

COMSATS University Islamabad
Registrar Secretariat, Academic Unit (PS)

No: CUI-Reg/Notif-2386/24/2473

October 10, 2024

NOTIFICATION

The Academic Council in its 39th meeting held on August 01, 2024 based on the recommendations of the Board of Advanced Studies and Research in its 35th meeting held on June 25, 2024, approved the revised Studies of Doctor of Philosophy in Computer Engineering, effective from Fall 2024.

Nomenclature of the Program: Doctor of Philosophy in Computer Engineering

1. Duration:

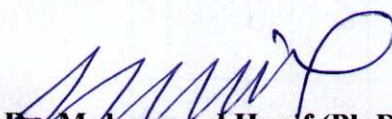
- | | |
|--------------------------------|----------------------------------|
| 1.1 Minimum Duration: 03 Years | 1.2 Minimum No. of Semesters: 06 |
| 1.3 Maximum Duration: 08 Years | 1.4 Maximum No. of Semesters: 16 |

2. No. of Courses and Credit Hours:

S. No.	Category	SAME DISCIPLINE		INTRADISCIPLINARY	
		No. of Courses*	No. of Credit Hours	No. of Courses*	No. of Credit Hours
1.	Deficiency Courses of level 7	-	-	02-03	06-09
2.	Courses	06	18	06	18
3.	Research Thesis	01	09	01	09
4.	Total	07	27	09-10	33-36
5.	Prerequisite	The zero semester of PhD candidate shall not count towards the time limit of comprehensive exams etc. or the maximum study duration.			

* Courses completed during the MS program shall not count towards the PhD program's requirements, preventing any duplication or repetition of coursework.

This supersedes notification No: CUI-Reg/Notif-2145/24/2220 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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CC:

8. SO, to the Rector
9. PS to the Registrar

List of Elective Courses:

Sr. #	Course Code	Course Title	Credit Hours
1.	ETN641	Digital Communications	3(3, 0)
2.	ETN676	Internetworking: Architectures, Protocols and Applications	3(3, 0)
3.	ETN610	Electromagnetic Field Theory	3(3, 0)
4.	ETN611	Microwave Passive Devices and Circuits	3(3, 0)
5.	ETN612	Microwave Active Devices and Circuits	3(3, 0)
6.	ETN613	Introduction to RF Front-End Design	3(3, 0)
7.	ETN614	RF System Engineering and Design	3(3, 0)
8.	ETN616	Radio Engineering	3(3, 0)
9.	ETN620	Antennas Theory, Design and Applications	3(3, 0)
10.	ETN621	Radio Wave Propagation	3(3, 0)
11.	ETN630	Radar Systems	3(3, 0)
12.	ETN631	Satellite Communications	3(3, 0)
13.	ETN640	Communications System Engineering	3(3, 0)
14.	ETN642	Information Theory and Coding	3(3, 0)
15.	ETN643	Communication Signal Processing	3(3, 0)
16.	ETN644	Wireless Communication Techniques	3(3, 0)
17.	ETN650	Communication Electronics Design	3(3, 0)
18.	ETN651	Embedded System Design for Telecommunications	3(3, 0)
19.	ETN661	Telecommunication Switching Systems	3(3, 0)
20.	ETN662	Performance Analysis of Communication Systems	3(3, 0)
21.	ETN663	Telecommunication Network Management	3(3, 0)
22.	ETN664	Optical Fiber Networks	3(3, 0)

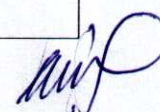
23.	ETN665	Communication System Design	3(3, 0)
24.	ETN670	Communication Networks-Architectures and Protocols	3(3, 0)
25.	ETN672	Queuing Theory for Performance Modeling	3(3, 0)
26.	ETN673	Graph Theory and Network Optimization	3(3, 0)
27.	ETN675	Internet Architectures and Protocols	3(3, 0)
28.	ETN678	Design of Computer Communication Networks	3(3, 0)
29.	ETN680	Wireless Networks	3(3, 0)
30.	ETN681	Mobile Cellular Systems and Standards	3(3, 0)
31.	ETN682	Mobile and Broadband Networks	3(3, 0)
32.	ETN685	Mobile Communication Systems	3(3, 0)
33.	ETN686	Wireless Sensor Networks	3(3, 0)
34.	ETN712	Microwave Integrated Circuits	3(3, 0)
35.	ETN713	RF and Microwave Measurement Techniques	3(3, 0)
36.	ETN720	Smart Antennas for Mobile Communications	3(3, 0)
37.	ETN730	Radar Signal Processing	3(3, 0)
38.	ETN740	Advanced Communication Systems Engineering	3(3, 0)
39.	ETN741	Advanced Digital Communications	3(3, 0)
40.	ETN742	Advanced Information Theory and Coding	3(3, 0)
41.	ETN743	Adaptive Techniques for Wireless Communications	3(3, 0)
42.	ETN745	Advanced Channel Coding Techniques	3(3, 0)
43.	ETN746	Channel Estimation and Characterization	3(3, 0)
44.	ETN747	Communication Channel Modeling	3(3, 0)
45.	ETN748	Wireless Channel Modeling	3(3, 0)
46.	ETN750	Advanced Integrated Circuits for Communication	3(3, 0)



47.	ETN761	Broadband Network Architectures	3(3, 0)
48.	ETN764	Modeling and Analysis of Telecommunication Networks	3(3, 0)
49.	ETN765	Transport and Switching Technologies	3(3, 0)
50.	ETN766	Short-Range Communication Systems	3(3, 0)
51.	ETN767	Mobile Computing	3(3, 0)
52.	ETN770	IP Routing Protocols and Internetwork Design	3(3, 0)
53.	ETN771	Advanced Network Programming	3(3, 0)
54.	ETN772	Networks and Computer Security	3(3, 0)
55.	ETN773	Performance Evaluation of Computer Networks	3(3, 0)
56.	ETN774	Cryptography and Secure Communication	3(3, 0)
57.	ETN778	Network Programming Techniques	3(3, 0)
58.	ETN780	RF Network Planning and Design	3(3, 0)
59.	ETN784	Mobile Networking	3(3, 0)
60.	ETN789	Advanced Internet of Things (IoT)	3(3, 0)
61.	ETN810	Advanced Topics in RF System Design	3(3, 0)
62.	ETN811	Advanced Topics in RF/Microwave Engineering	3(3, 0)
63.	ETN820	Advanced Topics in Antenna Design	3(3, 0)
64.	ETN821	Advanced Topics in Radio Wave Propagation	3(3, 0)
65.	ETN822	Advanced Topics in RF Planning and Optimization	3(3, 0)
66.	ETN841	Advanced Topics in Communications Theory	3(3, 0)
67.	ETN842	Advanced Topics in Communication Signal Processing	3(3, 0)
68.	ETN846	Advanced Topics in Information Security	3(3, 0)
69.	ETN870	Network Forensics	3(3, 0)
70.	ETN873	Advanced Topics in Network Security	3(3, 0)



71.	ETN874	Advanced Network Security	3(3, 0)
72.	ETN881	Advanced Topics in Wireless Networks	3(3, 0)
73.	ETN885	Advanced Mobile Networking	3(3, 0)
74.	ECI660	Linear Control Systems	3(3, 0)
75.	ECI663	Robotics	3(3, 0)
76.	ECI640	Advanced Digital Signal Processing	3(3, 0)
77.	ECI641	Digital Image Processing	3(3, 0)
78.	ECI642	Digital Filters	3(3, 0)
79.	ECI650	Image, Video, and Multimedia	3(3, 0)
80.	ECI653	Fundamentals of Computer Graphics	3(3, 0)
81.	ECI661	Digital Control Systems	3(3, 0)
82.	ECI664	Industrial Automation and Control	3(3, 0)
83.	ECI665	Linear Systems Theory	3(3, 0)
84.	ECI770	Intelligent Systems	3(3, 0)
85.	EEE723	Biologically Inspired Computing	3(3, 0)
86.	ECI671	Artificial Intelligence	3(3, 0)
87.	ECI748	Machine Learning	3(3, 0)
88.	EEE611	Stochastic Processes	3(3, 0)
89.	ECI624	Microcontroller/Microprocessor based Systems	3(3, 0)
90.	ECI674	Pattern Recognition	3(3, 0)
91.	ECI721	Embedded Software and RTOS	3(3, 0)
92.	ECI723	Embedded Computing Systems	3(3, 0)
93.	ECI726	Design of Real-Time Embedded Systems	3(3, 0)
94.	ECI740	Estimation of Signals and Systems	3(3, 0)



95.	ECI741	Audio Signal Processing	3(3, 0)
96.	ECI742	Adaptive Signal Processing	3(3, 0)
97.	ECI743	Computer Vision	3(3, 0)
98.	ECI744	Advanced Pattern Recognition	3(3, 0)
99.	ECI746	Detection and Estimation Theory	3(3, 0)
100.	ECI747	Advanced Filter Design	3(3, 0)
101.	ECI760	Non-Linear Systems and Control	3(3, 0)
102.	ECI762	Advanced Linear Systems	3(3, 0)
103.	ECI820	Advanced Topics in Embedded System Design	3(3, 0)
104.	ECI822	Advanced Topics in Real-Time Embedded System Design	3(3, 0)
105.	ECI814	Advanced Microprocessor/Microcontroller Systems	3(3, 0)
106.	ECI833	Security Applications: Watermarking and Biometrics	3(3, 0)
107.	ECI835	Digital Watermarking	3(3, 0)
108.	ECI840	Special Topics in Signal Processing	3(3, 0)
109.	ECI841	Advanced Topics in Image Processing	3(3, 0)
110.	ECI842	Advanced Topics in Computer Vision	3(3, 0)
111.	ECI847	Advanced Topics in Filter Design	3(3, 0)
112.	ECI850	Advanced Topics in Multimedia Technologies	3(3, 0)
113.	ECI860	Advanced Topics in Control Systems	3(3, 0)
114.	ECI871	Advanced Topics in Pattern Recognition	3(3, 0)
115.	ETN651	Embedded System Design for Telecommunications	3(3, 0)
116.	ECI610	Advanced Digital Design	3(3, 0)
117.	ECI611	Logic Design and Switching Theory	3(3, 0)
118.	ECI612	Advanced Microprocessor Systems	3(3, 0)

119.	ECI613	Advanced Operating Systems	3(3, 0)
120.	ECI614	Advanced Computer Architecture	3(3, 0)
121.	ECI615	Operating Systems Fundamentals	3(3, 0)
122.	ECI620	ASIC and FPGA Design	3(3, 0)
123.	ECI621	DSP Hardware Systems Design	3(3, 0)
124.	ECI622	DSP Software Systems Design	3(3, 0)
125.	ECI623	VLSI System Design	3(3, 0)
126.	ECI624	Microprocessor/Microcontroller Based Systems	3(3, 0)
127.	ECI630	Mobile Devices Programming	3(3, 0)
128.	ETN676	Internetworking: Architectures, Protocols and Applications	3(3, 0)
129.	ETN673	Graph Theory and Network Optimization	3(3, 0)
130.	ETN644	Wireless Communication Techniques	3(3, 0)
131.	ETN767	Mobile Computing	3(3, 0)
132.	ETN874	Advanced Network Security	3(3, 0)
133.	ETN671	Advanced Computer Networks	3(3, 0)
134.	ETN742	Advanced Information Theory and Coding	3(3, 0)
135.	ETN643	Communication Signal Processing	3(3, 0)
136.	ECI631	Web Technologies	3(3, 0)
137.	ECI632	Advanced Programming Techniques	3(3, 0)
138.	ECI633	Software Development Methodologies	3(3, 0)
139.	ECI634	Distributed Databases	3(3, 0)
140.	ECI635	Object Oriented Databases	3(3, 0)
141.	ECI636	Web Based Databases	3(3, 0)
142.	ECI637	Data Structures for Computer Graphics	3(3, 0)

143.	ECI710	Computer-Aided Design of Digital Systems I	3(3, 0)
144.	ECI712	Multithreaded Architectures	3(3, 0)
145.	ECI713	Parallel Processing	3(3, 0)
146.	ECI714	Diagnosis and Design of Reliable Digital Systems	3(3, 0)
147.	ECI715	Real Time Computer Systems	3(3, 0)
148.	ECI716	Probabilistic Methods in Computer Systems Modeling	3(3, 0)
149.	ECI717	Compiler Design	3(3, 0)
150.	ECI718	Analysis of Algorithms	3(3, 0)
151.	ECI720	Hardware/Software Co-Design Techniques	3(3, 0)
152.	ECI721	Embedded Software and RTOS	3(3, 0)
153.	ECI722	Mixed-Signal VLSI Systems Design	3(3, 0)
154.	ECI723	Embedded Computing Systems	3(3, 0)
155.	ECI724	VLSI Architectures and Algorithms	3(3, 0)
156.	ECI725	Design of Systems on a Chip (SoC)	3(3, 0)
157.	ECI726	Design of Real-Time Embedded Systems	3(3, 0)
158.	ECI753	Advanced Computer Graphics	3(3, 0)
159.	ECI810	Computer-Aided Design of Digital Systems II	3(3, 0)
160.	ECI811	Special Topics in Computer Systems Architectures	3(3, 0)
161.	ECI812	Advanced Topics in Digital Design	3(3, 0)
162.	ECI813	Advanced Topics in Operating Systems	3(3, 0)
163.	ECI815	Special Topics in Digital Design	3(3, 0)
164.	ECI820	Advanced Topics in Embedded System Design	3(3, 0)
165.	ECI821	Advanced Topics in VLSI Design	3(3, 0)
166.	ECI822	Advanced Topics in Real-Time Embedded System Design	3(3, 0)

167.	ECI834	Data Authentication Techniques	3(3, 0)
168.	ECI670	Neural and Fuzzy Systems	3(3, 0)
169.	ECI731	Data Warehousing	3(3, 0)
170.	ECI672	Natural Language Processing	3(3, 0)
171.	ECI732	Data Mining	3(3, 0)
172.	EEE720	Modern Data Analysis Methods	3(3, 0)
173.	ECI870	Advanced Topics in AI and Neural Computing	3(3, 0)
174.	ECI872	Advanced Topics in Knowledge Based Systems	3(3, 0)
175.	ECI873	Advanced Topics in Decision Support Systems	3(3, 0)
176.	ECI874	Advanced Topics in Machine Learning	3(3, 0)
177.	BME650	Bio-Medical Instrumentation	3(3, 0)
178.	BME630	Physiological Monitoring and Data Analysis	3(3, 0)
179.	BME731	Advanced Medical Imaging	3(3, 0)
180.	BME780	Special Topics in Bio-Medical Engineering	3(3, 0)
181.	BME840	Special Topics in Medical Imaging	3(3, 0)
182.	BME841	Special Topics in Bio-Medical Data Processing	3(3, 0)
183.	EEE610	Engineering Mathematics	3(3, 0)
184.	EEE613	Graph Theory	3(3, 0)
185.	EEE615	Probabilistic Learning: Theory and Algorithms	3(3, 0)
186.	EEE616	Optimization Theory	3(3, 0)
187.	EEE621	Modeling and Simulation	3(3, 0)
188.	EEE630	Professional Development	3(3, 0)
189.	EEE631	Professional and Technical Communication	3(3, 0)
190.	EEE632	Research Methods	3(3, 0)



191.	EEE640	Innovation and Technology Development	3(3, 0)
192.	EEE641	Sociological Impact of Technology	3(3, 0)
193.	EEE642	Science, Politics and Ethics	3(3, 0)
194.	EEE650	Project Management	3(3, 0)
195.	EEE651	Engineering Project Management	3(3, 0)
196.	EEE690	Industrial Project-I	3(0, 3)
197.	EEE691	Independent Studies-I	3(0, 3)
198.	EEE692	Directed Study-I	3(0, 3)
199.	EEE710	Advanced Engineering Mathematics	3(3, 0)
200.	EEE711	Advanced Stochastic Processes	3(3, 0)
201.	EEE712	Optimization Techniques	3(3, 0)
202.	EEE714	Advanced Numerical Analysis	3(3, 0)
203.	EEE715	Numerical Linear Algebra	3(3, 0)
204.	EEE720	Modern Data Analysis Methods	3(3, 0)
205.	EEE721	Formal Specification and Modeling	3(3, 0)
206.	EEE722	Computational Biology	3(3, 0)
207.	EEE723	Biologically Inspired Computing	3(3, 0)
208.	EEE730	Advanced Professional Development	3(3, 0)
209.	EEE740	Advanced Electrochemistry	3(3, 0)
210.	EEE741	Advanced Thermal Chemistry	3(3, 0)
211.	EEE751	Project Feasibility Study	3(3, 0)
212.	EEE790	Industrial Project-II	3(0, 3)
213.	EEE791	Independent Studies-II	3(0, 3)
214.	EEE792	Directed Study-II	3(0, 3)

215.	ECI662	Optimization Control Theory	3(3, 0)
216.	ECI763	Multivariable Control	3(3, 0)
217.	ECI764	Adaptive Control	3(3, 0)
218.	ECI765	Robust Control	3(3, 0)
219.	ETN785	Wireless Medium Access Techniques	3(3, 0)
220.	ETN786	Wireless Wide Area Networks (WWANs)	3(3, 0)
221.	ETN787	Wireless Metropolitan Area Networks (WMANs)	3(3, 0)
222.	ETN788	Wireless Personal and Body Area Networks (WPANs/WBANs)	3(3, 0)
223.	ETN775	IP Telephony	3(3, 0)
224.	ETN776	Design and Analysis of Computer Communication Networks	3(3, 0)
225.	ETN777	Multimedia Networking	3(3, 0)
226.	ETN781	Emerging Wireless Networks	3(3, 0)
227.	ETN782	QoS Architectures for Multimedia Wireless Networks	3(3, 0)
228.	ETN783	Mobile Devices Applications Development	3(3, 0)
229.	ETN889	Selected Topics in Internet of Things (IoT)	3(3, 0)
230.	ETN679	Interconnection Networks	3(3, 0)
231.	ETN660	Digital Telephony	3(3, 0)
232.	ETN683	Wireless LANs	3(3, 0)
233.	ETN684	Mobile Applications and Services	3(3, 0)
234.	ETN710	Electromagnetic Interference and Compatibility	3(3, 0)
235.	ETN711	Numerical and Computational Techniques in Electromagnetics	3(3, 0)
236.	ETN731	Modern Radar Systems	3(3, 0)
237.	ETN760	Teletraffic Engineering	3(3, 0)

238.	ETN762	Broadband Access Networks	3(3, 0)
239.	ETN763	Telecommunication Software Design	3(3, 0)
240.	ETN779	High-Speed Switched Local Area Networks (LANs)	3(3, 0)
241.	ETN871	Traffic Engineering and QoS in TCP/IP Networks	3(3, 0)
242.	ETN872	Special Topics in Computer Networks	3(3, 0)
243.	ETN883	Selected Topics in Wireless Networks Design and Planning	3(3, 0)
244.	ETN884	Advanced Mobile Applications	3(3, 0)
245.	ETN875	Advanced Internetworking (TCP/IP) Protocols	3(3, 0)
246.	ETN880	Advanced Multi-user Systems for Wireless Communications	3(3, 0)
247.	ETN850	Advanced Topics in Telecommunication Electronics	3(3, 0)
248.	ETN845	Advanced Error Control Coding	3(3, 0)
249.	ETN840	Special Topics in Communication Systems	3(3, 0)
250.	ETN844	Advanced Topics in Information Theory and Coding	3(3, 0)
251.	ETN843	Advanced Topics in Wireless Communications	3(3, 0)
252.	ETN677	Internet Applications and Services	3(3, 0)
253.	ETN882	Selected Topics in Wireless Network Security	3(3, 0)
254.	ETN744	Advanced Wireless Communications	3(3, 0)
255.	ETN674	Network Management and Operational Network Security	3(3, 0)
256.	ETN622	RF Propagation and Planning for Wireless Communications	3(3, 0)
257.	ETN615	RF Filter Design	3(3, 0)
258.	ETN632	GPS and Navigation Systems	3(3, 0)

PhD Thesis:

Sr. #	Course Code	Course Title	Credit Hours
1.	ECE900	PhD Dissertation	9(0, 9)