Pre-Revision

Study &Evaluation Scheme

Bachelor of Technology (Computer Science & Engineering)

[Applicable w.e.f Academic Session 2017-18 till revised]

COLLEGE OF COMPUTING SCIENCES & INFORMATION TECHNOLOGY

TEERTHANKER MAHAVEER UNIVERSITY

Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in

Teerthanker Mahaveer University, Moradabad-244001 Registrar

Study & Evaluation Scheme
Programme: B. Tech. (Computer Science & Engineering)

Semester I

S. No	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EAS116	Engineering Mathematics-I	3	1	-	4	40	60	100
2	EAS112/212	Engineering Physics-I	3	1	-	4	40	60	100
	EAS113/213	Engineering Chemistry							
3	EEE117/217	Basic Electrical Engineering	3	1	-	4	40	60	100
	EEC111/211	Basic Electronics Engineering							
4	EAS115/ BAS214/ BAS328/ BAS428	Environmental Studies	1	2	-	2	40	60	100
5	EHM199/ BHM199	English communication and soft skills – I	1	1	2	2	50	50	100
6	EAS162/262	Engineering Physics (Lab)	-	-	2	1	50	50	100
	EAS163/263	Engineering Chemistry (Lab)							
7	EEE161/261	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
	EEC161/261	Basic Electronics Engineering (Lab)							
8	EME161/261	Engineering Drawing (Lab)	-	-	4	2	50	50	100
	EME162/262	Workshop Practice (Lab)							
9	EGP111	Discipline & General Proficiency	-	-	-		100	-	100
		Total	**11**	**6**	**10**	**20**	**460**	**440**	**900**

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Semester II

S. No	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	EAS211	Engineering Mathematics-II	3	1	-	4	40	60	100
2	EAS212/112	Engineering Physics-I	3	1	-	4	40	60	100
	EAS213/113	Engineering Chemistry							
3	EEE217/117	Basic Electrical Engineering	3	1	-	4	40	60	100
	EEC211/111	Basic Electronics Engineering							
4	ECS201	Computer Basics & C Programming	3	-	-	3	40	60	100
5	EHM249	English communication and soft skills – II	1	1	2	2	40	60	100
6	EAS262/162	Engineering Physics (Lab)	-	-	2	1	50	50	100
	EAS263/163	Engineering Chemistry (Lab)							
7	EEE261/161	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
	EEC261/161	Basic Electronics Engineering (Lab)							
8	ECS251	Computer Basics & C Programming (Lab)	-	-	2	1	50	50	100
9	EME261/161	Engineering Drawing (Lab)		-	4	2	50	50	100
	EME262/162	Workshop Practice (Lab)							
10	EGP211	Discipline & General Proficiency	-	-	-		100	-	100
		Total	**13**	**4**	**12**	**22**	**500**	**500**	**1000**

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Semester III

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	ECS301	Discrete Structure	3	1	0	4	40	60	100
2	ECS305	Data Structure using C	3	1	0	4	40	60	100
3	ECS306	Data Base Management System	3	1	0	4	40	60	100
4	EEC302	Digital Electronics &Computer Organization	3	1	0	4	40	60	100
5	EAS 301	Mathematics-III	3	1	0	4	40	60	100
6	EHM 302	Organizational Behavior	3	0	0	3	40	60	100
7	ECS355	Data Structure using C (Lab)	0	0	4	2	50	50	100
8	ECS356	Data Base Management System (Lab)	0	0	3	1.5	50	50	100
9	EEC 351	Digital Logic Circuit Lab	0	0	3	1.5	50	50	100
10	EHM349	English Communication and Soft Skills-III	1	1	2	2	40	60	100
11	EGP311	Discipline & General Proficiency	1	0	0	1	100	--	100
		Total	**20**	**06**	**12**	**31**	**530**	**570**	**1100**

Additional Courses for Lateral Entry Students with B.Sc background, to be taken in III and IV semester and all should pass with minimum of 40% marks: credits will not be added.

1	EME161/261	Engineering Drawing Lab	-	-	4	50	50	100
2	EME162/262	Workshop Practice (Lab)	-	-	4	50	50	100

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Semester IV

S. No.	Course Code	Subject	Periods L	Periods T	Periods P	Credit	Evaluation Scheme Internal	Evaluation Scheme External	Evaluation Scheme Total
1	ECS401	Theory of Computation	3	1	0	4	40	60	100
2	ECS 403	Object Oriented Programming System	3	1	0	4	40	60	100
3	ECS404	Software Engineering	3	1	0	4	40	60	100
4	ECS405	Computer Based Numerical & Statistical Techniques	3	1	0	4	40	60	100
5	ECS406	Operating System	3	1	0	4	40	60	100
6	EAS403	Human Values & professional Ethics	3	1	0	4	40	60	100
7	ECS452	C++ Programming (Lab)	0	0	4	2	50	50	100
8	ECS453	Computer Based Numerical & Statistical Techniques (Lab)	0	0	3	1.5	50	50	100
9	ECS454	UNIX & Shell Programming (Lab)	0	0	3	1.5	50	50	100
10	EHM499	English Communication and Soft Skills-IV	**0**	**0**	**4**	**2**	**50**	**50**	**100**
11	EGP411	Discipline & General Proficiency	**1**	**0**	**0**	**1**	**100**	**--**	**100**
		Total	**19**	**6**	**14**	**32**	**540**	**560**	**1100**

Semester V

S.NO.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	ECS501	Compiler Design and Construction	3	1	0	4	40	60	100
2	ECS 502	Computer Architecture	3	1	0	4	40	60	100
3	ECS503	Analysis and Design of Algorithm	3	1	0	4	40	60	100
4	ECS508	Java Programming	3	1	0	4	40	60	100
5	EHM503	Engineering and Managerial Economics	3	1	0	4	40	60	100
6	ECS552	Analysis and Design of Algorithm (Lab)	0	0	4	2	50	50	100
7	ECS554	Java Programming (Lab)	0	0	4	2	50	50	100
8	EHM 599	English Communication and Soft Skills – V	1	1	2	2	50	50	100
9	ECS591	Industrial Training	0	0	0	2	50	50	100
Elective I – Select any one course from serial no. 10 below									
10	ECS506	ERP System	3	1	0	4	40	60	100
	ECS507	Mobile Communication							
	ECS509	Multimedia & Animation							
11	EGP511	Discipline & General Proficiency	1	0	0	1	100	--	100
		Total	**20**	**7**	**10**	**33**	**540**	**560**	**1100**

Semester VI

S. No	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	ECS601	Artificial Intelligence	3	1	0	4	40	60	**100**
2	ECS603	Computer Graphics	3	1	0	4	40	60	**100**
3	ECS608	Computer Network	3	1	0	4	40	60	**100**
4	EHM 649	English Communication & Soft Skills – VI	1	1	2	2	40	60	**100**
5	ECS610	Cyber Law & Information Security	3	1	0	4	40	60	**100**
6	ECS 651	Artificial Intelligence (Lab)	0	0	4	2	50	50	**100**
7	ECS653	Computer Graphics (Lab)	0	0	4	2	50	50	**100**
8	ECS654	Computer Network (Lab)	0	0	4	2	50	50	**100**
Elective II – Select any one course from serial no. 9 below									
9	ECS606	Real Time Operating System	3	1	0	4	50	50	100
	ECS607	Soft Computing							
	EEC606	Microprocessor & Application							
	ECS609	E-commerce							
	ECS 611	Big Data Analytics							
10	EGP611	Discipline & General Proficiency	**1**	**0**	**0**	**1**	**100**	--	100
		Total	**17**	**6**	**14**	**29**	**500**	**500**	1000

Semester VII

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	ECS701	Web Technology (Design and Architecture using ·NET)	3	1	-	4	40	60	100
2	ECS703	Cryptography and Network Security	3	1	-	4	40	60	100
3	ECS704	Software Project Management	3	1	-	4	40	60	100
4	ECS751	Web Technology(Design and Architecture using .NET) (Lab)	0	0	4	2	50	50	100
5	ECS752	Cryptography and Network Security (Lab)	0	0	4	2	50	50	100
Elective III – Select any one course from serial no. 6 below									
6	ECS711	Pattern Recognition	3	0	0	3	40	60	100
	ECS712	Neural Network							
	ECS703	Industrial Psychology							
	ECS706	Natural Language Processing							
Elective IV – Select any one course from serial no. 7 below									
7	ECS713	Data Compression	3	1	0	4	40	60	100
	ECS708	Simulation and Modeling							
	ECS709	Cloud Computing							
	ECS714	Python							
8	ECS791	Industrial Training & Presentation	0	0	0	4	50	50	100
9	ECS799	Project Work Phase-1	0	0	8	4	50	50	100
10	EGP711	Discipline & General Proficiency	1	0	0	1	100	--	100
		Total	**16**	**4**	**16**	**32**	**500**	**500**	**1000**

Semester VIII

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	ECS801	Data Warehousing and Data	3	1	-	4	40	60	100
2	ECS805	Distributed System	3	1	-	4	40	60	100
3	ECS806	Android Programming	3	1	-	4	40	60	100
4	ECS807	Concepts of IoT (Internet of Things)	3	-	-	3	40	60	100
Elective V – Select any one course from serial no. 5 below									
5	ECS803	Digital Image Processing	3	1	0	4	40	60	100
	ECS804	Management Information System							
	ECS808	R-Programming							
Elective V - Lab – Same as one selected from column above									
6	ECS 852	Digital Image Processing (Lab)	0	0	4	2	50	50	100
	ECS 853	Management Information System (Lab)							
7	ECS 851	Data Warehousing and Data Mining (Lab)	0	0	4	2	50	50	100
8	ECS854	Android Programming (Lab)	0	0	4	2	50	50	100
9	ECS 899	Project Work Phase-2	0	0	16	8	50	50	100
10	EGP811	Discipline & General Proficiency	1	0	**0**	**1**	**100**	--	**100**
		Total	**16**	**4**	**28**	**34**	**500**	**500**	**1000**

Post Revision

Study & Evaluation Scheme

of

Bachelor of Technology
(Computer Science & Engineering)

[Applicable w.e.f. Academic Session - 2019-20 till revised]

[As per CBCS guidelines given by UGC]

TEERTHANKER MAHAVEER UNIVERSITY
N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001
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Study & Evaluation Scheme

B. Tech. (Computer Science & Engineering)
Semester I

S. No	*Course Category*	*Course Code*	*Course*	*Periods*			*Credit*	*Evaluation Scheme*		
				L	*T*	*P*		*Internal*	*External*	*Total*
1	BSC-1	EAS116	Engineering Mathematics-I	3	1	-	4	40	60	100
2	BSC-2	EAS112	Engineering Physics	3	1	-	4	40	60	100
		EAS113	Engineering Chemistry							
3	ESC-1	EEE117	Basic Electrical Engineering	3	1	-	4	40	60	100
		EEC111	Basic Electronics Engineering							
4	MC-1	TMU-101	Environmental Studies	2	1	0	3	40	60	100
5	HSMC-1	TMUGE101	English Communication–I	2	0	2	3	40	60	100
6	LC-1	EAS162	Engineering Physics (Lab)	-	-	2	1	50	50	100
		EAS163	Engineering Chemistry (Lab)							
7	LC-2	EEE161	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
		EEC161	Basic Electronics Engineering (Lab)							
8	LC-3	EME161	Engineering Drawing (Lab)	-	-	4	2	50	50	100
		EME162	Workshop Practice (Lab)							
9	DGP-1	EGP111	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**13**	**4**	**10**	**22**	**450**	**450**	**900**

B. Tech. (Computer Science & Engineering)
Semester II

S. No	Course Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	BSC-3	EAS211	Engineering Mathematics-II	3	1	-	4	40	60	100
2	BSC-4	EAS212	Engineering Physics	3	1	-	4	40	60	100
		EAS213	Engineering Chemistry							
3	ESC-2	EEE217	Basic Electrical Engineering	3	1	-	4	40	60	100
		EEC211	Basic Electronics Engineering							
4	ESC-3	ECS201	Computer Basics & C Programming	3	-	-	3	40	60	100
5	HSMC-2	TMUGE201	English Communication–II	2	0	2	3	40	60	100
6	LC-4	EAS262	Engineering Physics (Lab)	-	-	2	1	50	50	100
		EAS263	Engineering Chemistry (Lab)							
7	LC-5	EEE261	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
		EEC261	Basic Electronics Engineering (Lab)							
8	LC-6	ECS251	Computer Basics & C Programming (Lab)	-	-	2	1	50	50	100
9	LC-7	EME261	Engineering Drawing (Lab)		-	4	2	50	50	100
		EME262	Workshop Practice (Lab)							
10	DGP-2	EGP211	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**14**	**3**	**12**	**23**	**500**	**500**	**1000**

B. Tech. (Computer Science & Engineering)
Semester III

S. No	Course Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	PCC-1	ECS305	Data Structure using C++	3	0	0	3	40	60	100
2	PCC-2	ECS306	Data Base Management System	3	0	0	3	40	60	100
3	PCC-3	EEC302	Digital Electronics & Computer Organization	3	0	0	3	40	60	100
4	BSC-5	EAS 301	Mathematics-III	3	0	0	3	40	60	100
5	HSMC-3	EAS303	Human Values & professional Ethics	2	0	0	2	40	60	100
6	LC-8	ECS355	Data Structure using C++ (Lab)	0	0	4	2	50	50	100
7	LC-9	ECS356	Data Base Management System (Lab)	0	0	2	1	50	50	100
8	LC-10	EEC351	Digital Logic Circuit Lab	0	0	2	1	50	50	100
9	HSMC-4	TMUGE301	English Communication–III	2	0	2	3	40	60	100
10	DGP-3	EGP311	Discipline & General Proficiency	0	0	0	-	100	--	100
			Total	**16**	**0**	**10**	**21**	**490**	**510**	**1000**

For Lateral Entry student with polytechnic/ B.Sc background will have to pass below additional courses either in III[rd] or IV[th] semester with minimum 40% marks if they have not taken these courses in their polytechnic/B.Sc degree.

1	LC-3	EME161/261	Engineering Drawing (Lab)	-	-	4	-	50	50	100
2	LC-7	EME162/262	Workshop Practice (Lab)	-	-	4	-	50	50	100
3	HSMC-1	TMU101	Environmental Studies	2	1	3	-	40	60	100

Value Added Course:
It is an audit course. The performance of the student in this course will not be counted in the overall result however the student has to pass it compulsorily with 45% marks.

SNO	Course Category	Course Code	Course		Periods		Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	VAC – I	TMUGA301	Foundation in Quantitative Aptitude	2	1	0	0	40	60	100

B. Tech. (Computer Science & Engineering)
Semester IV

S. No	Course Category	Course Code	Course	Periods L	Periods T	Periods P	Credit	Evaluation Scheme Internal	Evaluation Scheme External	Evaluation Scheme Total
1	PCC-4	ECS401	Theory of Computation	3	0	0	3	40	60	100
2	PCC-5	ECS407	Java Programming	3	0	0	3	40	60	100
3	PCC-6	ECS404	Software Engineering	3	0	0	3	40	60	100
4	PCC-7	ECS405	Computer Based Numerical & Statistical Techniques	3	0	0	3	40	60	100
5	PCC-8	ECS406	Operating System	3	0	0	3	40	60	100
6	HSMC-5	EHM403	Management Concepts & Organizational Behavior	2	0	0	2	40	60	100
7	LC-11	ECS456	Java Programming (Lab)	0	0	4	2	50	50	100
8	LC-12	ECS453	Computer Based Numerical & Statistical Techniques (Lab)	0	0	2	1	50	50	100
9	LC-13	ECS455	OS Lab with Software Engineering (Lab)	0	0	2	1	50	50	100
10	HSMC-6	TMUGE401	English Communication-IV	2	0	2	3	40	60	100
11	DGP-4	EGP411	Discipline & General Proficiency	0	0	0	0	100	-	100
			Total	**19**	**0**	**10**	**24**	**530**	**570**	**1100**

Value Added Course* :

SNO	Course Category	Course Code	Course	Periods L	Periods T	Periods P	Credit	Evaluation Scheme Internal	Evaluation Scheme External	Evaluation Scheme Total
1	VAC-II	TMUGA401	Analytical Reasoning	2	1	0	0	40	60	100

NOTE: After the examination of 4th Semester. Student has to take industrial training of minimum 40days before the starting of 5th Semester. The evaluation will be performed with below mentioned code in 5th semester.

PROJ-1	ECS591	Industrial Training

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Semester V

S. No	Course Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	PCC-9	ECS511	Computer Architecture	3	0	0	3	40	60	100
2	PCC-10	ECS503	Analysis and Design of Algorithms	3	1	0	4	40	60	100
3	PCC-11	ECS510	Computer Network	3	0	0	3	40	60	100
4	LC-14	ECS552	Analysis and Design of Algorithms (Lab)	0	0	2	1	50	50	100
5	LC-15	ECS556	Python (Lab)	0	0	2	1	50	50	100
6	PROJ-1	ECS591	Industrial Training	0	0	0	2	50	50	100
7	LC-16	ECS555	Computer Network (Lab)	0	0	2	1	50	50	100
8	PEC-1		Professional Elective Course-I	3	0	0	3	40	60	100
9	PROJ-2	ECS559	MOOC Course	0	0	0	2	50	50	100
10	DGP-5	EGP511	Discipline & General Proficiency	0	0	0	0	100	-	100
			Total	**12**	**1**	**06**	**20**	**510**	**490**	**1000**

Value Added Course *:

SNO	Course Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	VAC-III	TMUGS501	Managing Self	2	1	0	0	40	60	100
2	VAC-IV	TMUGA501	Modern Algebra & Data Analysis	2	1	0	0	40	60	100

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B. Tech. (Computer Science & Engineering)
Semester VI

S. No	Course Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	PCC-12	ECS601	Artificial Intelligence	3	1	0	4	40	60	100
2	PCC-13	ECS 611	Data Warehousing and Data Mining with R- programming	3	0	0	3	40	60	100
3	PCC-14	ECS612	Mobile Communication	3	0	0	3	40	60	100
4	LC-17	ECS 651	Artificial Intelligence (Lab)	0	0	2	1	50	50	100
5	LC-18	ECS654	Data Warehousing and Data Mining with R- programming (Lab)	0	0	2	1	50	50	100
6	PEC-2	Professional Elective Course-II		3	0	0	3	40	60	100
7	PROJ-3	ECS 692	Seminar (Field Project)	-	-	-	2	50	50	100
8	HSMC-7	FOE023	Entrepreneurship	3	0	0	4	40	60	100
9	DGP-6	EGP611	Discipline & General Proficiency	0	0	0	0	100	-	100
			Total	**15**	**0**	**4**	**20**	**450**	**450**	**900**

Value Added Course *:

SNO	Course Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	VAC-V	TMUGS601	Managing Work and Others	2	1	0	0	40	60	100
2	VAC-VI	TMUGA601	Advance Algebra and Geometry	2	0	0	0	40	60	100

NOTE: After the examination of 6th Semester. Student has to take industrial training of 40days minimum before the starting of 7th Semester. The evaluation will be performed with below mentioned code in 7th semester.

PROJ-4	ECS791	Industrial Training - II

B. Tech. (Computer Science & Engineering)
Semester VII

S. No	Course Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	PCC-15	ECS701	Web Technology(Design And Architecture Using .NET)	3	1	0	4	40	60	100
2	PCC-16	ECS703	Cryptography and Network Security	3	0	0	3	40	60	100
3	PCC-17	ECS709	Cloud Computing	3	0	0	3	40	60	100
4	LC-19	ECS751	Web Technology(Design And Architecture Using .NET)(Lab)	0	0	4	2	50	50	100
5	LC-20	ECS752	Cryptography and Network Security(LAB)	0	0	2	1	50	50	100
6	PEC-3	Professional Elective Courses-III		3	0	0	3	40	60	100
7	PEC-4	Professional Elective Courses-IV (Lab)		0	0	2	1	50	50	100
8	PROJ-4	ECS791	Industrial Training - II	0	0	0	4	50	50	100
9	PROJ-5	ECS799	Project Work Phase-1	0	0	8	4	50	50	100
10	OEC-1		**OPEN ELECTIVE COURSE–I**	3	0	0	3	40	60	100
11	DGP-7	EGP711	Discipline & General Proficiency	0	0	0	0	100	-	100
			Total	**15**	**1**	**16**	**28**	**550**	**550**	**1100**

B. Tech. (Computer Science & Engineering)
Semester VIII

S. No	Course Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	HSMC-8	EHM801	Project Management for Engineers	3	0	0	3	40	60	100
2	PCC-18	ECS812	Big Data Analytics	3	0	0	3	40	60	100
3	PEC-5	Professional Elective Courses-V		3	0	0	3	40	60	100
4	PEC-6	Professional Elective Courses-VI		3	0	0	3	40	60	100
5	LC-21	ECS855	Big Data Analytics (Lab)	0	0	2	1	50	50	100
6	PROJ-6	ECS899	Project Work Phase- 2	0	0	12	6	50	50	100
7	OEC-2		**OPEN ELECTIVE COURSE –II**	3	0	0	3	40	60	100
8	DGP-8	EGP811	Discipline & General Proficiency	0	0	0	0	100	-	100
			Total	**15**	**0**	**14**	**22**	**400**	**400**	**800**

Scheme of Professional Elective Courses (PEC)

Professional Elective Courses (PEC) I (Semester-V)- Select any one course from Group No 1 given below:

		Course code	Course
1	[Group No 1] Professional Elective Courses (PEC)-I	ECS506	ERP System
		EHM504	Managerial Economics & Engineering
		ECS512	E-commerce
		ECS513	Software Project Management
		ECS514	Software Testing

Professional Elective Courses (PEC)-II (Semester-VI) - Select any one course from Group No 2 given below:

		Course code	Course
2	[Group No 2] Professional Elective Courses (PEC)-II	ECS606	Real Time Operating System
		ECS607	Soft Computing
		EEC606	Microprocessor & Applications
		ECS603	Computer Graphics
		ECS610	Cyber Law & Information Security
		ECS613	Compiler Design and Construction
		ECS614	Multimedia & Animation

Professional Elective Courses (PEC)-III (Semester-VII) - Select any one course from Group No 3 given below:

		Course code	Course
3	[Group No 3] Professional Elective Courses (PEC)-III	ECS713	Data compression
		ECS716	Digital Image Processing
		ECS5717	Android Programming

Professional Elective Courses (PEC)-IV (Lab) (Semester-VII) - Select any one course from Group No 4 same as one selected from Group No 3 mentioned above

		Course code	Course
4	[Group No 4] Professional Elective Courses (PEC)-IV (Lab)	ECS754	Data compression(LAB)
		ECS756	Digital Image Processing Using SCI-Lab (Lab)
		ECS757	Android Programming (Lab)

Professional Elective Courses (PEC)-V (Semester-VIII) - Select any one course from Group No 5 given below:			
5	[Group No 5] Professional Elective Courses (PEC)-V	Course code	Course
		ECS809	Pattern Recognition
		ECS810	Neural Network
		ECS811	Natural Language Processing
		ECS814	Block Chain Technology

Professional Elective Courses (PEC)-VI (Semester-VIII) - Select any one course from Group No 6 given below:			
6	[Group No 6] Professional Elective Courses (PEC)-VI	Course code	Course
		ECS805	Distributed System
		ECS812	Concept of IoT(Internet of Things)
		ECS813	Machine Learning

New Course Added

Course Code: EAS303	Humanities and Social Sciences including Management Course-3 B.Tech (CSE) Semester III **Human Values & Professional Ethics**	L-2 T-0 P-0 C-2
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the importance of value education in life and method of self-exploration.	
CO2.	Understanding 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration.	
CO3.	Applying right understanding about relationship and physical facilities.	
CO4.	Analyzing harmony in myself, harmony in the family and society, harmony in the nature and existence.	
CO5.	Evaluating human conduct on ethical basis.	
Course Content:		
Unit-1:	Understanding of Morals, Values and Ethics; Introduction to Value Education- need for Value Education. Self- Exploration–content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration. Continuous Happiness and Prosperity- basic Human Aspirations. Gender Issues: Gender Discrimination and Gender Bias (home & office), Gender issues in human values, morality and ethics.	**8 Hours**
Unit-2:	Conflicts of Interest: Conflicts between Business Demands and Professional Ethics. Social and Ethical Responsibilities of Technologists. Ethical Issues at Workplace: Discrimination, Cybercrime, Plagiarism, Sexual Misconduct, Fraudulent Use of Institutional Resources. Intellectual Property Rights and its uses. Whistle blowing and beyond, Case study.	**8 Hours**
Unit-3:	Harmony in the Family and Society- Harmony in Human-Human Relationship, Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman and other salient values in relationship.	**8 Hours**
Unit-4:	Understanding Harmony in the Nature and Existence – Whole existence as Co-existence. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Coexistence (Sah-astitva) of mutually interacting units in all pervasive space. Holistic perception of harmony at all levels of existence.	**8 Hours**
Unit-5:	Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order b) Ability to identify the scope and characteristics of people friendly and eco-friendly production systems c) Ability to identify and develop appropriate technologies and management patterns	**8 Hours**

	for above production systems.	
Text Books:	1.R R Gaur, R Sangal, G P Bagaria, A Foundation Course in Value Education.	
Reference Books:	1. Ivan Illich, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA 2. E.F. Schumacher, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain. 2. A Nagraj, Jeevan Vidya ekParichay, Divya Path Sansthan, Amarkantak. 3. Sussan George, How the Other Half Dies, Penguin Press. Reprinted. 4. PL Dhar, RR Gaur, Science and Humanism, Commonwealth Purblishers. 5. A.N. Tripathy, Human Values, New Age International Publishers. 6. E G Seebauer& Robert L. Berry, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	1https://www.youtube.com/watch?v=1xFZ7ZVVJeA&list=PLXcPnJsWbdxujUIptbSdeJXC0Jd-InxFG 2https://www.youtube.com/watch?v=nlh9V5gd8hg&list=PLbMVogVj5nJQ20ZixllzM69agBq-m8ndV 3 https://www.youtube.com/watch?v=cFOZplkRqsk	

New course Added

Course Code: ECS407	Professional Core Course-5 B.Tech (CSE) Semester IV **JAVA PROGRAMMING**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the object oriented approach of programming, basic building blocks of java programming, java development environment, datatypes, class, methods, and various predefine packages.	
CO2.	Understanding the various predefine classes, interfaces, which deals with networking, understanding the basic approach of graphical user interface design using Abstract window toolkit and Applet.	
CO3.	Understanding the basic concept of Event handling, Applying the concept of thread and multithreading.	
CO4.	Understanding the Database connectivity using java, along with the classes and methods of java.sql package and creating basic programs using this package.	
CO5.	Understanding the concept of java Bean, session bean, Enterprise Java Bean, client server concept using Remote Method Invocation. Creating basic application using RMI architecture.	
CO6.	Understanding the web architecture of java programming, understanding the various servers and deployment of application on servers, Understanding Servlets and java server pages,	
CO7.	Applying the graphical user interface design concept using Swing, Analyzing the predefine methods and interfaces of Swing package and creating basic user interface using swing.	
CO8.	Analyzing the various methods of java.servlet package and creating basic web application using this package.	
Course Content:		
Unit-1:	**Core Java:** Operators, Data types, Variables, Arrays, Control Statements, Methods &Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling. **Abstract Window Toolkit (AWT):** Controls, Layout managers, Menus, Images, Graphics	**8 Hours**
Unit-2:	**Java Swing:** Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner frame.	**8 Hours**
Unit-3:	**JDBC:** Connectivity Model, JDBC/ODBC Bridge, java.sql package, Connectivity to remote database,navigating through multiple rows retrieved from a database.	**8 Hours**
Unit-4:	**Java Beans:** Application Builder tools, Bean developer kit (BDK), JAR files, Introspection, Developing a simple bean, Using Bound properties, Java Beans API, Session Beans, Entity Beans, Enterprise Java beans (EJB), RMI (Remote Method Invocation), A simple client-server application using RMI.	**8 Hours**
Unit-5:	**Java Servlets:** Basics, API basic, Life cycle, Running, Debugging, Thread-safe, HTTP Redirects, Cookies, Java Server pages (JSP).	**8 Hours**
Text Books:	1. Margaret, L. Y., *The Complete Reference- Internet*, Tata McGraw Hill.	
Reference Books:	1. Balagurusamy, E., *Programming in JAVA*, Tata McGraw Hill. 2. Dustin, R. Callway*Inside Servlets*, Addison-Wesley.	

	3. Steven, H., *Java2 Black Book*, Dreamtech. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	1. https://www.youtube.com/watch?v=J_d1fJy90GY&list=PLbRMhDVUMngcx5xHChJ-f7ofxZI4JzuQR 2. https://www.youtube.com/watch?v=0GkqhLcym48&list=PL3618681FEEDA821F 3. https://www.youtube.com/watch?v=DeL-OoWyNrE	

New course Added

Course Code: EHM403	Humanities and Social Sciences including Management Course-5 B.Tech (CSE) Semester IV Management Concepts & Organizational Behavior	L-2 T-0 P-0 C-2
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding the Concept and importance of management and its functions, organizational behavior, challenges for management	
CO2.	Understanding flow and formation of powers and politics in organizational groups	
CO3.	Analyzing Perception and Thinking process of individual, personality traits and its importance	
CO4.	Analyzing Theories of motivation and leadership and its importance and applicability into business	
CO5.	Analyzing change in organization and Conflict management.	
Course Content:		
Unit-1:	Introduction to Management: Meaning, nature and importance of management; Management functions; Managerial Skills. Planning: Introduction, Importance of Planning, Types of Plans, Planning & Decision Making Process	8 Hours
Unit-2:	Organizing and staffing: Meaning, Importance & Process of Organizing, Organizational Structure & its types, Delegation of Authority, Staffing: Meaning & importance. Directing: Importance & Functions, Controlling: Importance and Process, Measures for Effective Control & Control Techniques.	8 Hours
Unit-3:	Organizational Behaviour (OB): Concept, Characteristics, Key Elements of OB, Models of OB. Perception: Concept, Process & Importance. Attitudes & Job Satisfaction. Personality: Concept, Types & Theories, Learning: Concept & Theories of Learning.	8 Hours
Unit-4:	Motivation: Concepts, Principles, Theories. Leadership: Concept, Function & Style. Group Dynamics: Definition, Stages of Group Development, Types & Group Decision Making. Power and Politics: Concept, Sources, Approaches to Power, Political Implications of Power.	8 Hours
Unit-5:	Organizational Change: Concept, Resistance to change & its Management, Implementation of Change. Conflict: Concept, Sources, Types and Resolution of Conflict, Stress: Meaning, Causes, Consequences & Managing Stress. Culture: Concept, Characteristics, Elements of Culture.	8 Hours
Text Books:	1. Prasad L.M., Principles and Practice of Management, Sultan Chand	
Reference Books:	1. Robbins Stephen P., Organizational Behavior Pearson Education 2. Koontz, Harold, Cyril 'O' Donnell, And Heinz Weihrich, Essentials of Management, Fourth Edition, McGraw-Hill, Singapore	

Chhatrapati Shahu Ji Maharaj University, Kanpur Registrar

	3. Srivastava & Chunawalla, Management Principles and Practices, Macmillan 4. Koontz, Principles of Management, Tata McGraw Hill. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/110/105/110105033/ https://freevideolectures.com/course/3502/organizational-behaviour-i https://nptel.ac.in/courses	

New course Added

Course Code: ECS456	Laboratory Course-11 B.Tech (CSE) Semester IV **JAVA PROGRAMMING (LAB)**	L-0 T-0 P-4 C-2
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying knowledge to solve real world problems based on object-oriented principles.	
CO2.	Applying the basic approach of graphical user interface design using Abstract window toolkit, Applet and swing packages, create some application that are based upon some real world scenario	
CO3.	Analyzing the concept of database handling and creating application that are able to communicate with various database.	
CO4.	Analyzing the web architecture for creating applications using servlets and java server pages.	
CO5.	Analyzing the Client server architecture, Understanding the Remote method invocation architecture and creating basic application using Remote method invocation.	
	LIST OF EXPERIMENTS	
	1. To write a program in Java for illustrating, overloading, over riding and various forms of inheritance. **2.** To write programs to create packages and multiple threads in Java. **3.** To write programs in Java for event handling Mouse and Keyboard events. **4.** To create different applications using Layout Manager. **5.** To write programs in Java to create and manipulate Text Area, Canvas, Scroll Bars, Frames and Menus using swing/AWT. **6.** To create Applets using Java. **7.** To write program for Client Server Interaction with stream socket connections. **8.** To write a program in java to read data from disk file.	

New course Added

Course Code: TMUGA-401	Value Added Audit Course-2 BTech- Semester-IV **Analytical Reasoning**	L-2 T-1 P-0 C-0
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Applying the arithmetical concepts in Ratio Proportion Variation.	
CO2.	Employing the techniques of Percentage; Ratios and Average in inter related concepts of Time and Work, Time Speed and Distance.	
CO3.	Identifying different possibilities of reasoning based problems of Syllogisms and Venn diagram.	
CO4.	Examining the optimized approach to solve logs and Surds.	
Course Content:		
Unit-1:	**Ratio, proportions and variations** Concept of ratios, proportions, variations, properties and their applications	**5 Hours**
Unit-2:	**Time and Work** Same efficiency, different efficiency, alternate work, application in Pipes and Cisterns	**6 Hours**
Unit-3:	**Time Speed Distance** Average speed, proportionalities in Time, Distance, trains, boats, races, circular tracks	**6 Hours**
Unit-4:	**Logs and Surds** Concept and properties of logs, surds and indices	**4 Hours**
Unit-5:	**Coding and decoding** Sequential coding, reverse coding, abstract coding	**3 Hours**
Unit-6:	**Syllogisms** Two statements, three statements	**4 Hours**
Unit-7:	**Venn diagram** Basic concept and applications	**2 Hours**
Reference Books:	• R1:-Arun Shrama:- How to Prepare for Quantitative Aptitude • R2:-Quantitative Aptitude by R.S. Agrawal • R3:-M Tyra: Quicker Maths • R4:-Nishith K Sinha:- Quantitative Aptitude for CAT • R5:-Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com • R6:-Logical Reasoning by Nishith K Sinha • R7:-Verbal and Non Verbal Reasoning by R.S. Agrawal *** Latest editions of all the suggested books are recommended.**	

New course Added

Course Code: ECS510	Professional Core Course-11 B.Tech (CSE) Semester V **COMPUTER NETWORK**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the fundamentals of computer networks, their types, transmission modes, and various reference models.	
CO2.	Understanding error-free transmission of data along with data collision.	
CO3.	Understanding addressing techniques and transmission modes of a network.	
CO4.	Understanding the working of application layer protocols and the impact of network security tools on an existing systems.	
CO5.	Applying various routing and congestion control algorithms over a network and Identify Quality of service parameters and addressing techniques.	
Course Content:		
Unit-1:	**Network:** Goals, Applications, Components; Direction of Data flow networks, Categories, Types of Connections, Topologies, Protocols and Standards, ISO / OSI model, Transmission Media, Types, ISDN, Routers.	**8 Hours**
Unit-2:	**Medium Access Sub-Layer:** Channel Allocations, ALOHA protocols, Error detection and correction: Parity, LRC, CRC, Hamming code, Flow Control and Error control; Stop and wait, Go back-N, ARQ, Selective repeat ARQ, Sliding Window, HDLC, Ethernet: IEEE-802.3, 802.4, 802.5, 802.11, FDDI, SONET , Bridges.	**8 Hours**
Unit-3:	**Network Layer:** Internet works, Packet Switching and Datagram Approach, IP addressing methods, Sub netting, Routing: Distance Vector, Link State.	**8 Hours**
Unit-4:	**Transport Layer:** Duties, Multiplexing, Demultiplexing, Sockets. **Protocols:** User Datagram Protocol (UDP), Transmission Control Protocol (TCP),Congestion Control, Quality of Services (QOS), Integrated Services.	**8 Hours**
Unit-5:	**Application Layer:** Domain Name Space (DNS), File Transfer Access and Management, Electronic Mail, Virtual Terminals, WWW, Security, Cryptography.	**8 Hours**
Text Books:	1. Forouzan, B.A., *Data Communication and Networking*, Tata McGraw Hill	
Reference Books:	1. Stallings, W., *Data and Computer Communication*, Macmillan Press. 2. Keshav, S., *An Engineering Approach on Computer Networking*, Addison-Wesley. 3. Larry, L.P. and Peter, S.D., *Computer Network*, Harcourt Asia. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/105/106105081/ https://nptel.ac.in/courses/106/105/106105080/ https://www.youtube.com/watch?v=3DZLItfbqtQ	

New course Added

Course Code: ECS556	Laboratory Course15 B.Tech (CSE) Semester IV **PYTHON (LAB)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the concepts of different collections - list, Tuple, dictionaries and dataframe.	
CO2.	Understanding the concepts to built-in functions in Python and their usage.	
CO3.	Applying the concept of database connectivity with python to perform some operations in database.	
CO4.	Applying the programming construct to perform various matrix operations.	
CO5.	Developing own packages in python with different functionalities	
	LIST OF EXPERIMENTS	
	Based on the content: Introduction History, Features, Setting up path, Working with Python, Basic Syntax ,Variable and Data Types , Operator Conditional Statements If ,If- else ,Nested if-else Looping For, While ,Nested loops Control Statements Break, Continue . String Manipulation Accessing Strings ,Basic Operations ,String slices ,Function and Methods Lists Introduction ,Accessing list ,Operations ,Working with lists ,Function and Methods Tuple Introduction ,Accessing tuples ,Operations ,Working ,Functions and Methods. Dictionaries Introduction,Accessing values in dictionaries, Working with dictionaries, Properties ,Functions Functions Defining a function , Calling a function, Types of functions ,Function Arguments ,Anonymous functions ,Global and local variables. Modules Importing module ,Math module ,Random module ,Packages ,Composition Input-Output Printing on screen ,Reading data from keyboard ,Opening and closing file ,Reading and writing files ,Functions. Exception Handling Exception ,Exception Handling ,Except clause ,Try, finally clause ,User Defined Exceptions, OOPs concept class and object , Attributes ,Inheritance ,Overloading ,Overriding ,Data hiding	
	Write a Python program to: - 1. Demonstrate the working of 'id' and 'type' functions 2. To find all prime numbers within a given range. 3. To print 'n terms of Fibonacci series using iteration. 4. To demonstrate use of slicing in string 5.	

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	a. To add 'ing' at the end of a given string (length should be at least 3). If the given string already ends with 'ing' then add 'ly' instead. If the string length of the given string is less than 3, leave it unchanged. Sample String : 'abc' Expected Result : 'abcing' Sample String : 'string' Expected Result : 'stringly' b. To get a string from a given string where all occurrences of its first char have been changed to '$', except the first char itself. 6. a. To compute the frequency of the words from the input. The output should output after sorting the key alphanumerically. b. Write a program that accepts a comma separated sequence of words as input and prints the words in a comma-separated sequence after sorting them alphabetically. 7. Write a program that accepts a sequence of whitespace separated words as input and prints the words after removing all duplicate words and sorting them alphanumerically. 8. To demonstrate use of list & related functions 9. To demonstrate use of Dictionary& related functions 10. To demonstrate use of tuple, set& related functions 11. To implement stack using list 12. To implement queue using list 13. To read and write from a file 14. To copy a file 15. To demonstrate working of classes and objects 16. To demonstrate class method & static method 17. To demonstrate constructors 18. To demonstrate inheritance 19. To demonstrate aggregation/composition 20. To create a small GUI application for insert, update and delete in a table using Oracle as backend and front end for creating form	

New Course Added

Course Code: ECS611	Professional Core Course-13 B.Tech (CSE) Semester VI **DATA WAREHOUSING AND DATA MINING WITH R-PROGAMMING**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the various components of data warehousing.	
CO2.	Understanding the constructs and usage of R-Programming language for developers.	
CO3.	Understanding how to design the physical model of data warehouse.	
CO4.	Understanding various algorithms of Data Mining and its process.	
CO5.	Applying the programming concept to solve problems using R-Programming.	
CO6.	Analyzing the concept of data mining using R-Programming.	
Course Content:		
Unit-1:	**Introduction**: Motivation (for Data Mining), Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation.	**8 Hours**
Unit-2:	**Concept Description:** Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases	**8 Hours**
Unit-3:	**Classification and Predictions**: What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods KNN classifiers, Genetic Algorithm. **Cluster Analysis**: Data types in cluster analysis, Categories of clustering methods, Partitioning methods. Hierarchical Clustering-CURE and Chameleon. Density Based Methods-DBSCAN, OPTICS. Grid Based Methods- STING, CLIQUE. Model Based Method –Statistical Approach, Neural Network approach, Outlier Analysis.	**8 Hours**
Unit-4:	**Overview of R programming** : Introduction to R, The S Philosophy, Basic Features of R, Free Software Design of the R , System Limitations of R, R Resources, Installation and getting started with the R interface. **Data Manipulation (dplyr, reshape2 packages) and Scoping Rules of R**: Data Frames, The dplyr Package, dplyr Grammar,	**8 Hours**

	Installing the dplyr package, select(), filter(), arrange(), rename(), mutate(), group_by(), Lexical Scoping: Why Does It Matter?, Lexical vs. Dynamic Scoping	
Unit-5:	**Data Warehousing:** Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Aggregation, OLAP Servers: ROLAP, MOLAP, HOLAP, Process Architecture, 3 Tier Architecture, Data Mart.	**8 Hours**
Text Books:	1. Paul R. P., *Fundamentals Of Data Warehousing*, John Wiley and Sons.	
Reference Books:	1. Anahony S., *Data Warehousing In the Real World: A Practical Guide for Building DecisionSupport Systems*, John Wiley and Sons. 2.Kamber and Han, "Data Mining Concepts and Techniques", Hartcourt India P. Ltd., 3. R Programming for Data Science, by Roger D. PengUsing R for Introductory Statistics, by John Verzani, Chapman & Hall/CRC, 2004, ISBN 1584884509 Advanced R, by Hadley Wickham, ISBN 9781466586963 *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/110/107/110107092/ https://www.youtube.com/watch?v=J326LIUrZM8	

New course Added

Course Code: ECS612	Professional Core Course-14 B.Tech (CSE) Semester VI **MOBILE COMMUNICATION**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basic concept of mobile computing, wireless networks, structure of mobile computing based application.	
CO2.	Understanding various schemes like Fixed Assignment Schemes, Random Assignment Schemes, Reservation Based Schemes.	
CO3.	Understanding the mobile IP, Key functionality of IP, Choose the required functionality at each layer for given application.	
CO4.	Understanding the hand-off process in mobile communication	
CO5.	Analyzing solution for each functionality at each layer x Use simulator tools and design Ad hoc networks	
Course Content:		
Unit-1:	**Introduction**: Issues in mobile computing, Study of Electromagnetic Spectrum: Radio wave, Microwave, Infrared, Overview of wireless communication, Cellular concept, sharing of Wireless channels: FDMA, TDMA, CDMA.	**8 Hours**
Unit-2:	**Global System for Mobile Communication (GSM):** Architecture, Mobility Management, and Network signaling; General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes	**8 Hours**
Unit-3:	**Mobile Data Communication:** WLANs (Wireless LANs); IEEE 802.11 standard; Mobile IP; Wireless Application Protocol (WAP); Mobile Internet Standards; WAP Gateway and Protocols Wireless Markup Languages (WML).	**8 Hours**
Unit-4:	**Third Generation (3G) Mobile Services:** International Mobile Telecommunications 2000 (IMT 2000) vision; Wideband Code Division Multiple Access (W-CDMA); and CDMA 2000: Quality of services in 3G.	**8 Hours**
Unit-5:	**Wireless Local Loop (WLL):** Architecture, Technologies; Global Mobile Satellite Systems; Case studies of Iridium and Global star systems; Bluetooth technology and Wi-Max.	**8 Hours**
Text Books:	**1.** Lin, Y. B. and Chlamatac, I, *Wireless and mobile Networks Architecture,* John Wiley & Sons	
Reference Books:	**1.** Talukdar, A. K. and Yaragal, R., *Mobile Computing,* Tata McGraw Hill. **2.** Theodore, S. R., *Wireless Communication- Principles and Practices,* Pearson Education. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/117/102/117102062/ https://www.youtube.com/watch?v=Ibaqg6P2-8k	

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New course Added

Course Code: ECS654	Laboratory Course-18 B.Tech (CSE) Semester VI **DATA WAREHOUSING AND DATA MININGWITH R-PROGAMMING (LAB)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding Modeling and design of data warehouse.	
CO2.	Understanding how to Install and Configure R Tool and R Studio.	
CO3.	Applying the concept to design a star and snowflake schema.	
CO4.	Analyzing R Explorer, Mining techniques and Attribute Relation File	
CO5.	Developing basic data warehouse applications along with the data visualization using R.	
	LIST OF EXPERIMENTS	
	1. To develop an application to implement defining subject area, design of fact dimension table, data mart. 2. To develop an application to construct a multidimensional data. 3. To develop an application to implement data generalization and summarization technique. 4. To develop an application to extract association rule of data mining. 5. To develop an application for classification of data. 6. To develop an application for decision tree. 7. To develop an application to implement R PROGRAMMING loops. 8. To develop an application to implement structure and components of an R-Programming	

New course Added

Course Code: EHM601 / FOE023	Professional Core Course Specialization- Artificial Intelligence, Machine Learning & Deep Learning B.Tech (CSE) Semester VI **ENTREPRENEURSHIP**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Understanding the meaning and concepts of Entrepreneurship	
CO2.	Understanding and applying the concepts and theories of motivation Analyzing different facet and forms of business	
CO3.	Understand, apply and evaluate different financing options	
CO4.	Understanding the government support policies and its applications	
CO5.	Understanding and applying remedies to sick businesses	
Course Content:		
Unit-1:	**Entrepreneurship:** Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.	**8 Hours**
Unit-2:	**Motivation:** Major Motives Influencing an Entrepreneur – Achievement Motivation Training, Self-Rating, Business Games, Thematic Apperception Test – Stress Management, Entrepreneurship Development Programs – Need, Objectives.	**8 Hours**
Unit-3:	**Business:** Small Enterprises – Definition, Classification – Characteristics, Ownership Structures – Project Formulation – Steps involved in setting up a Business – identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal – Sources of Information – Classification of Needs and Agencies.	**8 Hours**
Unit-4:	**Financing and Accounting:** Need – Sources of Finance, Term Loans, Capital Structure, Financial Institution, Management of working Capital, Costing, Break Even Analysis, Taxation – Income Tax, Excise Duty – Sales Tax.	**8 Hours**
Unit-5:	**Support to Entrepreneurs:** Sickness in small Business – Concept, Magnitude, Causes and Consequences, Corrective Measures – Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Sub Contracting.	**8 Hours**
Text Books:	1. Khanka. S.S., "Entrepreneurial Development" S. Chand & Co. Ltd., Ram Nagar, New Delhi.	
Reference Books:	1. Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill. 2. Mathew J Manimala, "Entrepreneurship theory at cross roads: paradigms and praxis" 2nd Edition Dream tech.	

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	3. Rajeev Roy, 'Entrepreneurship', Oxford University Press. 4. EDII "Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development", Institute of India, Ahmadabad. ***Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/110/106/110106141/ https://www.youtube.com/watch?v=QoqohmccTSc	

Evaluation Scheme:

Internal Evaluation	External Evaluation	Total Marks
40 Marks	**60 Marks**	**100**
The Internal evaluation will be performed by the internal faculty on the basis of the below mentioned parameters: • Problem Identification • Data Collection and Data Analysis • Case study • Proposal of innovative Business idea (All Above mentioned parameters contains 30 marks and 10 marks for Attendance)	External evaluation will be performed by the external examiner on the basis of following parameters: • Report • Presentation • VIVA (All Above Category contains 20 marks each)	

New Course Added

Course Code: ECS709	Professional Core Course-17 B.Tech (CSE) Semester VII **CLOUD COMPUTING**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the Cloud Computing and its role in current scenario.	
CO2.	Understanding the different models of Cloud Computing and their limitations	
CO3.	Understanding the virtual data centre architecture, governance strategy, security mechanism and contingency plans.	
CO4.	Identifying various risk factors involved in Cloud Computing and to tackle them using risk management techniques	
CO5.	Understanding the importance of Cloud services and economic factors related to them	
CO6.	Understanding the billing process for usage of Cloud Computing and factors that controls the bill amount	
CO7.	Understanding the architecture and considerations for storage network design using technologies like iSCSI, FCIP, FCoE etc.	
Course Content:		
Unit-1:	**Cloud Computing:** Existing usage of cloud computing; New paradigm in the cloud; Applications. **Cloud Computing Architectural Framework:** Cloud: Benefits, Vocabulary, Business scenarios, Essential characteristics, Deployment models, Service models, Multi-tenancy, Approaches to create a barrier between the tenants.	**8 Hours**
Unit-2:	**Vendor Lock-in and Efforts at Standardization:** Need of migration; Preventing vendor lock-in; Comparison chart. **Cloud Software:** Scripting languages; Eucalyptus; Cloud-optimized Linux; ABIQUO; Problem of metering Cloud broker.	**8 Hours**
Unit-3:	**Cloud Economics and Capacity Management:** Restricted choices; Capacity planning; Queuing and response time; Evidence based decision making; Instrumentation (measuring resource consumption); Bottlenecks; Key volume indicators.	**8 Hours**
Unit-4:	**Cloud Reliability, Fault Tolerance and Response Time:** Business continuity management: System reliability, Human factors; Case studies on designing for reliability; Concept of fault tolerance; Response time. **Internet Cloud Security:** Introduction; Potential threats; Security as a service by cloud providers; Fraud theory and Intellectual property; Security engineering.	**8 Hours**
Unit-5:	**Case Studies on Cloud Computing Applications:** Amazon's cloud services (AWS); Windows Azure; Cloud software for private banking.	**8 Hours**
Text Books:	1. David, E.Y. Sarna, *Implementing and Developing Cloud Computing Applications*, CRC Press.	
Reference Books:	1. Mather, T., *Cloud Security and Privacy: An Enterprise Perspective On Risks And Compliance,* O'Relly. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/105/106105167/ https://www.youtube.com/watch?v=EN4fEbcFZ_E	

New course Added

Course Code: EHM801	Humanities and Social Sciences including Management Course -8 B.Tech (CSE) Semester VIII **Project Management for Engineers**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding Project Management & its evaluation	
CO2.	Understanding and analysis the technical feasibility of a project	
CO3.	Understanding financial system and analyze the use of funding mechanism	
CO4.	Understanding the application of laws related to business and project execution	
CO5.	Understanding Financial Accounting and Financial Statements for business	
Course Content:		
Unit-1:	**Project Management & Sources of Funds:** Project Management- Introduction, Need, Phases and Processes of Project Management. **Financial Markets as Sources of Funds:** Money Market & Capital Market. Overview of Regulatory Framework of Financial System in India- SEBI, RBI, and NABARD.	**8 Hours**
Unit-2:	**Project Feasibility & Analysis:** Project Identification, Generation Of Ideas, SWOT Analysis, Screening and Project Rating Index. Market & Demand Analysis: Collection of Data, Market Survey, Project Risk Analysis.	**8 Hours**
Unit-3:	**Project Technical Analysis:** Selection of Technology, Plant Capacity, Structures and Civil Work. Location- Factors, Costs, Availability of Resources. Environmental Aspects, Project Implementations. **Financial Analysis:** Project Cost, Cost of Production, Cost of Capital, Time Value of Money.	**8 Hours**
Unit-4:	**Regulatory Framework for Project:** Legal Environment of Business, Law of Contract- Meaning and Concepts, Contract of Agent and Agency, Power of Attorney, Consumer Protection Law- Introduction, Rights of Consumers, Complaints & its Remedies, Intellectual Property Law- Introduction, Rights from Patents & Copyright, Infringement its Remedies, Overview of Companies Act, Foreign Exchange Management Law, Labour Laws in India, Various Project Approvals from Local, State & Central Government.	**8 Hours**
Unit-5:	**Basics of Accounting for Project:** Introduction, Meaning of Account & Accountancy, Book-keeping, Accounting Process, Users of accounting information, Double Entry Accounting, Accounting Equation. Introduction to Trial Balance, Trading Account, Profit and Loss Account, Balance Sheet, Cash Flow and Fund Flow. Budget- Meaning of a Budget & Budgeting, Budgetary Control, Types of Budgets.	**8 Hours**
Text Books:	1. Chaudhary, S., Project Management, Tata Mc Graw Hill Publications	
Reference Books:	1. Bhole L.M., Financial Institutions and Markets, Tata McGraw-Hill	

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	2. Srivastava, R.M & Nigam Divya, Management of Financial Institutions, Himalaya 3. Goyal B.B., Project Management: A Development Perspective, Deep & Deep Publications. *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/110/104/110104073/ https://www.youtube.com/watch?v=gEhr0ZAL2zE	

New course Added

Course Code: ECS812	Professional Core Course-18 B.Tech (CSE) Semester VIII **Big Data Analytics**	L-3 T-0 P-0 C-3
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***Understanding*** the requirement of Big data with respect to 5 V's .	
CO2.	***Understanding*** the basic storage structure used in Big data with respect to clusters.	
CO3.	***Understanding*** the Hadoop Ecosystem and its components.	
CO4.	***Analyzing*** the data processing in Big data with HIVE , PIG and HBASE.	
CO5.	***Analyzing*** the functionality and working of Zookeeper for monitoring Servers in Cluster.	
Course Content:		
Unit-1:	**INTRODUCTION TO BIG DATA:** Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.	**8 Hours**
Unit-2:	**INTRODUCTION HADOOP:** Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.	**8 Hours**
Unit-3:	**HADOOP ARCHITECTURE:** Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.	**8 Hours**
Unit-4:	**HIVE AND HIVEQL, HBASE:**Hive Architecture and Installation, Comparison with Traditional Database, HiveQL – Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries, HBase conceptsAdvanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper	**8 Hours**
Unit-5:	**Big Data Analytics:** Introduction to Big data Business Analytics - State of the practice in analytics role of data scientists - Key roles for successful analytic project - Main phases of life cycle - Developing core deliverables for stakeholders.	**8 Hours**
Text Books:	Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.	

Reference Books:	1. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012. 2. Vignesh Prajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013. 3. Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014 4. Jy Liebowitz, "Big Data and Business analytics",CRC press, 2013. Chris Eaton, Dirk Deroos, Tom Deutsch et al., "Understanding Big Data", McGrawHIll, 2012 *** Latest editions of all the suggested books are recommended.**	
Additional Electronic Reference Material:	https://nptel.ac.in/courses/106/104/106104189/ https://www.youtube.com/watch?v=3SK9iJNYehg	

New course Added

Course Code: ECS855	Laboratory Course-21 B.Tech (CSE) Semester III **BIG DATA (LAB)**	L-0 T-0 P-2 C-1
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	***understanding*** the concept to work with basic linux commands.	
CO2.	***Applying*** the concept to install a standalone Hadoop cluster Node.	
CO3.	***Applying*** the concept to read and write data into HDFS from Linux environment.	
CO4.	***Applying*** the concept to solve a problem using MAP Reduce programming.	
CO5.	***Analyzing*** the concept for data processing using HIVE.	
	LIST OF EXPERIMENTS	
	1. Introduction, use and assessment of most recent advancements in Big Data technology along with their usage and implementation with relevant tools and technologies. 2. Map Reduce application for word counting on Hadoop cluster. 3. Unstructured data into NoSQL data and do all operations such as NoSQL query with API. 4. K-means clustering using map reduce. 5. Page Rank Computation. 6. Data retrieval from AQL. 7. Data Retrieval from JQL 8. Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics	