

Academic Program Description Form(Postgraduate Studies)

University Name: Mosul University

Faculty/Institute: College of Engineering

Scientific Department: Electrical Engineering

Academic or Professional Program Name: M.Sc. Program in
Electrical Engineering / Electronics and Communication

Final Certificate Name: Master of Science in Electrical Engineering
/ Electronics and Communication

Academic System: Semester system - coursework, research,
thesis/dissertation

Description Preparation Date: , 2026

File Completion Date: , 2026



Signature :

Head of Department Name :

Name :Dr. Omar Sh. Alyozbaky

Date :

Signature :

Scientific Associate

Dr. Ayman T. Hameed

Date :

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

Department : Asst. Prof. Rana Burhan Abdulrahman

Date :

Signature :



Approval of the Dean

Asst prof Dr Omar M. Hamdon

Ministry of Higher Education and Scientific Research

University of Mosul / College of Engineering

Department of Electrical Engineering

Academic Program Description for Postgraduate Studies

**M.Sc. Program in Electrical Engineering / Electronic and
Communication**

Academic Year 2025-2026

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1. Introduction and Basic Concepts

This academic description provides an organized framework for the postgraduate program offered by the Department of Electrical Engineering, College of Engineering, University of Mosul. It presents the main features of the M.Sc. Program in Electrical Engineering / Electronics and Communication, including courses, targeted learning outcomes, teaching and assessment mechanisms, admission requirements, and development plans.

The document converts the approved undergraduate academic-description structure into a postgraduate-oriented format. It also includes concise course descriptions for each subject, including aims, learning outcomes, indicative content, teaching strategies, and assessment methods.

Field		Details	
University Name		University of Mosul	
Faculty/Institute		College of Engineering	
Scientific Department		Department of Electrical Engineering	
Academic Program Name		M.Sc. Program in Electrical Engineering / Electronics and Communication	
Final Certificate Name		Master of Science in Electrical Engineering / Electronics and Communication	
Academic System		Semester system - coursework, research, thesis/dissertation	
Description Preparation Date		2025-2026	
File Completion Date		To be officially specified by the Department	
Name	Position	Date	Signature
	Head of Department		
	Scientific Assistant		
	Director of Quality Assurance and University Performance		
	Dean Approval		

2. Program Vision

To make the Department of Electrical Engineering a distinguished academic and research center for preparing researchers and specialists in Electronics, Communication, microwave engineering, digital systems, computer networks, antennas, and modern wireless technologies in a manner that serves scientific development and community needs.

3. Program Mission

To provide a rigorous postgraduate program with scientific and research depth in Electronics and Communication engineering. The program aims to prepare graduates who possess advanced skills in analysis, modeling, design, scientific research, and academic publishing, and who can produce and apply engineering knowledge to solve modern technical and communication problems.

4. Program Objectives

1. Prepare researchers and specialists capable of addressing advanced engineering problems in Electronics and Communication engineering.
2. Deepen specialized knowledge in communication systems, microwave engineering, signal processing, Electronics, and computer networks.
3. Enhance scientific research skills, academic publishing, critical analysis, and research ethics.
4. Develop the ability to use modeling, simulation, measurement, and analytical tools to solve real engineering problems.
5. Strengthen research cooperation with governmental, industrial, and research institutions.
6. Provide a supportive academic environment for innovation, research supervision, and professional development.

5. Program Accreditation and External Influences

Item	Description
Program Accreditation	The programs are subject to review and updating according to quality-assurance and academic-accreditation requirements and the applicable regulations of the Ministry of Higher Education and Scientific Research.
External Influences	The program is influenced by labor-market needs, developments in communication technologies, wireless systems, Electronics industries, computer networks, and national research priorities.

6. Program Structure and Courses

The programs are based on specialized coursework distributed over two semesters, followed by scientific research and a thesis/dissertation according to the applicable postgraduate regulations. The following tables present the courses by program, specialization, and semester.

6.1 M.Sc. in Electrical Engineering / Electronics and Communication - First Semester

No.	Code	Course Title	Instructor(s)	Credit Units	Type
1	EEE653	Microelectronics Devices	Dr. Mohammed Tariq Yaseen + Dr. Shamil Hamza Hussein	2	Compulsory
2	EEE667	Modern Power Electronics	Dr. Yasser Mohammed Younis + Dr. Mohammed Natiq Abdulqadir	2	Compulsory
3	EEE644	Advanced Antenna and Wave Propagation	Dr. Saad Wasmi Othman	2	Compulsory
4	EEE652	Advanced Digital Signal Processing	Dr. Mohammed Younis Thanoun	2	Compulsory
5	EEE640	Advanced Mathematics	Dr. Dawood Najim Saleh	2	Compulsory
6	EEE647	Modern Control Theory	Dr. Mohammed Obaid Mustafa	2	Compulsory
7	EEE670	Modeling and Simulation	Dr. Firas Sami Haseeb	2	Compulsory

6.2 M.Sc. in Electrical Engineering / Electronics and Communication - Second Semester

No.	Code	Course Title	Instructor(s)	Credit Units	Type
1	EEE646	Mobile Communication	Dr. Saad Ahmed + Dr. Mohammed Abdulmalik	2	Compulsory
2	EEE648	Microwave Devices	Dr. Saad Wasmi + Dr. Ahmed Salim	2	Compulsory
3	EEE661	Modern Computer Networks	Dr. Mohammed Younis + Dr. Firas Sami	2	Compulsory
4	EEE680	Programmable Controllers	Dr. Mohammed Tariq + Dr. Shamil Hamza	2	Compulsory
5	EEE638	English Language	Dr. Anmar Hamoodi	2	Compulsory
6	EEE690	Scientific Research Methods	Dr. Omar Sharaf Al-Din + Dr. Hiba Nazim	2	Compulsory

7. Expected Program Learning Outcomes for Postgraduate Studies

PGO1: Analyze, formulate, and solve advanced engineering problems using principles of engineering, science, and mathematics.

PGO2: Design models, algorithms, or engineering systems that meet specified requirements while considering technical, economic, and environmental constraints.

PGO3: Conduct independent scientific research, analyze data, interpret results, and draw scientifically defensible conclusions.

PGO4: Use software tools, laboratory instruments, and simulation environments to develop and analyze electrical and Electronics systems.

PGO5: Communicate scientific work orally and in writing in Arabic and English, including reports, theses, dissertations, and research papers.

PGO6: Adhere to research ethics, professional responsibility, anti-plagiarism principles, and accuracy in presenting results.

PGO7: Demonstrate self-learning, follow recent developments, and work effectively within multidisciplinary research teams.

8. Teaching and Learning Strategies

- Advanced theoretical lectures supported by computational and applied examples.
- Discussion of recent scientific papers and linkage with research gaps.
- Computer laboratories and simulation using MATLAB/Simulink and specialized software.
- Periodic seminars presented by students.
- Mini-projects and case studies related to communication, Electronics, microwave systems, and networks.
- Self-directed learning under instructor and supervisor guidance.

9. Assessment Methods

- Mid-term and final written examinations.
- Assignments, analytical reports, or simulation reports.
- Oral presentations and research seminars.
- Evaluation of projects or case studies.
- Evaluation of research proposal and thesis/dissertation progress.
- Final defense of the thesis or dissertation according to the applicable regulations.

10. Faculty

Academic Rank	General Specialization	Specific Specialization	Number
Professor	Electrical Engineering/ Electronics and Communication	Solid State Electronic	1
Professor	Electrical Engineering/ Power and Machines	Electrical Power and Machines Engineering	2
Emeritus Professor	Electrical Engineering/ Power and Machines	Power Electronics Engineering	1
Assistant Professor	Electrical Engineering/ Power and Machines	Automatic Control Engineering	1
Assistant Professor	Electrical Engineering/ Electronics and Communication	Communication Engineering	1
Assistant Professor	Electrical Engineering/ Power and Machines	Power Electronics Engineering	3
Assistant Professor	Electrical Engineering/ Power and Machines	Electrical Power Engineering	3
Assistant Professor	Electrical Engineering/ Electronics and Communication	Nanotechnology	1
Assistant Professor	Electrical Engineering/ Electronics and Communication	Electronics and Communication Engineering	1

11. Admission Criteria

Admission to the program is conducted according to the applicable instructions of the Ministry of Higher Education and Scientific Research. Applicants must hold a relevant bachelor's degree, satisfy GPA and competitive-examination requirements, and meet additional conditions specified in the annual postgraduate-admission instructions.

12. Main Sources of Information about the Program

- Academic Program and Course Description Guide issued by the Ministry of Higher Education and Scientific Research.
- Official website of the University of Mosul / College of Engineering / Department of Electrical Engineering.
- Approved postgraduate curricula and course tables for the Department for the academic year 2025-2026.
- Course-description files received from the Scientific Committee and course instructors.

13. Program Development Plan

- Annual review of courses and learning outcomes.
- Update course contents according to modern technologies such as 5G/6G Communication, artificial intelligence, IoT, microwave systems, and cybersecurity.
- Strengthen scientific publishing requirements.
- Develop simulation and measurement laboratories.
- Encourage research cooperation with universities and industrial institutions.
- Apply benchmarking with reputable international postgraduate programs.

14. Brief Detailed Course Descriptions

This section includes concise course-description forms for all postgraduate courses. These forms can be used as an initial basis and then reviewed by the course instructor to add weekly contact hours, detailed grade distribution, and full references when required.

M.Sc. Courses / Electronics and Communication

EEE653 - Microelectronics Devices

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication

Semester	First Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Mohammed Tariq Yaseen + Dr. Shamil Hamza Hussein

Course Aims:

- Study modeling and design principles of microelectronic devices and circuits.
- Deepen understanding of semiconductor characteristics and their use in integrated circuits.

Course Learning Outcomes:

- Analyze MOSFET/CMOS characteristics and small/large-signal models.
- Interpret scaling, noise, and thermal effects on device performance.
- Relate device properties to Electronics circuit design.

Indicative Contents:

Semiconductor physics; MOS devices; CMOS technology; small-signal models; scaling effects; noise; analog/digital IC basics.

Teaching and Learning Strategies:

- Interactive lectures, advanced problem solving, recent-paper reading and discussion, software/simulation applications, and student seminars.

Assessment Methods:

- Mid-term and final examinations, assignments and reports, seminar presentations, research discussions, and a project/case study when required.

EEE667 - Modern Power Electronics

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	First Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Yasser Mohammed Younis + Dr. Mohammed Natiq Abdulqadir

Course Aims:

- Study modern power converters and their applications in renewable energy systems, electrical drives, and electric charging.
- Analyze the performance of static converters, modulation methods, control techniques, and harmonic effects.

Course Learning Outcomes:

- Analyze advanced AC/DC, DC/DC, and DC/AC converter circuits.
- Select power semiconductor devices, filters, and suitable control strategies.
- Evaluate efficiency, harmonic distortion, thermal issues, and reliability in power Electronics systems.

Indicative Contents:

Power semiconductor devices; rectifiers; DC-DC converters; inverters; PWM/SVPWM; filters; efficiency; thermal and reliability issues.

Teaching and Learning Strategies:

- Interactive lectures, advanced problem solving, recent-paper reading and discussion, software/simulation applications, and student seminars.

Assessment Methods:

- Mid-term and final examinations, assignments and reports, seminar presentations, research discussions, and a project/case study when required.

EEE644 - Advanced Antenna and Wave Propagation

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	First Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Saad Wasmi Othman

Course Aims:

- Study antenna theory, wave propagation, and their applications in modern communication systems.
- Analyze radiation characteristics, matching, gain, and polarization.

Course Learning Outcomes:

- Calculate and interpret basic antenna parameters.
- Analyze wave propagation in free space and practical channels.
- Use modeling/simulation tools to assess antenna performance.

Indicative Contents:

Antenna parameters; radiation pattern; arrays; aperture antennas; propagation mechanisms; path loss; matching; modern wireless applications.

Teaching and Learning Strategies:

- Interactive lectures, advanced problem solving, recent-paper reading and discussion, software/simulation applications, and student seminars.

Assessment Methods:

- Mid-term and final examinations, assignments and reports, seminar presentations, research discussions, and a project/case study when required.

EEE652 - Advanced Digital Signal Processing

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	First Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Mohammed Younis Thanoun

Course Aims:

- Deepen concepts of digital signals, systems, and advanced processing algorithms.
- Apply transforms and digital filters to communication, measurement, and control problems.

Course Learning Outcomes:

- Analyze signals in time and frequency domains.
- Design FIR/IIR filters and evaluate their performance.
- Apply FFT and processing techniques to engineering data.

Indicative Contents:

Discrete-time signals; Z-transform; FFT; FIR/IIR filters; adaptive filtering; spectral analysis; DSP applications.

Teaching and Learning Strategies:

- Interactive lectures, advanced problem solving, recent-paper reading and discussion, software/simulation applications, and student seminars.

Assessment Methods:

- Mid-term and final examinations, assignments and reports, seminar presentations, research discussions, and a project/case study when required.

EEE640 - Advanced Mathematics

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	First Semester

Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Dawood Najim Saleh

Course Aims:

- Strengthen the mathematical foundation required for modeling and analyzing advanced electrical systems.
- Develop the ability to use analytical and numerical methods for engineering problems.

Course Learning Outcomes:

- Apply linear algebra, transforms, and differential equations to electrical engineering problems.
- Choose suitable mathematical methods for engineering models.
- Interpret mathematical results and link them to the physical behavior of systems.

Indicative Contents:

Linear algebra; eigenvalues; differential equations; Laplace/Fourier transforms; numerical methods; optimization basics.

Teaching and Learning Strategies:

- Interactive lectures, advanced problem solving, recent-paper reading and discussion, software/simulation applications, and student seminars.

Assessment Methods:

- Mid-term and final examinations, assignments and reports, seminar presentations, research discussions, and a project/case study when required.

EEE647 - Modern Control Theory

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	First Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Mohammed Obaid Mustafa

Course Aims:

- Deepen the concepts of modern control and analysis of multivariable dynamic systems.
- Enable students to design controllers suitable for electrical and Electronics systems.

Course Learning Outcomes:

- Model systems in state-space form and analyze stability.
- Design modern controllers such as state feedback, observers, and introductory optimal control.
- Evaluate controller performance in terms of response, stability, and robustness.

Indicative Contents:

State-space analysis; controllability; observability; pole placement; observers; optimal/robust control concepts; digital implementation.

Teaching and Learning Strategies:

- Interactive lectures, advanced problem solving, recent-paper reading and discussion, software/simulation applications, and student seminars.

Assessment Methods:

- Mid-term and final examinations, assignments and reports, seminar presentations, research discussions, and a project/case study when required.

EEE670 - Modeling and Simulation

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	First Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Firas Sami Haseeb

Course Aims:

- Develop skills in mathematical modeling and computer simulation of electrical and Electronics systems.
- Connect theoretical models with real system behavior and validate simulation results.

Course Learning Outcomes:

- Build a mathematical/computational model for an electrical or Electronics system.
- Run simulations using suitable tools such as MATLAB/Simulink or equivalent software.
- Perform sensitivity analysis, validate results, and discuss model limitations.

Indicative Contents:

Model formulation; state-space models; simulation workflow; parameter estimation; validation; sensitivity analysis; reporting results.

Teaching and Learning Strategies:

- Applied lectures, computer laboratories, simulation assignments, and discussion of student results.

Assessment Methods:

- Simulation project, technical report, presentation, and written examination.

EEE646 - Mobile Communication

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	Second Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Saad Ahmed + Dr. Mohammed Abdulmalik

Course Aims:

- Study principles of mobile communication systems and modern cellular networks.
- Analyze wireless channels, interference, resource management, and access techniques.

Course Learning Outcomes:

- Explain cellular-system architecture and radio planning concepts.
- Analyze the effect of fading and interference on service quality.
- Compare 4G/5G technologies and applications.

Indicative Contents:

Cellular concepts; radio propagation; fading; handoff; multiple access; OFDM; LTE/5G architecture; capacity and QoS.

Teaching and Learning Strategies:

- Interactive lectures, advanced problem solving, recent-paper reading and discussion, software/simulation applications, and student seminars.

Assessment Methods:

- Mid-term and final examinations, assignments and reports, seminar presentations, research discussions, and a project/case study when required.

EEE648 - Microwave Devices

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	Second Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Saad Wasmi + Dr. Ahmed Salim

Course Aims:

- Study microwave devices and circuits and their methods of analysis.
- Deepen understanding of transmission lines, S-parameters, and passive/active microwave components.

Course Learning Outcomes:

- Use the Smith chart and scattering parameters in analysis.
- Analyze microwave filters, couplers, amplifiers, and oscillators.
- Evaluate matching, losses, and gain in microwave circuits.

Indicative Contents:

Transmission lines; Smith chart; S-parameters; waveguides; resonators; couplers; microwave amplifiers and oscillators.

Teaching and Learning Strategies:

- Interactive lectures, advanced problem solving, recent-paper reading and discussion, software/simulation applications, and student seminars.

Assessment Methods:

- Mid-term and final examinations, assignments and reports, seminar presentations, research discussions, and a project/case study when required.

EEE661 - Modern Computer Networks

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	Second Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Mohammed Younis + Dr. Firas Sami

Course Aims:

- Study architectures and protocols of modern computer networks and their engineering applications.
- Analyze performance, management, security, and quality of service in networks.

Course Learning Outcomes:

- Explain protocol operation across network layers.
- Analyze congestion, QoS, and performance indices.
- Design a suitable network layout for an engineering application.

Indicative Contents:

TCP/IP; routing; switching; VLANs; wireless networks; QoS; network management; cybersecurity basics; modern network architectures.

Teaching and Learning Strategies:

- Interactive lectures, advanced problem solving, recent-paper reading and discussion, software/simulation applications, and student seminars.

Assessment Methods:

- Mid-term and final examinations, assignments and reports, seminar presentations, research discussions, and a project/case study when required.

EEE680 - Programmable Controllers

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	Second Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Mohammed Tariq + Dr. Shamil Hamza

Course Aims:

- Introduce programmable logic controllers and their use in industrial automation.
- Develop skills in PLC programming, I/O interfacing, sequence control, and HMI integration.

Course Learning Outcomes:

- Design ladder-logic or function-block programs for industrial processes.
- Select and interface sensors, actuators, and PLC I/O modules.
- Test and troubleshoot basic automated systems.

Indicative Contents:

PLC hardware; I/O modules; ladder logic; timers and counters; sequence control; analog signals; HMI/SCADA basics; industrial safety.

Teaching and Learning Strategies:

- Interactive lectures, advanced problem solving, recent-paper reading and discussion, software/simulation applications, and student seminars.

Assessment Methods:

- Mid-term and final examinations, assignments and reports, seminar presentations, research discussions, and a project/case study when required.

EEE638 - English Language

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	Second Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Anmar Hamoodi

Course Aims:

- Develop academic reading and writing skills in English.
- Enable students to prepare abstracts, reports, research summaries, and scientific presentations clearly.
- Enhance the use of engineering and research terminology in electrical engineering.

Course Learning Outcomes:

- Write a research abstract, a formal academic text, and a concise literature review.
- Present an engineering topic in clear English.
- Use technical terminology accurately in written and oral communication.

Indicative Contents:

Academic writing; technical vocabulary; abstract and report writing; presentation skills; research-paper reading.

Teaching and Learning Strategies:

- Writing exercises, short presentations, scientific-paper reading, peer review, and guided correction of academic texts.

Assessment Methods:

- Short reports, oral presentation, translation/summarization assignments, and a written examination.

EEE690 - Scientific Research Methods

Field	Details
Program	M.Sc.
Specialization	Electrical Engineering / Electronics and Communication
Semester	Second Semester
Course Type	Compulsory
Credit Units	2
Instructor(s)	Dr. Omar Sharaf Al-Din + Dr. Hiba Nazim

Course Aims:

- Introduce scientific research methodology, research ethics, and requirements of sound academic publishing.

- Develop the ability to formulate a research problem, hypotheses, objectives, and an executable methodology.
- Develop skills in citation management, reference use, and plagiarism avoidance.

Course Learning Outcomes:

- Formulate a clear and focused research proposal.
- Conduct a critical literature review and link it to a research gap.
- Select suitable measurement, simulation, and analysis tools for engineering research.

Indicative Contents:

Research design; literature review; research gap; citation styles; ethics; plagiarism; data analysis; thesis proposal writing.

Teaching and Learning Strategies:

- Applied workshops on proposal writing, abstract writing, and literature review, with discussion of published research examples.

Assessment Methods:

- Research proposal, literature review, seminar presentation, and a short test in research ethics.

15. Brief Alignment between Courses and Program Learning Outcomes

M.Sc. / in Electrical Engineering Electronics and Communication

Code	Course	PGO1	PGO2	PGO3	PGO4	PGO5	PGO6	PGO7
EEE653	Microelectronics Devices	✓	✓	✓				
EEE667	Modern Power Electronics	✓	✓	✓	✓			
EEE644	Advanced Antenna and Wave Propagation	✓	✓	✓				
EEE652	Advanced Digital Signal Processing	✓	✓	✓	✓			
EEE640	Advanced Mathematics	✓	✓	✓				
EEE647	Modern Control Theory	✓	✓	✓				
EEE670	Modeling and Simulation	✓	✓	✓	✓			
EEE646	Mobile Communication	✓	✓	✓	✓			
EEE648	Microwave Devices	✓	✓	✓				
EEE661	Modern	✓	✓	✓	✓			

	Computer Networks							
EEE680	Programmable Controllers	✓	✓	✓	✓			
EEE638	English Language	✓	✓	✓		✓		✓
EEE690	Scientific Research Methods	✓	✓	✓		✓	✓	✓