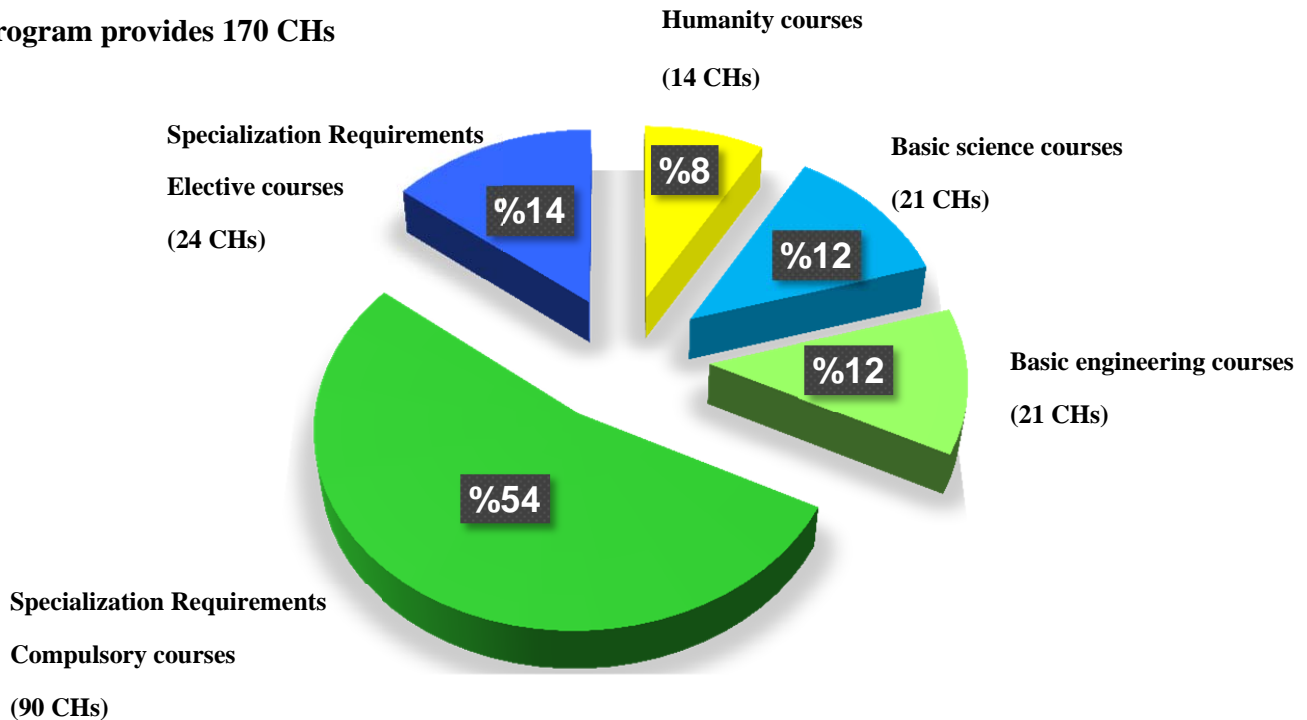


Communication Systems Engineering Program

The program provides 170 CHs



Communication Systems Engineering Program Mission and Aims

Program Mission

The Communication Systems Engineering Program graduates engineers with the ability to deal with the latest developments in the fields of advanced communication, optical and electronic systems to meet the requirements of the market at the moral and professional levels by creating the appropriate conditions for the development of different skills of students and faculty members and cooperate with specialized industrial and research bodies locally and internationally.

The program is therefore based on the following intentions:

- PM 1.** To enhance the students' awareness of some non-related to their specialization sciences, specially which are related to human sciences to enhance their social involvement.
- PM 2.** To augment the intellectual capacity to develop communication systems optimum solutions in an environment based on technological innovation.

- PM 3.** To prepare students to acquire the individual skills and ethics required for long-term learning and competent professional practice.
- PM 4.** To equip students with the required basic knowledge of engineering sciences and interpersonal skills to understand, coordinate with, and lead other engineering disciplines in the communication systems engineering profession.

Program aims

The specific aims of communication systems engineering program are:

- PA 1.** Develop in the students a strong understanding of the capabilities and limitations of communication systems and the related electronics.
- PA 2.** Give the students a chance to gain knowledge and develop skills in a wide variety of specialized selective courses.
- PA 3.** Develop advanced analytical and experimental skills that will allow the successful graduates to design new communication systems and provide them with the skills to critically analyze existing designs.
- PA 4.** Develop in the students competence in computing in terms of software engineering and the use of the latest computing technologies.
- PA 5.** Train students in laboratory techniques for the safe and effective construction and testing of communication systems.
- PA 6.** Develop in the students excellence in communication of technical and non-technical information in written, oral or graphical form and the duties associated with the status of a communication engineer.
- PA 7.** Provide the students with opportunities for internships in industry to gain career enhancing experience of the application of engineering principles.
- PA 8.** Enhance the active learning by the students and provide them with a well-developed academic base and ethics that provides for further learning and professional development

Graduate attributes

To achieve the program mission and aims, program graduates should be able to:

- GA 1-** Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
- GA 2-** Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
- GA 3-** Behave professionally and adhere to engineering ethics and standards.
- GA 4-** Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.

- GA 5-** Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.
- GA 6-** Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
- GA 7-** Use techniques, skills and modern engineering tools necessary for engineering practice.
- GA 8-** Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.
- GA 9-** Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
- GA 10-** Demonstrate leadership qualities, business administration and entrepreneurial skills.
- GA 11-** Select, model and analyze a communication system that satisfies a given specification.
- GA 12-** Design, model and analyze electronic / communication system or component for a specific application; and identify the tools required to optimize this design.
- GA 13-** Design and implement elements, modules, sub-systems or systems in communication systems engineering using technological and professional tools .
- GA 14-** Estimate and measure the performance of electronic / communication system or circuit under specific input excitation, and evaluate its suitability for a specific application .
- GA 15-** Use fundamental knowledge to investigate new and emerging technologies and synthesize solutions to communication systems engineering problems.
- GA 16-** Demonstrate additional abilities to design analog and/or digital circuits of any electronic system .
- GA 17-** Demonstrate additional abilities to analyze, design any microwave or optical communication system.
- GA 18-** Demonstrate additional abilities to work on state-of-the-art research problems in signal processing, image and multimedia processing.
- GA 19-** Demonstrate additional abilities to manage and design any communication system.

University Requirements

To achieve this goal, Ain Shams University has designed a number of courses planned to build the student personality, develop his skills, and increase his awareness of different topics. These courses are called University Requirements. The Faculty of Engineering Ain Shams University has selected some of these courses to be offered within the Engineering Programs. These courses are:

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECT S	SWL	Lec	Tut	Lab	TT
ASU011	Technical English Language	0	4	100	2	2	0	4
ASU111	Human Rights	2	2	50	2	1	0	3
ASU112	Report Writing and Communication skills	3	4	100	2	2	0	4
ASU113	Professional Ethics and Legislations	3	4	100	2	2	0	4
ASU114	Selected Topics in Contemporary Issues	2	2	50	2	0	0	2
-	ASU Elective (1)	2	3	75	2	1	0	3
-	ASU Elective (2)	2	2	50	2	0	0	2
Total		14	17	425	12	6	0	18
Pool of ASU Elective (1) Courses								
ASU321	Innovation and Entrepreneurship	2	3	75	2	1	0	3
ASU322	Language Course – can accept equivalent certificates	2	3	75	2	1	0	3
ASU323	Introduction to Accounting	2	3	75	2	1	0	3
ASU324	History of Engineering and Technology	2	3	75	2	1	0	3
Pool of ASU Elective (2) Courses								
ASU331	Human Resources Management	2	2	50	2	0	0	2
ASU332	History of Architecture	2	2	50	2	0	0	2
ASU333	Introduction to Marketing	2	2	50	2	0	0	2
ASU334	Building Safety and Fire Protection	2	2	50	2	0	0	2
ASU335	Literature and Arts	2	2	50	2	0	0	2
ASU336	Business Administration	2	2	50	2	0	0	2

A placement test in English Language will be conducted for some admitted students to the Faculty of Engineering. If the student passes this test, then he will be exempted from taking the Technical English Language Course. The Technical English Language course is a pre-requisite for all Faculty requirements courses.

For ASU322 – Language course, any non-English language is accepted including Arabic. If a student has an equivalent certificate, he is exempted from taking this course. Examples of equivalent certificates: TOEFL, IELTS ... etc.

Faculty Requirements

To achieve these Intended Learning Outcomes, a set of courses must be completed as a Faculty Requirement. These courses are divided into Basic Science Courses and Basic Engineering Courses.

List of Faculty requirements courses.

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	T T
PHM011	Basic Mathematics	0	4	100	2	2	0	4
ENG111	Field Training	0	12	300	0	10	15	25
PHM012	Mathematics (1)	3	5	125	3	2	0	5
PHM013	Mathematics (2)	3	5	125	3	2	0	5
PHM021	Vibration and Waves	3	5	125	3	1	1	5
PHM022	Electricity and Magnetism	3	5	125	3	1	1	5
PHM031	Statics	3	5	125	2	2	1	5
PHM032	Dynamics	3	5	125	2	2	1	5
PHM041	Engineering Chemistry	3	5	125	2	1	2	5
PHM111	Probability and Statistics	2	4	100	2	2	0	4
MDP081	Production Engineering	3	5	125	2	0	3	5
MDP011	Engineering Drawing	3	6	150	1	3	2	6
CEP011	Projection and Engineering Graphics	3	6	150	1	3	2	6
CSE031	Computing in Engineering	2	4	100	2	0	0	2
ENG011	Fundamentals of Engineering	2	4	100	2	1	0	3
-	Structures and Properties of Materials Elective	2	4	100	2	1	1	4
-	Engineering Economy Elective	2	4	100	2	1	0	3
-	Project Management Elective	2	4	100	2	1	0	3
Total		42	76	1900	34	23	14	71

Pool of Structures and Properties of Materials Elective Courses								
MDP151	Structures and Properties of Materials	2	4	100	2	1	1	4
EPM211	Properties of Electrical Materials	2	4	100	2	1	1	4
CES151	Structures and Properties of Construction Materials	2	4	100	2	1	1	4
Pool of Engineering Economy Elective Courses								
MDP231	Engineering Economy	2	4	100	2	1	0	3
ARC471	Feasibility Studies	2	4	100	2	1	0	3
ARC463	Renewable Energy Systems and Economics	2	4	100	2	1	0	3
UPL271	Society and Housing Economics	2	4	100	2	1	0	3
UPL471	Urban Economics	2	4	100	2	1	0	3
EPM119	Engineering Economy and Investments	2	4	100	2	1	0	3
CEI261	Engineering Economics and Management	2	4	100	2	1	0	3
CES171	Engineering Economics and Finance	2	4	100	2	1	0	3
Pool of Project Management Elective Courses								
MDP232	Industrial Project Management	2	4	100	2	1	0	3
ARC371	Architecture Project Management	2	4	100	2	1	0	3
EPM411	Project Management for Electrical Engineering	2	4	100	2	1	0	3
CSE441	Software Project Management	2	4	100	2	1	0	3

CES271	Project Management Essentials in Construction	2	4	100	2	1	0	3
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A placement test in Mathematics will be conducted for all admitted students except some High School Degrees which are determined by the Faculty Council. If the student passes this test, then he will be exempted from taking Basic Mathematics Course. The Basic Mathematics course is a pre-requisite for all Faculty requirements courses.

Specialization requirements

In order to get a Bachelor of Science Degree in this program, and to satisfy the Program Competences, the following set of courses need to be completed.

List of Communication Systems Engineering Program Requirements courses.

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECT S	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	14	17	425	12	6	0	18
	Faculty of Engineering Requirements	42	76	1900	34	23	14	71
PHM113	Differential and Partial Differential Equations	3	5	125	3	2	0	5
PHM114	Numerical Analysis	3	5	125	2	2	0	4
PHM213	Complex and Special Functions and Fourier Analysis	3	4	100	2	2	0	4
PHM121	Modern Physics and Quantum Mechanics	3	5	125	3	1	1	5
PHM123	Thermal and Statistical Physics	3	5	125	2	2	0	4
ECE111	Electronic Materials	3	5	125	3	1	0	4
ECE213	Solid State Electronic Devices	3	7	175	2	2	0	4
ECE214	Electronic Circuits (1)	4	7	175	3	2	2	7
ECE315	Electronic Circuits (2)	3	5	125	2	2	0	4
ECE316	Digital Circuit Design	3	7	175	2	2	0	4
ECE131	Electrostatics and Magnetostatics	3	5	125	2	2	0	4
ECE331	Electromagnetic waves	3	6	150	2	2	1	5
ECE333	Microwave Engineering	4	6	150	3	2	2	7
ECE334	Optical Fiber Communications	4	6	150	3	2	2	7
ECE432	Antenna Engineering and Propagation	2	4	100	2	1	0	3
ECE253	Signals and Systems	4	8	200	3	2	2	7
ECE254	Analog Communications	3	5	125	2	2	1	5
ECE255	Digital Signal Processing	3	6	150	2	2	2	6
ECE354	Digital Communications	3	5	125	3	1	1	5
ECE355	Communication Networks (1)	3	6	150	2	2	0	4
ECE452	Information Theory and Coding	3	5	125	2	2	0	4
ECE458	Communication Networks (2)	3	7	175	2	2	0	4
CSE111	Logic Design	3	5	125	3	1	1	5
CSE212	Computer Organization	3	6	150	2	2	0	4
CSE131	Computer Programming	3	6	150	3	0	2	5
CSE371	Control Engineering	3	5	125	2	1	1	4
EPM114	Fundamentals of Electrical Circuits	3	6	150	2	2	1	5
	Communication Systems Elective (1) from Pool A	3	5	125	2	2	2	6

	Communication Systems Elective (2) from Pool B	3	5	125	2	2	0	4
	Communication Systems Elective (3) from Pool A	3	5	125	2	2	2	6
	Communication Systems Elective (4) from Pool B	3	5	125	2	2	0	4
	Communication Systems Elective (5) from Pool B	3	5	125	2	2	0	4
	Communication Systems Elective (6) from Pool B	3	5	125	2	2	0	4
	Communication Systems Elective (7) from Pool B	3	5	125	2	2	0	4
	Communication Systems Elective (8) from Pool B	3	5	125	2	2	0	4
ECE491	Graduation Project (1)	3	7	175	1	0	6	7
ECE492	Graduation Project (2)	3	8	200	1	0	6	7
Total		170	300	7500	128	91	49	268
Pool of Circuits and Systems Concentration Elective Courses								
Pool A								
ECE211	Introduction to Embedded Systems	3	5	125	2	2	2	6
ECE318	Electronic Measurements and Instrumentation	3	5	125	2	2	2	6
Pool B								
ECE317	Modern VLSI Devices	3	5	125	2	2	0	4
ECE411	Integrated Circuits Technology	3	5	125	2	2	0	4
ECE412	Analog Integrated Circuit Design	3	5	125	2	2	0	4
ECE413	ASIC Design and Automation	3	5	125	2	2	0	4
ECE414	RF Circuit Design	3	5	125	2	2	0	4
ECE419	Selected Topics in Circuits and Systems	3	5	125	2	2	0	4
Pool of Physical and Wave Electronics Concentration Elective Courses								
Pool A								
ECE335	Microwave Measurements	3	5	125	2	2	2	6
ECE338	Optical Sensing and Instrumentation	3	5	125	2	2	2	6
Pool B								
ECE336	Integrated Optics and Optical MEMS	3	5	125	2	2	0	4
ECE337	Microwave Circuits	3	5	125	2	2	0	4
ECE438	Microwave Devices	3	5	125	2	2	0	4
ECE439	Optoelectronics Devices	3	5	125	2	2	0	4
ECE440	RF and Microwave Systems	3	5	125	2	2	0	4
ECE441	Selected Topics in Physical and Wave Electronics	3	5	125	2	2	0	4
Pool of Signals and Communication Systems Concentration Elective Courses								
Pool A								
ECE357	Statistical Signal Processing	3	5	125	2	2	2	6
ECE359	Signal Processing for Multimedia	3	5	125	2	2	2	6
Pool B								
ECE356	Electro-Acoustical Engineering	3	5	125	2	2	0	4
ECE358	Wireless Communications	3	5	125	2	2	0	4
ECE454	Satellite Communication Systems	3	5	125	2	2	0	4
ECE459	Mobile Communications	3	5	125	2	2	0	4
ECE460	Machine Learning for Multimedia	3	5	125	2	2	0	4
ECE461	Selected Topics in Signals & Communication Systems	3	5	125	2	2	0	4

Course Tree of Communication Systems Program

