

School of Electrical Engineering & Computing (SoEEC)

Short History of SoEEC

School of Electrical Engineering and computing (SoEEC) is one of the largest and oldest schools in Adama Science and Technology University (ASTU). It was established following to the decomposition of previous School of Engineering (SoE) in to five schools. The current School of Electrical Engineering & Computing is formed from the former Electrical/ Electronic Technology and Information Technology Departments of the former Nazareth Technical College NTC) since 1993.

Since then the two departments have gone through different curriculums and naming. Within the past 24years the two departments consistently supplied skilled professionals in the field of Electrical, Electronics and Computing fields (professions). These days those graduates are playing a major role in various business, industries, education and research sectors in nation as well as globally.

The Current SoEEC

The current School of Electrical Engineering and Computing is established following, the renaming of the Adama Science and Technology University by the Council of Ministers in May 2011 and shifting of the university from Ministry of Education (MoE) to Ministry of Science and Technology (MoST) to work towards the attainment to become the best Centre of Excellencies in Science and Technology in Ethiopia. Thereby, allowing for the realization of goal has set in the Growth and Transformation Plan (GTP).

Currently, School of Electrical Engineering and Computing has three programs under it:

- 1. Computer Science and Engineering (CSE) Program*
- 2. Electronics and Communication Engineering (ECE) program*
- 3. Electrical Power and Control Engineering (EPCE) program*

As of 2017, there are about **1939 students** attending their education in undergraduate and postgraduate level both in regular and extension programs. Moreover, in SoEEC there are **115** on duty and **38** on study leave academic staff perusing their MSc/PhD in Germany, Italy, South Korea, China & India in various specializations. These Academic staffs are engaged in teaching-learning process, research works community service, technology transfer activities and different university level and national level projects that focus on Science & Technology.

Table 1: Statistics of Regular SoEEC students Since 2017A.Y

Programs & Level of Study	STUDENTS BATCH														
	YEAR II			YEAR III			YEAR IV			YEAR V			GRAND TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Regular UG	353	93	446	147	33	180	375	222	597	198	70	268	1073	418	1491
Regular PG	42	5	47	44	2	46	13	2	15	2	1	3	101	10	111
Extension	0	0	0	136	21	157	118	36	154	25	1	26	279	58	337
SUB TOTAL	395	98	493	327	56	383	506	260	766	225	72	297	1453	486	1939

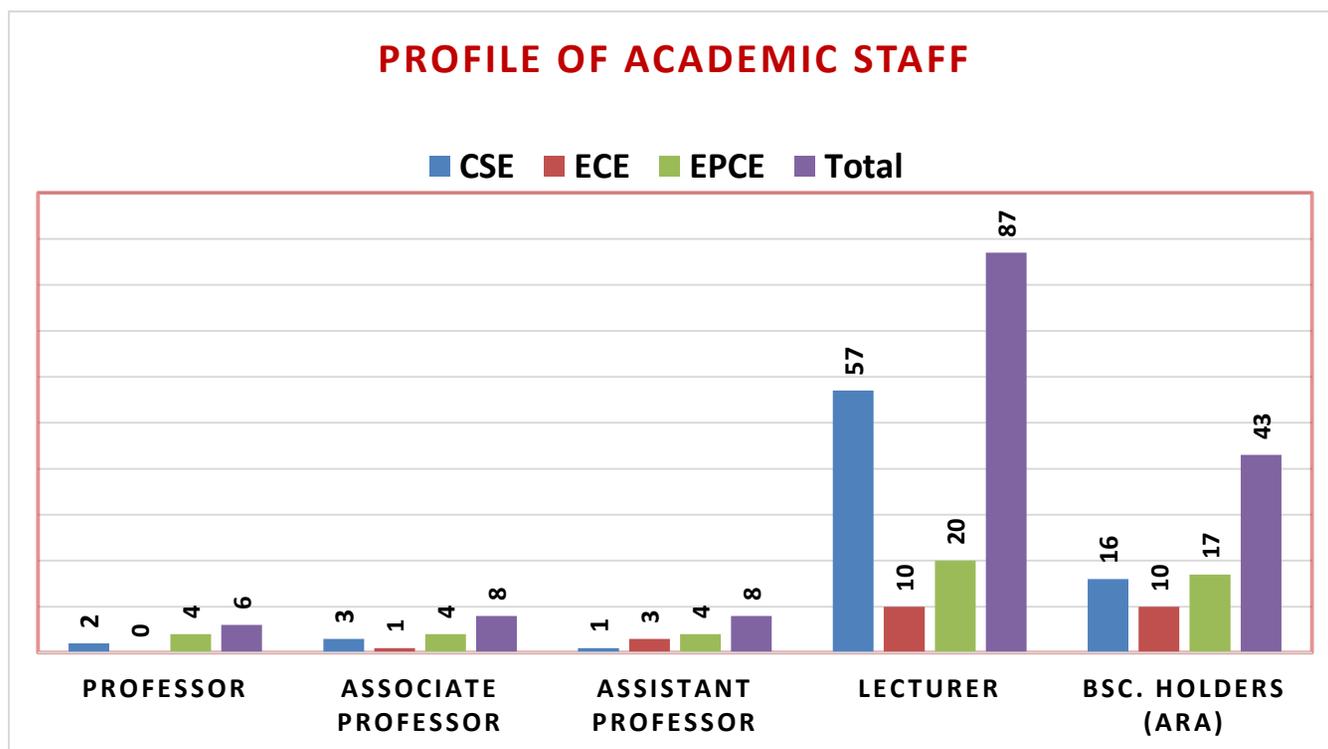


Figure 1: profile of SoEEC Academic staff profile in 2017

The core Strategy of the SoEEC is to pursue its vision and mission to enhance its research, linkage with industry, academic and scholarly activities and become a center of excellence for its programs, thereby improving its eminence in national and international rankings.

The core strategy of the school is to pursue with the universities vision and mission in enhancing its research, university-industry link, academic and scholarly activities and become a center of excellence for its programs, thereby improving its eminence in national and international rankings. The SoEEC aspires to excel in research, teaching, and industry linkage/consultancy at a national level. Moreover, we are attempting our best in producing competent engineers & computer scientists within the aforementioned programs that can solve pressing problems of industries, business organizations & societies.

Vision of SoEEC

- To produce a world-class competent electrical engineers and computing professionals who are equipped with necessary skills and knowledge to solve individuals and organizational problems of the country and bring about growth to the whole world.
- To excel in teaching, research, and industry linkage/consultancy at a national level as well as regionally in the field of Electrical Engineering and Computing.

Mission of SoEEC

- To its students, the SoEEC provides world-class curricula that facilitate student-centered and research-oriented learning in Electrical Engineering and Computing field that are relevant to their lives and careers, valuable in terms of content and competencies, and connected to the needs of industry.
- To industry, the SoEEC produces practitioner-oriented electrical engineers with the field of specialization in Electrical power, control, communication, Electronics, software, computer science and information system who can provide plausible scientific solutions to real world problems. The SoEEC actively partners with industries to provide students the opportunity to acquire practical skills from industry expertise.

Objectives of SoEEC

General Objectives

- To direct and assist students in the acquisition of fundamental principles of Computer Science and Engineering, Electronics and Communication Engineering & Electrical Power and Control Engineering.
- To stimulate and encourage students to have sound practical knowledge of the fields, through project work and evaluation.

Specific Objectives

- To Design different problem-solving principles and techniques in the area of Electrical engineering and computing.
- To Understand and apply high-level tools and emerging Technologies.
- To Apply various systems' theory and principles to real world problems.
- To Develop communication skills to effectively interact with customers, supervisors and peers, both orally and in writing
- To Learn to work effectively in teams to achieve a common goal
- To Develop skills to monitor, supervise, manage projects and handle conflict
- To Understand ethical expectations of a computing professional

Program and Its Description

Computer Science and Engineering, CSE



The mission of the Computer Science and Engineering CSE program is to provide students with a broad and flexible education in computer science and engineering, to prepare its graduates for rapidly changing technological fields, and give them a sound basis for professional practice, advanced education, active citizenship, and lifelong learning. The students are prepared to expand this knowledge through research into new technologies, design methods, and analysis techniques that link the knowledge with multi-disciplinary fields and advance the state of the art. With a knowledge of contemporary technological issues and their impact globally, economically, and environmentally, computer scientists and engineers are at the forefront of advances that continually transform society.

CSE undergraduate program tries to make balance among three spinoffs; Computer Science, Software Engineering, and Computer Engineering. This scheme exactly fits and aligned with the latest ACM curriculum directions, which considers best and tested experience internationally. Course distribution in each semester is well planned and structured to harness knowledge from the three spinoffs into computer science and engineering knowledge domain. Elective courses gives opportunity for program student to make more stable basement in one of the spinoffs for further study, without compromising computer science and engineering knowledge domain.

CSE postgraduate program is flexible, student oriented, and research driven program. Except one course, all courses are elective. There are *seven course clusters*, supposedly specialty steams in the PG curriculum.

Algorithm and computation

Artificial Intelligence

Software Engineering

Systems and Networks

Computer Architecture

Computer Vision, Graphics and Robotics

Network and Information Systems Security

SIG Special interest groups:

Special interest group, particularly research groups, are groups of people (preferably not less than three) who are devoted doing researches on specific areas in main and latest stream of CSE. An individual who is a professor on the area will lead the group. SIG group members are comprised of mainly program academic staff members, and PG and UG students. By its nature, SIGs are composed of multidisciplinary field of studies; hence members could come from different programs from the same school or even different schools.

Each research group main duties are (1) making discussion on scientific research outputs including journals, seminar and conference papers, brain storming on current status on science and technology, (2) disseminating the knowledge the University community by conducting seminars and other means, (3) and actively participate in scientific paper publications in the respective focus areas. In the aspect of establishing and strengthening the program, these groups plays vital roles in developing and reviewing course contents, also standardizing and managing labs for both undergraduate and post graduate programs. Research groups grow in to a particular post graduate program, and eventually into a research center in the area.

Currently, the following SIG are active in the program

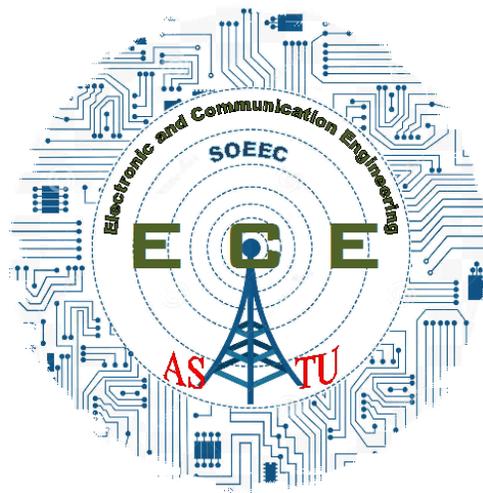
-  *Intelligent Systems*
-  *Data Science*
-  *Cloud Computing and distributed system*
-  *Network Science*

 *Computer vision and Robotics*

As of 2017, the CSE program has 46 teaching academic staffs on duties and 25 on study leaves for MSc and PhD programs. The academic rank of the active members on duty is as follows.

	Academic Rank	Number
1	Lecturer	37
2	Assistant Professor	4
3	Associate Professor	2
4	Professor	3

Electronics and Communication Engineering, ECE



Electronics and Communication Engineering is one of the programs of School of Electrical Engineering & Computing that aims to integrate separate engineering fields to meet the joint demands made by the Electronics and Communication industries in today's world. This program includes 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.

Possible specializations of the program includes Antennas and Satellites, Artificial Intelligence, Biomedical Engineering, Bioelectronics, Communications, Computer Architecture, Computer Hardware Design, Computer Networks, Digital Signal Processing, Electromagnetics, Electronics, Embedded Systems, Microelectronics, Nanotechnology, Robotics, Signal Processing.

ECE Staff profile

As of 2017, the ECE program has 12 teaching academic staffs on duties and 5 on study leaves for MSc and PhD programs. The academic rank of the active members on duty is as follows.

	Academic Rank	Number
1	Lecturer	8
2	Assistant Professor	3
3	Professor	1

Electrical Power and Control Engineering, EPCE



The program of Electrical Power and Control Engineering (EPCE) is one of the three programs in the School of Electrical Engineering and Computing in Adama Science and Technology University. The Program is aimed in serving the country by producing engineers and researchers who are playing key roles in the various sectors of development in the country and also advanced the University's reputation. The core strategy of the Program is to pursue its vision and mission to enhance its research, linkage with industry, academic and scholarly activities and become a center of excellence for its programs, thereby improving its eminence in national and international rankings.

The program has three areas of specialization at master level, namely:

ELECTRICAL POWER ENGINEERING

CONTROL ENGINEERING

POWER ELECTRONICS

Power engineering, also called power systems engineering, is a subfield of energy engineering and electrical engineering that deals with the generation, transmission, distribution and utilization of electric power and the electrical devices connected to such systems including generators, motors and transformers. Although much of the field is concerned with the problems of power, the standard for large-scale power transmission and distribution across the modern world, a significant fraction of the field is concerned with the conversion between AC and DC power and the development of specialized power systems such as those used in aircraft or for electric railway networks.

Control engineering or control systems engineering is the engineering discipline that applies control theory to design systems with desired behaviors. The practice uses sensors to measure the output performance of the device being controlled and those measurements can be used to give feedback to the input actuators that can make corrections toward desired performance. When a device is designed to perform without the need of human inputs for correction it is called automatic control (such as cruise control for regulating the speed of a car). Multi-disciplinary in nature, control systems engineering activities focus on implementation of control systems mainly derived by mathematical modeling of systems of a diverse range. Its main focus is on automation of system, fuzzy logic, mechatronics, etc

Power electronics is the application of solid-state electronics to the control and conversion of electric power. It is the bridge between electrical power and control engineering. It also refers to a subject of research in electronic and electrical engineering which deals with the design, control, computation and integration of nonlinear, time-varying energy-processing electronic systems with fast dynamics. In modern systems the conversion is performed with semiconductor switching devices such as diodes, thyristors and transistors. In contrast to electronic systems concerned with transmission and processing of signals and data, in power electronics substantial amounts of electrical energy are processed. An AC/DC converter (rectifier) is the most typical power electronics device found in many consumer electronic devices. The power range is typically from tens of watts to several hundred watts. In industry a common application is the variable speed drive (VSD) that is used to control an induction motor. The power ranges of VSDs start from a few hundred watts and end at tens of megawatts.

The program has sufficient PhD staffs to teach and advise the students. Moreover, the laboratory facilities are too the standard and it is well organized. Currently, the university is also purchasing very huge high technology laboratory equipment.

EPCE Staff profile

As of 2017, the EPCE program has 30 teaching academic staffs on duties and 12 on study leaves for MSc and PhD programs. The academic rank of the active members on duty is as follows.

	Academic Rank	Number
1	Lecturer	17
2	Assistant Professor	6
3	Associate Professor	3
4	Professor	4

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