

### 3.1.10 Computer Systems Engineering

#### FIRST YEAR

Fall Semester				Spring Semester					
Course Code	Course Title	Credit Hours			Course Code	Course Title	Credit Hours		
		Th	Pr	Total			Th	Pr	Total
EF-101	IT Fundamentals and Applications	2	1	3	CS-117	Discrete Structures	3	0	3
CS-115	Computer Programming	3	1	4	CS-116	Object Oriented Programming	3	1	4
MT-116	Calculus & Analytical Geometry	3	0	3	EE-125	Basic Electrical Engineering	3	1	4
EA-128	Functional English	3	0	3	ES-108	Ideology and Constitution of Pakistan	2	0	2
ES-105 /	Pakistan Studies OR	2	0	2	ES-206 /	Islamic Studies OR	2	0	2
ES-127	Pakistan Studies (For Foreigners)				ES-209	Ethical Behaviour			
PH-129	Applied Physics	3	0	3	MT-221	Linear Algebra & Ordinary Differential Equations	3	0	3
CY-100	Essentials of Chemistry (Only for computer Science students)			NC					

#### SECOND YEAR

Fall Semester				Spring Semester					
Course Code	Course Title	Credit Hours			Course Code	Course Title	Credit Hours		
		Th	Pr	Total			Th	Pr	Total
CS-220	Digital Logic Design	3	1	4	CS-221	Computer Organization & Design	3	1	4
CS-218	Data Structures & Algorithms	3	1	4	CS-215	Signals and Systems	2	1	3
EA-218	Business Communication	2	1	3	CS-222	Database Management Systems	3	1	4
EL-106	Basic Electronics	3	1	4	CS-326	Software Engineering	3	1	4
EF-309	Occupational Health and Safety	1	0	1	CS-219	Computer Engineering Workshop	0	1	1
CS-253	Sustainable Engineering Practices	1	0	1	EF-201	Civics and Community Engagement	2	0	2
					EF-200	Community Service			NC

#### THIRD YEAR

Fall Semester				Spring Semester					
Course Code	Course Title	Credit Hours			Course Code	Course Title	Credit Hours		
		Th	Pr	Total			Th	Pr	Total
CS-327	Computer Communication Networks	3	1	4	CS-329	Operating Systems	3	1	4
CS-328	Computer Architecture	3	0	3	CS-301	Microprocessor Based System Design	3	1	4
CS-373	Artificial Intelligence & Machine Learning	3	1	4	CS-34X	Elective-I (AI Domain)	2	1	3
MT-335	Probability & Statistics	3	0	3	MT-442	Numerical Methods	3	0	3
CS-419	Digital Signal Processing	3	1	4	EF-305	Engineering Economics & Management	3	0	3
					EA/ES-###	Foreign Language I			NC

#### FINAL YEAR

Fall Semester					Spring Semester				
Course Code	Course Title	Credit Hours			Course Code	Course Title	Credit Hours		
		Th	Pr	Total			Th	Pr	Total
CS-406	Computer Engineering Design Project*	0	3	3	CS-406	Computer Engineering Design Project*	0	3	3
CS-431	Digital System Design	3	1	4	CS-45X	Elective-III (System Design Domain)	2	1	3
CS-36X	Elective-II (Network / Cyberspace Domain)	2	0	2	CS-46X	Elective-IV (Software Engineering Domain)	2	1	3
CS-471	Modeling and simulation	3	0	3	CS-472	Entrepreneurship for Computer Engineers	2	0	2
CS-432	Distributed Computing	2	1	3	CS-371	Project Management	2	0	2
EA/ES-###	Foreign Language II			NC	CS-372	Professional Ethics	2	0	2
AI Domain					Network / Cyberspace Domain				
Elective-I (2+1) (to be chosen from the following)					Elective-II (2+0) (to be chosen from the following)				
CS-341	Deep Learning	2	1	3	CS-361	Cyber Security	2	0	2
CS-342	Computer Vision	2	1	3	CS-362	Computer Systems Security	2	0	2
CS-343	Natural Language Processing	2	1	3	CS-363	Internet Computing	2	0	2
CS-344	Reinforcement Learning	2	1	3	CS-364	Digital Communication Systems	2	0	2
CS-345	Bioinformatics	2	1	3	CS-365	Cloud Computing	2	0	2
CS-346	Virtual and Augmented Reality	2	1	3	CS-366	Block chain Technology	2	0	2
CS-347	Robotic Systems Design	2	1	3	CS-367	Wireless Sensor Networks	2	0	2
System Design Domain					Software Engineering Domain				
Elective-III (2+1) (to be chosen from the following)					Elective-IV (2+1) (to be chosen from the following)				
CS-452	Digital IC Design	2	1	3	CS-461	Software Development and Testing	2	1	3
CS-453	Embedded Systems Design for High Performance Applications	2	1	3	CS-462	Parallel Application development	2	1	3
CS-454	Internet of Medical Things (IoMT)	2	1	3	CS-463	Big Data Applications framework	2	1	3
CS-455	Mixed Signal IC Design	2	1	3	CS-464	Mobile Applications Development	2	1	3
CS-456	Reconfigurable Computing	2	1	3	CS-465	Big Data Analytics	2	1	3
CS-457	Cyber Physical Systems	2	1	3	CS-466	GPGPU programming	2	1	3

\* Duration one academic year: Requires literature survey and preliminary work during this Semester

