro	vides students an opportunity to apply the
		U		•	lectual abilities and practical skills to solve
		engineering p	roblems. The	se problems	may take the form of an investigation or the

				development of engineering hardware, software or both. rning Outcome (CLO): At the end of the course the student will be able to:														
8	Cou	ırse Le	arning	Outco	ome (CLO)	At th	ne end	l of tl	ne co	urse	the	student	will	be abl	e to:		
	CLC)1																
	CLC)2	_	gn/sim rs/con	-		elop p	orotot	ype/	'syst	em, (corre	lation	or m	odel b	y consi	dering	different
	CLC)3											rd rese ge of au			ig forma	ats and	present
	CLC)4											es and			its.		
9		pping						mes to	o the	Stud	lent (Outco	omes, T	'each	ing Me	ethods a	nd Ass	essment:
	Learning		Stude	ent Ou	tcome	es (SO)		1				1 -					
	arn	\subseteq								1 .			Assess		ıt T	1		
	Course Lea	comes (CL(chin thod:	_		Quiz/test	Assignment	Project	Progress- report	Oral presentatio	
	ງຈາ)ut	S02	S03	S04	S05	90S	202	L	Т	P	0		4	Щ	\(\frac{1}{\sqrt{1}}\)	<u> </u>	$\frac{\Sigma}{}$
	CLC	<u>)</u>)1	0,	0,	- 01	0,	V	V			$\sqrt{}$					V		√
	CLC)2	ν √								$\sqrt{}$					$\sqrt{}$		
	CLC)3									$\sqrt{}$					$\sqrt{}$		$\sqrt{}$
	CLC)4														$\sqrt{}$		$\sqrt{}$
1				•			Tr	ansfe	rable	Skil	ls (if	appl	icable)		T.			
0	1	Stude build		ill acq	uire s	skills	of go	od ju	dgm	ent,	decis	sion	making	gand	l conti	nual lea	arning	capacity
	2		nts w										ıl setup nclusio		onduct	ing exp	erimen	ıt, data
	3		nts wi nunica		iire sk	ills o	f exec	cuting	inde	epend	dent	task,	manag	ging r	esearc	h proje	ct and o	effective
1	Syn is:	iops	on che resear develo	emical ch wo pmen	engii rk, de t of fir	neerii esigni nal re	ng pr ng, s searc	obler imula h repo	ns. It tion, ort, a	t inc	lude dellir	s con	mplete rototyp	liter ing,	ature interii	review,	comp t, data	l research rehensive analysis, ablic.
1	Dis	tributi	on of S	tuden	t Lear	ning '	Time	(SLT)									1	
2								CI					arning A			1 .		
		ırse ivity	Conte	nt (Outlin	e/pro	ject	CL O		ided i to F)		ning	Guide Learn g (NF F)		Learn (NF to	_	Tota	ıl (SLT)
									L	T	P	0						
	and	nprehe l data g	gatheri	ing.	ature		view		0	0	0	0	2		8		10	
		nforce earch i							0	0	0	0	5		25		30	
		ail des			-	•	t of		0	0	0	0	10		40		50	
		nduct llyzing	ponent/systems/products. duct experiment, testing, yzing data and Validating 0 0 0 10 40 30 40															

		al research writing paration	and report		0	0	0	0	2		8	10
	Tot	A			0	0	0	0	29		111	140
	Ass	essment	<u> </u>			•	•		•			
	Cor	tinuous Assessment		Tot	cent al-)(%)	Ü	F	to F		NF	to F	SLT
	1	Interim Reports		20			3			6 (preparation)	9
	2	Seminar/progress p	resentation	30			3			5 (preparation)	8
	3	Final research publ	ic defense	50			1			2 (preparation)	3
	Tot	al										20
	Gra	nd Total SLT										160
	L =	Lecture, T = Tutorial	, P = Practical, O	= Ot	hers	, F to) F =	Face	to Fac	e, NI	F to F = Non Fac	e to Face
1	Spe	cial requirements	• Workshop	and l	abor	ator	y is r	equi	red for	r pro	ject work	
3	and		 Software, c 	ompi	uter	and s	simu	latio	n roon	n is r	reeded to simul	ate and design
	del	iver the course.	project wo	rks.								
1	Tex							•			s, workshop a	nd conference
4	refe	erence:	• •				ongo	ing i	esear	ch pr	oblem areas.	
			Faculty									
			• ASTU's	Senio	or Pr	oject	t guid	lelin	e			

11. Summary of Course to SO Mapping

Courses	S01	S02	803	S04	S05	908	S07
Applied Mathematics I	$\sqrt{}$						
General Physics	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$				$\sqrt{}$
General Chemistry	$\sqrt{}$						
Introduction to Computing	$\sqrt{}$	$\sqrt{}$					
Communicative English Skills						$\sqrt{}$	

Introduction to Ethics &						٦/	
Citizenship studies						v	
Health and Physical Education I	$\sqrt{}$				V	$\sqrt{}$	
Applied Mathematics II	$\sqrt{}$						
Introduction to Emerging				1/			1/
Technologies	V			\ \ \			V
Fundamentals of Programming	$\sqrt{}$	$\sqrt{}$	V				
Logic and Critical Thinking					$\sqrt{}$	$\sqrt{}$	
Engineering Drawing		$\sqrt{}$	V				
Basic Writing Skill						$\sqrt{}$	
Health and Physical Education II	$\sqrt{}$				V	$\sqrt{}$	
Applied Mathematics III	$\sqrt{}$						
Electronic Circuit I	$\sqrt{}$				V	$\sqrt{}$	$\sqrt{}$
Fundamentals of Electrical							
Engineering	•	•			•	•	•
Data Structures & Algorithms	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	V		$\sqrt{}$	V
Geography of Ethiopia and the Horn							
Electronic Circuit II	$\sqrt{}$	$\sqrt{}$	V			$\sqrt{}$	$\sqrt{}$
Signals and System Analysis	$\sqrt{}$	$\sqrt{}$				$\sqrt{}$	$\sqrt{}$
Electromagnetic Field	$\sqrt{}$				$\sqrt{}$		$\sqrt{}$
Engineering Application Software	$\sqrt{}$	$\sqrt{}$					$\sqrt{}$
Computational methods					V		$\sqrt{}$
Linear Algebra	$\sqrt{}$			$\sqrt{}$			
Digital Logic Design		V	V	V	V	$\sqrt{}$	$\sqrt{}$
Network Analysis and Synthesis	$\sqrt{}$	V					
Probability and Random Processes	$\sqrt{}$	V				$\sqrt{}$	
Digital Signal Processing	$\sqrt{}$	V					

General Psychology and Life Skills					$\sqrt{}$	$\sqrt{}$	
Applied Modern Physics	$\sqrt{}$	$\sqrt{}$		$\sqrt{}$	$\sqrt{}$		$\sqrt{}$
Introduction to Communication Systems	$\sqrt{}$	$\sqrt{}$					$\sqrt{}$
Solid State Physics	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$			$\sqrt{}$	$\sqrt{}$
History of Ethiopia and the Horn (not mapped)							
Microelectronic devices & circuits		$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$		
Optoelectronics	V	$\sqrt{}$				$\sqrt{}$	$\sqrt{}$
Object Oriented Programming	V	$\sqrt{}$	$\sqrt{}$		$\sqrt{}$		
Introduction to Artificial Intelligence	V	$\sqrt{}$				$\sqrt{}$	
Introduction to control System	V	$\sqrt{}$			$\sqrt{}$	$\sqrt{}$	$\sqrt{}$
Introduction to Electrical Machines		$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$
Computer Architecture and Organization		$\sqrt{}$					$\sqrt{}$
Digital Communication							
EM Waves and Guide Structure							
Entrepreneurship and Business Development							
Engineering Research and Development Methodology			√	V	√		√
Introduction to power systems							$\sqrt{}$
Electrical Measurement and Instrumentation		$\sqrt{}$	$\sqrt{}$		$\sqrt{}$		√
Microprocessor and Interfacing	$\sqrt{}$		$\sqrt{}$			$\sqrt{}$	$\sqrt{}$
Antenna and Radio Wave Propagation	$\sqrt{}$						

Data Communication and Computer Networks	$\sqrt{}$	$\sqrt{}$				$\sqrt{}$	V
Introduction to Economics				$\sqrt{}$	$\sqrt{}$		
Integrated Engineering Team Project		$\sqrt{}$	$\sqrt{}$		$\sqrt{}$		
Microwave Devices and Systems	$\sqrt{}$	$\sqrt{}$				$\sqrt{}$	$\sqrt{}$
Integrated Circuit Technology	$\sqrt{}$		$\sqrt{}$				
Industry Internship - II	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$		
Wireless and Mobile Communication		$\sqrt{}$	$\sqrt{}$				$\sqrt{}$
Capstone Project	$\sqrt{}$						
Final Year Project Phase I	$\sqrt{}$		$\sqrt{}$	$\sqrt{}$			
VLSI	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$				
Advanced Computer Networks							
Embedded and real time systems	$\sqrt{}$	$\sqrt{}$					
Programmable Logic Controllers and Robotics	V	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	V	V	$\sqrt{}$
Biomedical Instrumentation and Analysis	$\sqrt{}$	$\sqrt{}$		$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$
Power Electronics	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$		
Project Management for Engineers	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	V
Optics and Optical Communication	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	
Satellite Communication	$\sqrt{}$						
Analysis & design of Digital integrated Circuit	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	V
Telecommunication Networks and Switching	√	V	V			V	
Introduction to Computer Vision		$\sqrt{}$	$\sqrt{}$	$\sqrt{}$		$\sqrt{}$	
Digital Image Processing		$\sqrt{}$		$\sqrt{}$		$\sqrt{}$	$\sqrt{}$

Semiconductor Devices	$\sqrt{}$		$\sqrt{}$			$\sqrt{}$	$\sqrt{}$
Digital Hardware Design	$\sqrt{}$						
Final Year Project Phase II	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$		$\sqrt{}$	$\sqrt{}$
Total	60	48	34	25	31	51	41
Percentage (%)	80.0	64.0 %	44.0 %	32.0 %	42.7 %	68.0 %	56.0%