

COMSATS Institute of Information Technology
Registrar Office, Principal Seat, Islamabad

No: CIIT-Reg/Notif-726/12/1081

July 04, 2012

NOTIFICATION

Scheme of Studies of Master of Science (MS) in Computer Engineering

It is hereby notified that the Academic Council in its 13th Meeting held on June 04, 2012 approved the following scheme of studies for Master of Science (MS) in Computer Engineering with effect from Fall 2012 at CIIT system:

	Minimum No of Courses	Minimum No Credit Hours
1. MS Course Work		
1) Core Courses (List Attached)	1-4	3-12
2) Specialization/Area Elective Course (List Attached)	4-7	12-21
3) Open/Cross Area Elective Course	1-3	3-9
Total Credit Hours of course work		24
2. MS Thesis		06
3. Total Credit Hours of the Program		30

Note:

All Rules and Regulations approved by BASAR from time to time shall be applicable.

This issues with the approval of the Competent Authority.


Nadeem Uddin Qureshi
Additional Registrar

Encl: (Pages 9 in total including this page)

Distribution:

1. Dean, Faculty of Engineering, CIIT.
2. Dean of Research, Innovation and Commercialization (DORIC), CIIT.
3. All Directors, CIIT System.
4. Incharge, CIIT Islamabad Campus.
5. Chairman, Department of Electrical Engineering, CIIT.
6. All Incharges, Academic Sections, CIIT Campuses.
7. All HoD's/Incharges, Department of Electrical Engineering, CIIT Campuses.
8. Controller of Examinations, CIIT.
9. All Incharges, Examination Departments, CIIT Campuses.

CC:

1. PS to Rector
2. PA to Registrar

List of Core Courses

S.No	Course Codes	Course Title	Credit Hours
1	ECE600	Engineering Mathematics	3(3, 0)
2	ECE601	Stochastic Processes	3(3, 0)
3	ECE602	Discrete Mathematics	3(3, 0)
4	ECE603	Graph Theory	3(3, 0)
5	ECE604	Engineering Optimization	3(3, 0)
6	ECE605	Probabilistic Learning: Theory and Algorithms	3(3, 0)
7	ECE606	Modeling and Simulation	3(3, 0)
8	ECE607	Research Methods	3(3, 0)
9	ECE608	Project Management	3(3, 0)
10	ECE609	Optimization Techniques	3(3, 0)

List of Area Elective Courses with Specialization;**(i). Communication Systems**

S.No	Course Codes	Course Title	Credit Hours
1	ECE616	RF System Engineering and Design	3(3, 0)
2	ECE617	Communications System Engineering	3(3, 0)
3	ECE618	Digital Communications	3(3, 0)
4	ECE619	Information Theory and Coding	3(3, 0)
5	ECE620	Communication Signal Processing	3(3, 0)
6	ECE716	Wireless Communication Techniques	3(3, 0)
7	ECE717	Communication Networks-Architectures and Protocols	3(3, 0)
8	ECE718	Mobile Communication Systems	3(3, 0)
9	ECE719	Advanced Digital Communications	3(3, 0)
10	ECE720	Wireless Channel Modeling	3(3, 0)
11	ECE721	Broadband Network Architectures	3(3, 0)
12	ECE722	Modeling and Analysis of Telecommunication Networks	3(3, 0)
13	ECE816	Special Topics in Communication Systems	3(3, 0)
14	ECE817	Advanced Topics in Communications Theory	3(3, 0)
15	ECE818	Advanced Wireless Communications	3(3, 0)
16	ECE819	Advanced Error Control Coding	3(3, 0)
17	ECE820	Advanced Topics in Wireless Networks	3(3, 0)



(ii). Embedded Systems

S.No	Course Codes	Course Title	Credit Hours
1	ECE631	Advanced Microprocessor Systems	3(3, 0)
2	ECE632	Operating Systems Fundamentals	3(3, 0)
3	ECE633	Advanced Computer Architecture	3(3, 0)
4	ECE634	ASIC and FPGA Design	3(3, 0)
5	ECE635	VLSI System Design	3(3, 0)
6	ECE731	Computer-Aided Design of Digital Systems I	3(3, 0)
7	ECE732	Multithreaded Architectures	3(3, 0)
8	ECE733	Real Time Computer Systems	3(3, 0)
9	ECE734	Embedded Computing Systems	3(3, 0)
10	ECE735	Design of Systems on a Chip (SoC)	3(3, 0)
11	ECE831	Computer-Aided Design of Digital Systems II	3(3, 0)
12	ECE832	Advanced Topics in Digital Design	3(3, 0)
13	ECE833	Advanced Microprocessor/Microcontroller Systems	3(3, 0)
14	ECE834	Advanced Topics in Embedded System Design	3(3, 0)
15	ECE835	Advanced Topics in Real-Time Embedded System Design	3(3, 0)

(iii). Image and Signal Processing

S.No	Course Codes	Course Title	Credit Hours
1	ECE646	Advanced Digital Signal Processing	3(3, 0)
2	ECE647	Digital Image Processing	3(3, 0)
3	ECE648	Digital Filters	3(3, 0)
4	ECE649	Image, Video and Multimedia	3(3, 0)
5	ECE650	Fundamentals of Computer Graphics	3(3, 0)
6	ECE651	Pattern Recognition	3(3, 0)
7	ECE746	Audio Signal Processing	3(3, 0)
8	ECE747	Computer Vision	3(3, 0)
9	ECE748	Advanced Pattern Recognition	3(3, 0)
10	ECE749	Advanced Filter Design	3(3, 0)
11	ECE846	Digital Watermarking	3(3, 0)
12	ECE847	Advanced Topics in Image Processing	3(3, 0)
13	ECE848	Advanced Topics in Computer Vision	3(3, 0)
14	ECE849	Advanced Topics in Pattern Recognition	3(3, 0)



(iv). Machine Learning and Artificial Intelligence

S.No	Course Codes	Course Title	Credit Hours
1	ECE661	Robotics	3(3, 0)
2	ECE662	Neural and Fuzzy Systems	3(3, 0)
3	ECE663	Artificial Intelligence	3(3, 0)
4	ECE664	Automata Theory	3(3, 0)
5	ECE761	Machine Learning	3(3, 0)
6	ECE762	Intelligent Control Systems	3(3, 0)
7	ECE763	Intelligent Systems	3(3, 0)
8	ECE861	Advanced Topics in AI and Neural Computing	3(3, 0)
9	ECE862	Advanced Topics in Knowledge Based Systems	3(3, 0)
10	ECE863	Advanced Topics in Decision Support Systems	3(3, 0)
11	ECE864	Advanced Topics in Machine Learning	3(3, 0)

(v). Computer and Wireless Networks

S.No	Course Codes	Course Title	Credit Hours
1	ECE673	Data Networks and Communications	3(3, 0)
2	ECE675	Internetworking: Architectures, Protocols and Applications	3(3, 0)
3	ECE676	Interconnection Networks	3(3, 0)
4	ECE677	Wireless Networks	3(3, 0)
5	ECE678	Wireless LANs	3(3, 0)
6	ECE688	Mobile and Broadband Networks	3(3, 0)
7	ECE689	Mobile Applications and Services	3(3, 0)
8	ECE760	IP Routing Protocols and Internetwork Design	3(3, 0)
9	ECE772	Networks and Computer Security	3(3, 0)
10	ECE775	Design and Analysis of Computer Communication Networks	3(3, 0)
11	ECE786	Multimedia Networking	3(3, 0)
12	ECE776	Wireless Wide Area Networks (WWANs)	3(3, 0)
13	ECE777	Advanced Wireless Communications	3(3, 0)
14	ECE778	Performance Evaluation of Computer Networks	3(3, 0)
15	ECE779	Emerging Wireless Networks	3(3, 0)
16	ECE780	QoS Architectures for Multimedia Wireless Networks	3(3, 0)
17	ECE781	Wireless Medium Access Techniques	3(3, 0)
18	ECE876	Advanced Topics in Wireless Communications	3(3, 0)

19	ECE877	Advanced Topics in Information Theory and Coding	3(3, 0)
20	ECE878	Advanced Topics in Wireless Networks	3(3, 0)
21	ECE879	Selected Topics in Wireless Networks Design and Planning	3(3, 0)
22	ECE880	Advanced Mobile Applications	3(3, 0)

(vi). Software Engineering

S.No	Course Codes	Course Title	Credit Hours
1	ECE691	Software Development Methodologies	3(3, 0)
2	ECE692	Distributed Databases	3(3, 0)
3	ECE693	Data Structures for Computer Graphics	3(3, 0)
4	ECE791	Compiler Design	3(3, 0)
5	ECE792	Data Mining	3(3, 0)
6	ECE793	Object Oriented Software Engineering	3(3, 0)
7	ECE794	3-D and Virtual Imaging	3(3, 0)
8	ECE795	Multimedia Data Compression	3(3, 0)
9	ECE796	Advanced Computer Graphics	3(3, 0)
10	ECE891	Advanced Topics in Operating Systems	3(3, 0)
11	ECE892	Advanced Computer Animation	3(3, 0)

(vii). Control Systems

S.No	Course Codes	Course Title	Credit Hours
1	ECE680	Digital Control Systems	3(3, 0)
2	ECE681	Optimization Control Theory	3(3, 0)
3	ECE682	Industrial Automation and Control	3(3, 0)
4	ECE694	Linear Systems Theory	3(3, 0)
5	ECE753	Non-Linear Systems and Control	3(3, 0)
6	ECE764	Advanced Linear Systems	3(3, 0)
7	ECE765	Multivariable Control	3(3, 0)
8	ECE766	Adaptive Control	3(3, 0)
9	ECE767	Robust Control	3(3, 0)
10	ECE802	Advanced Topics in Control Systems	3(3, 0)

List of Open Electives Courses

S.No	Course Codes	Course Title	Credit Hours
1	ECE611	Electromagnetic Field Theory	3(3, 0)
2	ECE612	Microwave Passive Devices and Circuits	3(3, 0)
3	ECE613	Microwave Active Devices and Circuits	3(3, 0)
4	ECE614	Introduction to RF Front-End Design	3(3, 0)
5	ECE615	RF System Engineering and Design	3(3, 0)
6	ECE621	Digital Design	3(3, 0)
7	ECE622	Logic Design and Switching Theory	3(3, 0)
8	ECE626	RF Filter Design	3(3, 0)
9	ECE627	Radio Engineering	3(3, 0)
10	ECE628	Antennas Theory, Design and Applications	3(3, 0)
11	ECE629	Radio Wave Propagation	3(3, 0)
12	ECE630	RF Propagation and Planning for Wireless Communications	3(3, 0)
13	ECE636	DSP Hardware Systems Design	3(3, 0)
14	ECE637	DSP Software Systems Design	3(3, 0)
15	ECE638	Microprocessor/Microcontroller Based Systems	3(3, 0)
16	ECE641	Radar Systems	3(3, 0)
17	ECE642	Satellite Communications	3(3, 0)
18	ECE644	Communication Signal Processing	3(3, 0)
19	ECE645	Communication Electronics Design	3(3, 0)
20	ECE652	Mobile Devices Programming	3(3, 0)
21	ECE653	Web Technologies	3(3, 0)
22	ECE656	Embedded System Design for Telecommunications	3(3, 0)
23	ECE657	Digital Telephony	3(3, 0)
24	ECE658	Telecommunication Switching Systems	3(3, 0)
25	ECE659	Performance Analysis of Communication Systems	3(3, 0)
26	ECE660	Telecommunication Network Management	3(3, 0)
27	ECE665	Advanced Programming Techniques	3(3, 0)
28	ECE666	Object Oriented Databases	3(3, 0)
29	ECE667	Web Based Databases	3(3, 0)
30	ECE668	Multimedia Indexing and Retrieval	3(3, 0)
31	ECE671	Optical Fiber Networks	3(3, 0)
32	ECE672	Communication System Design	3(3, 0)
33	ECE674	Graph Theory and Network Optimization	3(3, 0)

34	ECE679	Multimedia Technologies	3(3, 0)
35	ECE686	Design of Computer Communication Networks	3(3, 0)
36	ECE687	Mobile Cellular Systems and Standards	3(3, 0)
37	ECE690	Mobile Communication Systems	3(3, 0)
38	ECE695	Natural Language Processing	3(3, 0)
39	ECE700	Performance of Computer Systems	3(3, 0)
40	ECE701	Parallel Processing	3(3, 0)
41	ECE702	Diagnosis and Design of Reliable Digital Systems	3(3, 0)
42	ECE703	Probabilistic Methods in Computer Systems Modeling	3(3, 0)
43	ECE704	Analysis of Algorithms	3(3, 0)
44	ECE705	Hardware/Software Co-Design Techniques	3(3, 0)
45	ECE706	Embedded Software and RTOS	3(3, 0)
46	ECE707	Mixed-Signal VLSI Systems Design	3(3, 0)
47	ECE708	VLSI Architectures and Algorithms	3(3, 0)
48	ECE709	Design of Real-Time Embedded Systems	3(3, 0)
49	ECE710	Protocol Software Design and Development	3(3, 0)
50	ECE711	Electromagnetic Interference and Compatibility	3(3, 0)
51	ECE711	Data Warehousing	3(3, 0)
52	ECE712	Numerical and Computational Techniques in Electromagnetics	3(3, 0)
53	ECE712	Requirements Engineering	3(3, 0)
54	ECE713	Microwave Integrated Circuits	3(3, 0)
55	ECE713	Software Project Management	3(3, 0)
56	ECE714	RF and Microwave Measurement Techniques	3(3, 0)
57	ECE714	Software Quality Assurance	3(3, 0)
58	ECE715	Smart Antennas for Mobile Communications	3(3, 0)
59	ECE715	Software Engineering Technologies	3(3, 0)
60	ECE726	Radar Signal Processing	3(3, 0)
61	ECE727	Modern Radar Systems	3(3, 0)
62	ECE728	Adaptive Techniques for Wireless Communications	3(3, 0)
63	ECE729	Channel Estimation and Characterization	3(3, 0)
64	ECE730	Communication Channel Modeling	3(3, 0)
65	ECE736	Geometric Modeling	3(3, 0)
66	ECE737	Computer Animation	3(3, 0)
67	ECE741	Wireless Channel Modeling	3(3, 0)
68	ECE742	Advanced Integrated Circuits for Communication	3(3, 0)
69	ECE743	Teletraffic Engineering	3(3, 0)

70	ECE744	Broadband Network Architectures	3(3, 0)
71	ECE745	Telecommunication Software Design	3(3, 0)
72	ECE750	Estimation of Signals and Systems	3(3, 0)
73	ECE751	Adaptive Signal Processing	3(3, 0)
74	ECE752	Detection and Estimation Theory	3(3, 0)
75	ECE756	Modeling and Analysis of Telecommunication Networks	3(3, 0)
76	ECE757	Transport and Switching Technologies	3(3, 0)
77	ECE758	Short-Range Communication Systems	3(3, 0)
78	ECE759	Mobile Computing	3(3, 0)
79	ECE771	Advanced Network Programming	3(3, 0)
80	ECE773	Cryptography and Secure Communication	3(3, 0)
81	ECE774	IP Telephony	3(3, 0)
82	ECE787	Network Programming Techniques	3(3, 0)
83	ECE788	High-Speed Switched Local Area Networks (LANs)	3(3, 0)
84	ECE789	QoS Architectures for Multimedia Wireless Networks	3(3, 0)
85	ECE790	Mobile Devices Applications Development	3(3, 0)
86	ECE800	Advanced Topics in Filter Design	3(3, 0)
87	ECE801	Advanced Topics in Multimedia Technologies	3(3, 0)
88	ECE811	Mobile Networking	3(3, 0)
89	ECE812	Wireless Wide Area Networks (WWANs)	3(3, 0)
90	ECE813	Wireless Metropolitan Area Networks (WMANs)	3(3, 0)
91	ECE814	Wireless Personal and Body Area Networks (WPANs/WBANs)	3(3, 0)
92	ECE815	Advanced Topics in RF System Design	3(3, 0)
93	ECE826	Advanced Topics in RF/Microwave Engineering	3(3, 0)
94	ECE827	Advanced Topics in Antenna Design	3(3, 0)
95	ECE828	Advanced Topics in Radio Wave Propagation	3(3, 0)
96	ECE829	Advanced Topics in RF Planning and Optimization	3(3, 0)
97	ECE830	Advanced Topics in Communication Signal Processing	3(3, 0)
98	ECE841	Advanced Topics in Information Theory and Coding	3(3, 0)
99	ECE842	Advanced Topics in Information Security	3(3, 0)
100	ECE843	Advanced Topics in Telecommunication Electronics	3(3, 0)
101	ECE844	Network Forensics	3(3, 0)
102	ECE845	Traffic Engineering and QoS in TCP/IP Networks	3(3, 0)
103	ECE856	Special Topics in Computer Networks	3(3, 0)
104	ECE857	Advanced Topics in Network Security	3(3, 0)
105	ECE858	Advanced Network Security	3(3, 0)

106	ECE859	Advanced Internetworking (TCP/IP) Protocols	3(3, 0)
107	ECE860	Advanced Multi-user Systems for Wireless Communications	3(3, 0)
108	ECE871	Selected Topics in Wireless Network Security	3(3, 0)
109	ECE872	Selected Topics in Wireless Networks Design and Planning	3(3, 0)
110	ECE873	Advanced Mobile Applications	3(3, 0)
111	ECE874	Advanced Mobile Networking	3(3, 0)
112	ECE875	Special Topics in Computer Systems Architectures	3(3, 0)
113	ECE886	Special Topics in Digital Design	3(3, 0)
114	ECE887	Advanced Topics in VLSI Design	3(3, 0)
115	ECE888	Security Applications: Watermarking and Biometrics	3(3, 0)
116	ECE889	Data Authentication Techniques	3(3, 0)
117	ECE890	Special Topics in Signal Processing	3(3, 0)

Thesis

S.No	Course Codes	Course Title	Credit Hours
1	ECE800	Thesis	6

Included.