COMSATS University Islamabad
Registrar Secretariate, Academic Unit (PS)

No: CUI-Reg/Notif- 2382 /24/2471

October 10, 2024

NOTIFICATION

Academic Council in its 39th meeting held on August 01, 2024, on the recommendations of the 35th meeting of the Board of Advance Studies and Research (BASAR) held on June 26, 2024, approved the Scheme of Studies of Master of Science in Electrical Engineering, effective from Fall 2024.

Nomenclature of the Program: Master of Science in Electrical Engineering

1. MS WITH THESIS OPTION

1(a). Duration:

1.1 Minimum Duration: 02 Years	1.2 Minimum No. of Semesters: 04
1.3 Maximum Duration: 04 Years	1.4 Maximum No. of Semesters: 08
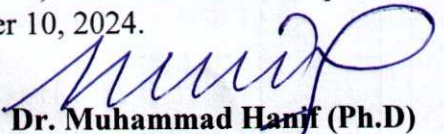
1(b). No. of Courses and Credit Hours in MS with Thesis Option:

Sr. #	Category	SAME DISCIPLINE		INTRADISCIPLINARY	
		No. of Courses	No. of Credit Hours	No. of Courses	No. of Credit Hours
1.	Deficiency Courses of level 6	-	-	02-03	06-09
2.	Core Courses	02	06	02	06
3.	Elective Courses	06	18	06	18
4.	Research Thesis	01	06	01	06
5.	Total	09	30	11-12	36-39
6.	Prerequisite	The zero semester of an MS candidate shall not count towards the maximum study duration.			

2. MS WITH NON-THESIS OPTION IN THE SAME DISCIPLINE / RELEVANT FIELD:
By selecting the MS with Non-Thesis option, a same/relevant discipline student can graduate by passing, in lieu of MS thesis, 02 additional elective courses and submitting a Non-Credit (NC) MS Project/Report. In such case, the course work consists of 11 courses (02 core courses, 08 electives, and 01 NC Project Report) accumulating in total 30 Credit Hours of course work.

MS WITH NON-THESIS OPTION IN THE INTRADISCIPLINARY FIELD: By selecting the MS with Non-Thesis option, an intradisciplinary student can graduate by passing 02-03 deficiency courses in the zero semester and then passing in subsequent semesters, in lieu of MS thesis, 02 additional elective courses and submitting a Non-Credit (NC) MS Project/Report. In such case, the course work consists of 13-14 courses (02-03 deficiency courses, 02 core courses, 08 electives, and 01 NC Project Report) accumulating in total 36-39 Credit Hours of course work.

This supersedes notification No: CUI-Reg/Notif-1940/24/2009 dated August 23, 2024 and issued as per the decision of 35th meeting of the Board of Faculty of Engineering held on October 10, 2024.

Dr. Muhammad Hanif (Ph.D)
Deputy Registrar

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List of Core Courses:

Sr. #	Course Code	Course Title	Credit Hours
1.	EEE610	Engineering Mathematics	3(3, 0)
2.	EEE621	Modeling and Simulation	3(3, 0)

List of Elective Courses:

Computing and Electronics			
Sr. #	Course Code	Course Title	Credit Hours
1.	EEE611	Stochastic Processes	3(3, 0)
2.	ECI610	Advanced Digital Design	3(3, 0)
3.	ECI611	Logic Design and Switching Theory	3(3, 0)
4.	ECI612	Advanced Microprocessor Systems	3(3, 0)
5.	ECI613	Advanced Operating Systems	3(3, 0)
6.	ECI614	Advanced Computer Architecture	3(3, 0)
7.	ECI620	ASIC and FPGA Design	3(3, 0)
8.	ECI621	DSP Hardware Systems Design	3(3, 0)
9.	ECI622	DSP Software Systems Design	3(3, 0)
10.	ECI623	VLSI System Design	3(3, 0)
11.	ECI624	Microprocessor/Microcontroller Based Systems	3(3, 0)
12.	ECI637	Data Structures for Computer Graphics	3(3, 0)
13.	ECI640	Advanced Digital Signal Processing	3(3, 0)
14.	ECI641	Digital Image Processing	3(3, 0)
15.	ECI642	Digital Filters	3(3, 0)

16.	ECI650	Image, Video, and Multimedia	3(3, 0)
17.	ECI653	Fundamentals of Computer Graphics	3(3, 0)
18.	ECI670	Neural and Fuzzy Systems	3(3, 0)
19.	ECI671	Artificial Intelligence	3(3, 0)
20.	ECI672	Natural Language Processing	3(3, 0)
21.	ECI673	Automata Theory	3(3, 0)
22.	ECI674	Pattern Recognition	3(3, 0)
23.	ECI710	Computer-Aided Design of Digital Systems I	3(3, 0)
24.	ECI711	Performance of Computer Systems	3(3, 0)
25.	ECI712	Multithreaded Architectures	3(3, 0)
26.	ECI713	Parallel Processing	3(3, 0)
27.	ECI714	Diagnosis and Design of Reliable Digital Systems	3(3, 0)
28.	ECI715	Real Time Computer Systems	3(3, 0)
29.	ECI716	Probabilistic Methods in Computer Systems Modeling	3(3, 0)
30.	ECI717	Compiler Design	3(3, 0)
31.	ECI718	Analysis of Algorithms	3(3, 0)
32.	ECI720	Hardware/Software Co-Design Techniques	3(3, 0)
33.	ECI721	Embedded Software and RTOS	3(3, 0)
34.	ECI731	Data Warehousing	3(3, 0)
35.	ECI732	Data Mining	3(3, 0)
36.	ECI734	Software Project Management	3(3, 0)
37.	ECI737	Object Oriented Software Engineering	3(3, 0)
38.	ECI738	Geometric Modeling	3(3, 0)
39.	ECI739	Computer Animation	3(3, 0)

40.	ECI743	Computer Vision	3(3, 0)
41.	ECI744	Advanced Pattern Recognition	3(3, 0)
42.	ECI745	3-D and Virtual Imaging	3(3, 0)
43.	ECI747	Advanced Filter Design	3(3, 0)
44.	ECI748	Machine Learning	3(3, 0)
45.	ECI753	Advanced Computer Graphics	3(3, 0)
46.	EEP610	Fundamentals of Semiconductor Devices	3(3, 0)
47.	EEP611	Circuit Modeling of Solid-State Devices	3(3, 0)
48.	EEP612	Active Semiconductor Devices	3(3, 0)
49.	EEP613	Solid State Electronic Devices	3(3, 0)
50.	EEP620	Integrated Circuit Analysis and Design	3(3, 0)
51.	EEP630	Theory of Optical Fibers	3(3, 0)
52.	EEP631	Optical Fiber Devices and Components	3(3, 0)
53.	EEP632	Semiconductor Optoelectronic Devices	3(3, 0)
54.	EEP641	Optical Communications	3(3, 0)
55.	EEP642	Optical Signal Processing	3(3, 0)
56.	EEP650	Introduction to MEMS	3(3, 0)
57.	EEP651	Nanosystems	3(3, 0)
58.	EEP652	Introduction to Nanoscience and Technology	3(3, 0)
59.	EEP710	MOS VLSI Circuit Design	3(3, 0)
60.	EEP711	Quantum Physical Electronics	3(3, 0)
61.	EEP712	Electronic Materials	3(3, 0)
62.	EEP713	Semiconductor Processing Technology	3(3, 0)
63.	EEP714	Advanced Semiconductor Materials	3(3, 0)

Sr. #	Course Code	Course Title	Credit Hours
64.	EEP715	Semiconductor Power Devices	3(3, 0)
65.	EEP730	Principles of Fiber and Integrated Optics	3(3, 0)
66.	EEP731	Integrated Optical Circuits and Devices	3(3, 0)
67.	EEP732	Optical Sensors	3(3, 0)
68.	EEP740	Optical Fiber Components and Transmission Systems	3(3, 0)
69.	EEP742	High Speed Photonic Components	3(3, 0)
70.	BME610	Anatomy and Physiology	3(3, 0)
71.	BME620	Nuclear Physics, Radiation and Safety	3(3, 0)
72.	BME630	Physiological Monitoring and Data Analysis	3(3, 0)
73.	BME640	Introductory Medical Imaging	3(3, 0)

Communications and Networks

Sr. #	Course Code	Course Title	Credit Hours
74.	ETN610	Electromagnetic Field Theory	3(3, 0)
75.	ETN611	Microwave Passive Devices and Circuits	3(3, 0)
76.	ETN612	Microwave Active Devices and Circuits	3(3, 0)
77.	ETN613	Introduction to RF Front-End Design	3(3, 0)
78.	ETN614	RF System Engineering and Design	3(3, 0)
79.	ETN620	Antennas Theory, Design and Applications	3(3, 0)
80.	ETN621	Radio Wave Propagation	3(3, 0)
81.	ETN622	RF Propagation and Planning for Wireless Communications	3(3, 0)
82.	ETN630	Radar Systems	3(3, 0)
83.	ETN631	Satellite Communications	3(3, 0)
84.	ETN640	Communication Systems Engineering	3(3, 0)
85.	ETN641	Digital Communications	3(3, 0)

86.	ETN642	Information Theory and Coding	3(3, 0)
87.	ETN643	Communication Signal Processing	3(3, 0)
88.	ETN644	Wireless Communication Techniques	3(3, 0)
89.	ETN650	Communication Electronics Design	3(3, 0)
90.	ETN651	Embedded System Design for Telecommunications	3(3, 0)
91.	ETN661	Telecommunication Switching Systems	3(3, 0)
92.	ETN662	Performance Analysis of Communication Systems	3(3, 0)
93.	ETN663	Telecommunication Network Management	3(3, 0)
94.	ETN664	Optical Fiber Networks	3(3, 0)
95.	ETN665	Communication System Design	3(3, 0)
96.	ETN670	Communication Networks-Architectures and Protocols	3(3, 0)
97.	ETN671	Advanced Computer Networks	3(3, 0)
98.	ETN672	Queuing Theory for Performance Modeling	3(3, 0)
99.	ETN673	Graph Theory and Network Optimization	3(3, 0)
100.	ETN675	Internet Architectures and Protocols	3(3, 0)
101.	ETN676	Internetworking: Architectures, Protocols and Applications	3(3, 0)
102.	ETN677	Internet Applications and Services	3(3, 0)
103.	ETN678	Design of Computer Communication Networks	3(3, 0)
104.	ETN680	Wireless Networks	3(3, 0)
105.	ETN681	Mobile Cellular Systems and Standards	3(3, 0)
106.	ETN682	Mobile and Broadband Networks	3(3, 0)
107.	ETN685	Mobile Communication Systems	3(3, 0)
108.	ETN686	Wireless Sensor Networks	3(3, 0)
109.	ETN689	Internet of Things (IoT)	3(3, 0)

110.	ETN711	Numerical and Computational Techniques in Electromagnetics	3(3, 0)
111.	ETN712	Microwave Integrated Circuits	3(3, 0)
112.	ETN713	RF and Microwave Measurement Techniques	3(3, 0)
113.	ETN720	Smart Antennas for Mobile Communications	3(3, 0)
114.	ETN730	Radar Signal Processing	3(3, 0)
115.	ETN740	Advanced Communication Systems Engineering	3(3, 0)
116.	ETN741	Advanced Digital Communications	3(3, 0)
117.	ETN742	Advanced Information Theory and Coding	3(3, 0)
118.	ETN743	Adaptive Techniques for Wireless Communications	3(3, 0)
119.	ETN744	Advanced Wireless Communications	3(3, 0)
120.	ETN745	Advanced Channel Coding Techniques	3(3, 0)
121.	ETN746	Channel Estimation and Characterization	3(3, 0)
122.	ETN747	Communication Channel Modeling	3(3, 0)
123.	ETN748	Wireless Channel Modeling	3(3, 0)
124.	ETN750	Advanced Integrated Circuits for Communication	3(3, 0)
125.	ETN761	Broadband Network Architectures	3(3, 0)
126.	ETN764	Modeling and Analysis of Telecommunication Networks	3(3, 0)
127.	ETN765	Transport and Switching Technologies	3(3, 0)
128.	ETN766	Short-Range Communication Systems	3(3, 0)
129.	ETN767	Mobile Computing	3(3, 0)
130.	ETN770	IP Routing Protocols and Internetwork Design	3(3, 0)
131.	ETN771	Advanced Network Programming	3(3, 0)
132.	ETN772	Networks and Computer Security	3(3, 0)
133.	ETN773	Performance Evaluation of Computer Networks	3(3, 0)

Sr. #	Course Code	Course Title	Credit Hours
134.	ETN774	Cryptography and Secure Communication	3(3, 0)
135.	ETN778	Network Programming Techniques	3(3, 0)
136.	ETN780	RF Network Planning and Design	3(3, 0)
137.	ETN784	Mobile Networking	3(3, 0)
138.	ETN789	Advanced Internet of Things (IoT)	3(3, 0)

Electric Power and Smart Grid Systems

Sr. #	Course Code	Course Title	Credit Hours
139.	EPE625	Advanced Power System Analysis	3(3, 0)
140.	EPE633	Introduction to Smart Grid Systems	3(3, 0)
141.	EPE618	Microgrid Modeling and Control	3(3, 0)
142.	EPE624	Smart Grid System Operation	3(3, 0)
143.	EPE638	Smart Grid: Economics, Policy & Engineering Aspects	3(3, 0)
144.	EPE645	Design and Analysis of Smart Grids	3(3, 0)
145.	EPE655	Energy Storage System for Smart Grids	3(3, 0)
146.	EPE730	Advanced Topics in Smart Grids	3(3, 0)
147.	EPE637	Advanced Power Electronic Converters for Smart Grids	3(3, 0)
148.	EPE662	Renewable Energy Integration in Smart Grids	3(3, 0)
149.	EPE628	HVDC systems applications in Smart Grids	3(3, 0)
150.	EPE670	Big Data Systems and Analytics for Smart Grids	3(3, 0)
151.	EPE647	Operation and Planning of Distribution Networks	3(3, 0)
152.	EPE627	Smart Grid Infrastructure and Planning	3(3, 0)
153.	EPE646	Machine Learning and Deep Learning Applications in Smart Grids	3(3, 0)
154.	EPE635	Smart Grid Energy Technologies	3(3, 0)
155.	EPE 672	Data acquisition and Analytics in Electric Utilities	3(3, 0)

156.	EPE634	Information and Communication Technologies for Smart Grids	3(3, 0)
157.	EPE795	Energy Management in Buildings	3(3, 0)
158.	EPE611	Power Transmission and Distribution	3(3, 0)
159.	EPE612	DC and Flexible AC Transmission	3(3, 0)
160.	EPE620	Advanced Power System Planning	3(3, 0)
161.	EPE621	Advanced Power System Protection	3(3, 0)
162.	EPE623	High Voltage Engineering Design	3(3, 0)
163.	EPE626	Advanced Power System Operation and Control	3(3, 0)
164.	EPE630	Advanced Power Electronics	3(3, 0)
165.	EPE631	Power Electronics Design	3(3, 0)
166.	EPE632	Electronics For Energy Control	3(3, 0)
167.	EPE640	Design of Electrical Machines	3(3, 0)
168.	EPE641	Square Wave AC Machine Design	3(3, 0)
169.	EPE663	Renewable Energy Technologies	3(3, 0)
170.	EPE664	Photovoltaic System Design	3(3, 0)
171.	EPE665	Solar Power Generation	3(3, 0)
172.	EPE666	Wind Power Generation	3(3, 0)
173.	EPE711	Flexible AC transmission	3(3, 0)
174.	EPE712	Integration of Distributed Generation	3(3, 0)
175.	EPE720	Power System Dynamics	3(3, 0)
176.	EPE721	High Voltage Engineering Design	3(3, 0)
177.	EPE722	Power System Reliability	3(3, 0)
178.	EPE723	Power System Stability and Control	3(3, 0)
179.	EPE724	Power System Transients	3(3, 0)

Sr. #	Course Code	Course Title	Credit Hours
180.	EPE725	Electric Power Quality	3(3, 0)
181.	EPE726	Computer Methods in Power System Analysis	3(3, 0)
182.	EPE727	Advance Digital Relaying	3(3, 0)
183.	EPE728	Power and Energy Management	3(3, 0)
184.	EPE729	Dynamics and Control of Integrated Power System	3(3, 0)
185.	EPE740	AC/DC Drives	3(3, 0)
186.	EPE741	Dynamic Modeling of Electric Machines and Controls	3(3, 0)
187.	EPE754	Hybrid Power Systems	3(3, 0)
188.	EPE762	Energy and Storage System	3(3, 0)

Control and Automation

Sr. #	Course Code	Course Title	Credit Hours
189.	ECI660	Linear Control Systems	3(3, 0)
190.	ECI661	Digital Control Systems	3(3, 0)
191.	ECI662	Optimization Control Theory	3(3, 0)
192.	ECI663	Robotics	3(3, 0)
193.	ECI664	Industrial Automation and Control	3(3, 0)
194.	ECI665	Linear Systems Theory	3(3, 0)
195.	ECI740	Estimation of Signals and Systems	3(3, 0)
196.	ECI746	Detection and Estimation Theory	3(3, 0)
197.	ECI760	Non-Linear Systems & Control	3(3, 0)
198.	ECI761	Intelligent Control Systems	3(3, 0)
199.	ECI762	Advanced Linear Systems	3(3, 0)
200.	ECI763	Multivariable Control	3(3, 0)
201.	ECI764	Adaptive Control	3(3, 0)

Sr. #	Course Code	Course Title	Credit Hours
202.	ECI765	Robust Control	3(3, 0)
203.	ECI770	Intelligent Systems	3(3, 0)

Underwater Acoustic Communications

Sr. #	Course Code	Course Title	Credit Hours
204.	UAC610	Elements of Acoustics and Vibration	3(3, 0)
205.	UAC611	Underwater Acoustics: Principles and Applications	3(3, 0)
206.	UAC612	Marine Acoustics	3(3, 0)
207.	UAC613	Underwater Target Localization and Tracking	3(3, 0)
208.	UAC614	Acoustic Transducers	3(3, 0)
209.	UAC710	Underwater Acoustic Signal Processing	3(3, 0)
210.	UAC711	Underwater Acoustic Signal and Noise Modeling	3(3, 0)
211.	UAC712	Modern Sonar Technology	3(3, 0)
212.	UAC713	Acoustical Measurements	3(3, 0)

General

Sr. #	Course Code	Course Title	Credit Hours
213.	EEE612	Discrete Mathematics	3(3, 0)
214.	EEE613	Graph Theory	3(3, 0)
215.	EEE615	Probabilistic Learning: Theory and Algorithms	3(3, 0)
216.	EEE616	Optimization Theory	3(3, 0)
217.	EEE630	Professional Development	3(3, 0)
218.	EEE631	Professional and Technical Communication	3(3, 0)
219.	EEE632	Research Methods	3(3, 0)
220.	EEE640	Innovation and Technology Development	3(3, 0)
221.	EEE641	Sociological Impact of Technology	3(3, 0)

222.	EEE642	Science, Politics and Ethics	3(3, 0)
223.	EEE650	Project Management	3(3, 0)
224.	EEE651	Engineering Project Management	3(3, 0)
225.	EEE690	Industrial Project-I	3(0, 3)
226.	EEE691	Independent Studies-I	3(0, 3)
227.	EEE692	Directed Study-I	3(0, 3)
228.	EEE710	Advanced Engineering Mathematics	3(3, 0)
229.	EEE711	Advanced Stochastic Processes	3(3, 0)
230.	EEE712	Optimization Techniques	3(3, 0)
231.	EEE714	Advanced Numerical Analysis	3(3, 0)
232.	EEE715	Numerical Linear Algebra	3(3, 0)
233.	EEE720	Modern Data Analysis Methods	3(3, 0)
234.	EEE721	Formal Specification and Modeling	3(3, 0)
235.	EEE722	Computational Biology	3(3, 0)
236.	EEE723	Biologically Inspired Computing	3(3, 0)
237.	EEE730	Advanced Professional Development	3(3, 0)
238.	EEE740	Advanced Electrochemistry	3(3, 0)
239.	EEE741	Advanced Thermal Chemistry	3(3, 0)
240.	EEE750	Power Sector Deregulation	3(3, 0)
241.	EEE751	Project Feasibility Study	3(3, 0)
242.	EEE790	Industrial Project-II	3(0, 3)
243.	EEE791	Independent Studies-II	3(0, 3)
244.	EEE792	Directed Study-II	3(0, 3)
245.	ETN785	Wireless Medium Access Techniques	3(3, 0)

246.	ETN786	Wireless Wide Area Networks (WWANs)	3(3, 0)
247.	ETN787	Wireless Metropolitan Area Networks (WMANs)	3(3, 0)
248.	ETN788	Wireless Personal and Body Area Networks (WPANs/WBANs)	3(3, 0)
249.	ETN775	IP Telephony	3(3, 0)
250.	ETN776	Design and Analysis of Computer Communication Networks	3(3, 0)
251.	ETN777	Multimedia Networking	3(3, 0)
252.	ETN781	Emerging Wireless Networks	3(3, 0)
253.	ETN782	QoS Architectures for Multimedia Wireless Networks	3(3, 0)
254.	ETN783	Mobile Devices Applications Development	3(3, 0)
255.	ETN679	Interconnection Networks	3(3, 0)
256.	ETN660	Digital Telephony	3(3, 0)
257.	ETN683	Wireless LANs	3(3, 0)
258.	ETN684	Mobile Applications and Services	3(3, 0)
259.	ETN710	Electromagnetic Interference and Compatibility	3(3, 0)
260.	ETN711	Numerical and Computational Techniques in Electromagnetics	3(3, 0)
261.	ETN731	Modern Radar Systems	3(3, 0)
262.	ETN760	Teletraffic Engineering	3(3, 0)
263.	ETN762	Broadband Access Networks	3(3, 0)
264.	ETN763	Telecommunication Software Design	3(3, 0)
265.	ETN779	High-Speed Switched Local Area Networks (LANs)	3(3, 0)
266.	ETN677	Internet Applications and Services	3(3, 0)
267.	ETN744	Advanced Wireless Communications	3(3, 0)
268.	ETN674	Network Management and Operational Network Security	3(3, 0)
269.	ETN622	RF Propagation and Planning for Wireless Communications	3(3, 0)

270.	ETN615	RF Filter Design	3(3, 0)
271.	ETN616	Radio Engineering	3(3, 0)
272.	ETN632	GPS and Navigation Systems	3(3, 0)
273.	ECI630	Mobile Devices Programming	3(3, 0)
274.	ECI631	Web Technologies	3(3, 0)
275.	ECI632	Advanced Programming Techniques	3(3, 0)
276.	ECI633	Software Development Methodologies	3(3, 0)
277.	ECI634	Distributed Databases	3(3, 0)
278.	ECI635	Object Oriented Databases	3(3, 0)
279.	ECI636	Web Based Databases	3(3, 0)
280.	ECI651	Multimedia Indexing and Retrieval	3(3, 0)
281.	ECI652	Multimedia Technologies	3(3, 0)
282.	ECI730	Protocol Software Design and Development	3(3, 0)
283.	ECI733	Requirements Engineering	3(3, 0)
284.	ECI735	Software Quality Assurance	3(3, 0)
285.	ECI736	Software Engineering Technologies	3(3, 0)
286.	ECI750	Multimedia Data Compression	3(3, 0)
287.	EEP634	Laser and Modern Optics	3(3, 0)
288.	EEP640	Lasers and Optical Communication	3(3, 0)
289.	EEP741	Optical Fiber Communication Systems	3(3, 0)
290.	BME650	Bio-Medical Instrumentation	3(3, 0)
291.	BME731	Advanced Medical Imaging	3(3, 0)
292.	BME740	Bio-Materials	3(3, 0)
293.	BME750	Health Economics	3(3, 0)

294.	BME760	Bio-Mechanics in Medicine	3(3, 0)
295.	BME721	Radiotherapy and Radiobiology	3(3, 0)
296.	BME722	Nuclear Medicine	3(3, 0)
297.	BME770	Computational Neuroscience	3(3, 0)
298.	BME780	Special Topics in Bio-Medical Engineering	3(3, 0)

MS with Thesis Option

Sr. #	Course Code	Course Title	Credit Hours
1	EEE800	MS Thesis	6(0, 6)

MS with Non-Thesis Option

Sr. #	Course Code	Course Title	Credit Hours
1	EEE600	MS Project/Report*	3(0, 3)

* For students choosing the MS with Non-Thesis option, the MS Project Report is a Non-Credit mandatory requirement for degree completion.

Tentative Semester Plan:

Semester	Course Title	Credit Hours
1st Semester	Engineering Mathematics	3(3, 0)
	Modeling and Simulation	3(3, 0)
	Elective-I	3(3, 0)
2nd Semester	Elective-II	3(3, 0)
	Elective-III	3(3, 0)
	Elective-IV	3(3, 0)
3rd Semester	Elective-V	3(3, 0)
	Elective-VI	3(3, 0)
	MS Thesis	6(0, 6)
4th Semester	MS Thesis (Continued)	6(0, 6)

Outline of Revised Course in MS Electrical Engineering

Course Title: **Modeling and Simulation**
Course Code: **EEE621**
Credit Hours: **3(3, 0)**

Course Objectives:
To understand the fundamental concepts in modelling and simulation of engineering problems.

Course Description:
The modeling component of the course will focus on the principles and techniques of developing mathematical and computational representations of electrical and computer engineering systems. It will cover various types of models, including deterministic, stochastic, and dynamic models for real world problems. Case studies will illustrate practical applications, enabling students to translate real-world engineering problems into solvable mathematical models.

The simulation part of the course will explore methods for analyzing and interpreting the behavior of engineering models over time. It will introduce discrete-event simulation, continuous simulation, and hybrid simulation techniques. Students will learn to develop and implement simulations using state of the art programming and modeling software tools.

Recommended Books:

1. Meerschaert, Mark. Mathematical modeling. Academic press, 2013.

2. Giordano, Frank R., Maurice D. Weir, and William P. Fox. A first course in mathematical modeling. Pacific Grove, CA: Brooks/Cole Thomson Learning, 2003.

3. Sarker, Ruhul Amin, and Charles S. Newton. Optimization modelling: a practical approach. CRC press, 2007.