

CURRICULUM FOR MASTER OF COMPUTER APPLICATIONS (MCA) PROGRAMME

CHOICE BASED CREDIT SYSTEM Effective from the session 2016-17

HIMACHAL PRADESH TECHNICAL UNIVERSITY (A STATE GOVERNMENT UNIVERSIRY) Gandhi Chowk, Hamirpur, District Hamirpur (HP)



2016

PREAMBLE

The curriculum of an institution of higher learning is a living entity. It evolves with time; it reflects the ever changing needs of the society and keeps pace with the growing talent of the students and the faculty. The curriculum of Himachal Pradesh Technical University, Hamirpur (HPTU) is no exception. Half a century of experience in preparing graduates in engineering and postgraduates in science for a wide variety of industries has led to creation of the new curriculum. I sincerely believe that it will meet the aspirations of all stake holders – students, faculty and the employers of the graduates and postgraduates of H.P. Technical University Hamirpur.

In the university system the curricula and syllabi represented the upper limit of the material to be covered, the teacher having no motivation for stepping outside the defined territory. The curriculum and syllabi only serve as a guideline. The teacher enjoys freedom to expand it in any direction he feels appropriate, incorporates his latest knowledge and stimulates the creative minds of the students. He experiments with new contents and new techniques. A new teaching learning paradigm is born.

The curriculum is the culmination of the efforts of large number of faculty members and university staff and reflects their creative contribution. In keeping with the demands of the changing times, it contains many innovative features. I sincerely hope that the faculty and students will take full advantage of the dynamic features of the curriculum and make the teaching-learning process a truly sublime experience for all.

On behalf of the Senate of HP Technical University Hamirpur, I record my appreciation of the meticulous work done by the Dr. N.N.Sharma, Dean Academic in compiling the whole curricula of different programmes in this consolidated form. I also record my personal gratitude to the members of the Senate who have lent every bit of their wisdom to make the contents truly superior.

Prof. R. L. Sharma, Vice-Chancellor



CURRICULUM FOR MCA PROGRAMME

- 1. Introduction: The curriculum for MCA Program of study has been designed with total minimum credits of 120 for those admitted in 1st year of MCA Programme (Direct Entry). The minimum credit requirement will be 77 for those admitted in 2nd year of MCA Programme(Lateral Entry). A student must register a minimum of 16 credits in each semester. Students can also opt open elective subjects from 3rd semester onwards, the total maximum credits of 130 for those admitted in 1st year of MCA Programme (Direct Entry) and the total maximum credits of 87 for those admitted in 2nd year of MCA Programme (Lateral Entry).
- 2. **Credit System:** A system enabling quantification of course work, with one credit being assigned to each unit after a student completes its teaching-learning process, followed by passing in both Internal Assessment (IA) and End Semester Examination (ESE); Further, Choice Based Credit System (CBCS) to be helpful in customizing the course work for a student, through Core, Electives and Open Electives.
- 3. **Credit Course:** All Courses registered by a student in a Semester is to earn credits. In a widely accepted definition, students to earn One Credit by registering and passing:
 - One Hour/Week/Semester for Lecture (L) Courses or Tutorials (T); and,
 - Two Hour/Week/Semester for Laboratory/Practical (P).
- 4. **Curriculum Structure:** MCA degree programme will have a curriculum with Syllabi consisting of following type of courses:
 - I. Foundation Course (F): Include Soft Skills and Business Management (SBM), Mathematics (MT) and Professional & Social Ethos (PSE).
 - II. **Program Core Courses (PC):** A course, which should compulsorily by studied by a candidate as a core requirement is termed as a Core course. These courses are employability enhancement courses relevant to the chosen program of study. Program core comprises of Theory, Practical, Project, Seminar etc. Project work is considered as a special course involving application of knowledge in solving/ analyzing/exploring a real life situation/ difficult problem and a candidate studies such a courses on his own with an advisory support by a teacher/faculty member.



- III. Elective Courses: Elective course is generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/subject of study or with provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill. Accordingly, elective course may be categorizes as:
 - A. **Program Elective Courses (E):** Programme elective courses include the courses relevant to the chosen programme of study. These courses may be offered by the main discipline/subject of study.
 - B. **Open Elective Courses (O):** An open elective course is generic in nature and is chosen generally from an unrelated discipline/subject, with an intention to seek exposure. A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Open Elective.
- IV. Audit Courses (A): Audit courses are the courses offered to supplement the student knowledge/skills prescribed outside the range of credits.

5. Nomenclature Used:

(a) Postgraduate Core Courses

- (i) Core Course(C)
- (ii) Information Technology (IT)
- (iii) Software Development (SD)
- (iv) Industrial Training & Project (ITP)
- (v) Theory Subject (T)
- (vi) Practical (P)
- (vii) Industrial Training(I)
- (viii) Core Information Technology Course (C-IT)
- (ix) Core Software Development Course (C-SD)

(b) Postgraduate Electives Courses

- (i) Elective Subject (E)
- (ii) Elective Information Technology Course (E-IT)
- (iii) Audit Course (AC)
- (iv) Elective Audit Course (E-AC)



(c) Foundation Courses

- (i) Foundation Courses (F)
- (ii) Soft Skills and Business Management (SBM)
- (iii) Mathematics (MA)
- (iv) Basic Sciences & Maths (BSM)
- (v) Foundation Soft Skills and Business Management Course(F-SBM)
- (vi) Professional and Social Ethos (PSE)
- (vii) Foundation Mathematics Course (F-MT)

(d) Open Elective Courses

- (i) Open Elective Courses (O)
- (ii) Open Elective Information Technology Courses (O-IT)

Course Classification							
1. Fo	undation Course	L	Т	Р	Credits		
1.	Business Communication	3	0	0	3		
2.	Mathematics	3	1	0	4		
3.	Fundamental of Management	3	1	0	4		
4.	Operational Research	3	1	0	4		
5.	Presentation and Interview Skills	3	0	2	4		
6.	Human Values and Professional Ethics	3	0	0	3		
	Total Credits						
2. Pr	ofessional Core Courses (Theory)	L	Т	Р	Credits		
1.	Programming Methodologies (C,C++)	3	1	0	4		
2.	Fundamentals of IT and Digital Electronics	3	1	0	4		
3.	Computer Architecture	3	1	0	4		
4.	Software Engineering	3	1	0	4		
5.	Object Oriented Programming and Data Structure Using Java	3	1	0	4		
6.	Data Base Management System	3	1	0	4		
7.	Computer Networks	3	1	0	4		
8.	Operating System	3	1	0	4		
9.	Web Technology (HTML, XHTML, CSS)	3	1	0	4		
10.	Visual Programming Using Java	3	1	0	4		



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11.	Discrete Mathematics	3	1	0	4					
12.	Fundamentals of Scripting Language using Java Scrips& PHP	3	1	0	4					
13.	Mobile Computing	3	1	0	4					
14.	Theory Of Computation	3	0	0	3					
15.	Web Programming using Perl & Python	3	1	0	4					
16.	Server Side Programming using JSP	3	1	0	4					
Total Credits										
3. Pr	3. Professional Core Courses (Practical)LTP									
1.	Programming-Lab	0	0	3	1					
2.	IT-Lab	0	0	3	1					
3.	Data Structures-Lab	0	0	3	1					
4.	DBMS-Lab	0	0	3	1					
5.	Web Tech-Lab + Minor Case Study	0	0	3	1					
6.	Visual Programming-Lab + Minor Case Study	0	0	3	1					
7.	Scripting Language-Lab +Minor Case Study	0	0	3	1					
8.	Mobil Computing-Lab + Minor Case Study	0	0	3	1					
9.	Web Programming-Lab+ Major Case Study	0	0	3	1					
10.	JSP-Lab + Major Case Study	0	0	3	1					
	Total Credits		•		10					
4. Pro	ogramme Elective	L	Т	Р	Credits					
1.	Elective-1	3	1	0	4					
2.	Elective-2	3	0	0	3					
3.	Elective-3	3	0	0	3					
	Total Credits			1	10					
5. Op	en Elective	L	Т	Р	Credits					
1.	Open-Elective-1	3	0	0	3					
2.	Open-Elective-2	3	0	0	3					
3.	Open-Elective-3	3	1	0	4					
	Total Credits				10					
6. Au	dit Course	L	Т	Р	Credits					
		1	1	1						



1.	IT and Cyber Laws in India	3	0	0	0		
	Total Credits						
7. Pr	7. Professional Core Course (Industrial Training and Project)						
1.	1. Industrial Training and Project						
	Total Credits						

6. Course numbering scheme:

Each course number is denoted by six alpha-numerals, three alphabets before hyphen indicates course name and three alpha-numerals after hyphen indicates, course type, semester and course number respectively as illustrated in the figure.



7. Course Plan: It has been recommended by the AICTE that the suggested Courses Work 120-130 Credits, with 15-25 credits per Semester on an average with built-in flexibility. The courses need to be completed successfully by a student to qualify for the award of the PG degree. The suggested plan for sequencing the Course Work is given in following Table 1.

Semester	Subject Area Coverage
1&11	Foundation Courses-1
	Professional Core Courses(Information Technology)-4
	Professional Core Courses(Software Development)-2
III & IV	Foundation Courses-1

Table 1:Typical Sequencing Plan for Courses:



	Professional Core Courses (Information Technology)-1
	Professional Core Courses(Software Development)-4
	Elective(Information Technology)-1
	Open Elective (Additional)-1
V	Foundation Courses-2
	Professional Core courses(Software Development)-4
	Elective(Information Technology)-1
	Audit Course (Information Technology)-1
	Open Elective (Additional)-1
VI	Professional Core Course (Industrial Training and Project)

Table 2: Elective Subjects

Sr. No.	Course Type	Course	Course Title	Remarks
		Code		
Elective	(Information Te	echnology)		
1.	E-IT	MCA-E31	Artificial Intelligence	Student can chose one subject out of these three Elective subjects in 3 rd
2.	E-IT	MCA-E32	Software Quality Assurance	semester.
3.	E-IT	MCA-E33	Information Security	
4.	E-IT	MCA-E41	Parallel Computing	Student can chose one subject out of these three Elective subjects in 4 th
5.	E-IT	MCA-E42	Cloud Computing	semester.
6.	E-IT	MCA-E43	Compiler Design	
7.	E-IT	MCA-E51	Algorithm Design	Student can chose one subject out of these three Elective subjects in 5 th
8.	E-IT	MCA-E52	Image Processing	semester.
9.	E-IT	MCA-E53	Linux Operation System	

Table 3: Open Elective Subjects:

Sr. No.	Course	Course	Specialization	Course	Remarks
	Туре	Code			
1.	0-IT	MCA-031	Mobile Computing (Part-I)	Mobile Computing and	Student can chose one
				Wireless Networks	subject out of these four
2.	O-IT	MCA-032	Data Analytics (Part-I)	Simulation and Modeling using	Open Elective subjects in
				MATLAB	3 rd semester.
3.	O-IT	MCA-033	Artificial Intelligence(Part-I)	Natural Language Processing	



4.	O-IT	MCA-034	Information Security (Part-I)	Computer and Information Security	
5.	O-IT	MCA-041	Mobile Computing (Part-II)	Mobile Architecture and Security	Student can chose one subject out of these four
6.	O-IT	MCA-042	Data Analytics (Part-II)	Data Analysis using R-Tool	Open Elective subjects in 4 th semester. Student
7.	O-IT	MCA-043	Artificial Intelligence(Part-II)	Image and speech recognition	have to opt the same specialization as he/she
8.	O-IT	MCA-O44	Information Security (Part-II)	Network and Web Security	had opted in 3 rd semester
9.	O-IT	MCA-051	Mobile Computing (Part-III)	Programming for Mobile Devices	Student can chose one subject out of these four
10.	O-IT	MCA-052	Data Analytics(Part-III)	Big Data Analysis	Open Elective subjects in 5 th semester. Student
11.	O-IT	MCA-053	Artificial Intelligence(Part-III)	Soft Computing	have to opt the same specialization as he/she
12.	O-IT	MCA-054	Information Security(Part-III)	Mobile and Cloud Security	had opted in 3 rd and 4 th semesters

Choice Based Credits Division:

Sr. No	Program Component	Subject Type				Credits			
		Theory	Practical	Total	Theory	Practical	Project	Total	
(i)	Core Course-(C)	16	10	26	64	10	17	91	
(ii)	Electives-(E)	4	0	4	12	0	0	12	
(iii)	Foundation-(F)	5	0	5	17	0	0	17	
	Total	25	10	35	93	10	17	120	
(iv)	Open Elective-(O)	3	0	4	10	0	0	10	
	Total*	28	10	39	103	10	17	130	

The total indicated by asterisk (*) mark will be applicable for the students who opt open elective subject along with the other foundation, compulsory and elective subjects.





Minimum Cr	edits requi	ired for Di	irect / Liter	al Entry
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Sr.	Program	Category	Minimum Credits For		
No	Component		MCA	MCA(LE)	
(i)	Compulsory	Information Technology (IT)	30	4	
	Core	Software Development (SD)	40	30	
		Mathematics (MT)	4	4	
		Industrial Training & Project (ITP)	17	17	
		Sub total	92	56	
(ii)	Foundation	Soft Skills and Business Management (SBM)	9	6	
	Core	Mathematics (MT)	8	4	
		Sub total	17	10	
(iii)	Electives	Information Technology (IT)	12	12	
		Sub total	12	12	
(iv)	Additional	Audit Courses(AC)	S*	S*	
	Course				
		Grand Total	120	77	

Note:S*- S grade for satisfactory.

Maximum Credits for Direct / Literal Entry

Sr.	Program	Category	Credits					
No	Component		MCA	MCA(LE)				
(i)	Compulsory	Information Technology (IT)	30	4				
	Core	Software Development (SD)	40	30				
		Mathematics (MT)	4	4				
		Industrial Training & Project (ITP)	17	17				
		Sub total	92	56				
(ii)	Foundation	Soft Skills and Business Management (SBM)	9	6				
	Core	Mathematics (MT)	8	4				
		Sub total	17	10				
(iii)	Electives	Information Technology (IT)	12	12				
		Sub total	12	12				
(iv)	Additional	Audit Courses(AC)	S*	S*				
	Course							
(v)	Open	Information Technology (IT)	10	10				
	Electives	Sub total	10	10				
	Grand Total 130 87							

Note:S*- S grade for satisfactory.



Minimum Courses required for Direct / Literal Entry

Sr.	Course	Category	Minimum	Courses For
No	Component		MCA	MCA(LE)
(i)	Compulsory	Information Technology (IT) Theory	7	1
	Core Course	Information Technology (IT) Practical	2	0
		Software Development (SD) Theory	8	6
		Software Development (SD) Practical	8	6
		Mathematics (MT)	1	1
		Industrial Training & Project (ITP)	1	1
		Sub total	27	15
(ii)	Foundation	Soft Skills and Business Management (SBM)	3	2
	Core Course	Mathematics (MT)	2	1
		Sub total	5	3
(iii)	Electives	Information Technology (IT)	3	3
	Course	Sub total	3	3
(iv)	Additional	Audit Courses(AC)	1	1
	Course	Sub total	1	1



Grand Total	36	22

Sr.	Course	Category	Cou	rses
No	Component		MCA	MCA(LE)
(i)	Compulsory	Information Technology (IT) Theory	7	1
	Core Course	Information Technology (IT) Practical	2	0
		Software Development (SD) Theory	8	6
		Software Development (SD) Practical	8	6
		Mathematics (MT)	1	1
		1	1	
		Sub total	27	15
(ii)	Foundation	Soft Skills and Business Management (SBM)	3	2
	Core Course	Mathematics (MT)	2	1
		Sub total	5	3
iii)	Electives	Information Technology (IT)	3	3
	Course	Sub total	3	3
(iv)	Additional	Audit Courses(AC)	1	1
	Course	Sub total	1	1
(v)	Open	Information Technology(IT) Theory	3	3
	Elective	Information Technology (IT) Practical	1	1
		Sub total	4	4
		Grand Total	40	26



Structure for MCA Course

Semester				Prof	essional Co	re Courses					Foundatio	on Courses
			Theory						Practical			
1	Programming Methodologies (C,C++)	Fundamental of IT and Digital Electronics	Computer Archit	ecture	Softwa	re Engineering	Program ming – Lab	IT –Lab		Business Communication		
2	Object Oriented Programming and Data Structures Using Java	Data Base Management System	Computer Netwo	orks	; Operating System		Data Structure -Lab	DBMS-Lab			Mathematics	
Semester		Pro	fessional Core Cou	rses					Elective		Foundation	Open Elective
		Theory			Pra	ctical					Courses	
3	Web Technology (HTML,XHTML,C SS)	Visual Programming Using Java	Discrete Mathematics	Web T Minor Study	ech-Lab + Case	Visual Programming- Lab + Minor Case Study	Artificial Intelligence	2	Software Quality Assurance	Information Security	Fundamental of Management	Open Elective Part-I
4	Fundamentals of Scripting Languages Using Java Script and PHP	Mobile Computing	Theory of Computation	Scripti Langu Minor Study	ng age-Lab + Case	Mobile Computing – Lab + Minor Case Study	Parallel Computing		Cloud Computing	Compiler Design	Operational Research	Open Elective Part-II
Semester		Professional Core C	ourses			Elective	Audit Course				Foundation	Open Elective
	The	eory	Practical								Courses	



5	Web Programming Using Perl & Python	Server Side Programming Using JSP	Web Progra mming - Lab+ Major Case Study	JSP-Lab + Major Case Study	Algorithm Design	Image Processing	Linux Operating System	Human Values and Professional Ethics	IT and Cyber Laws in India	Presentation and Interview Skills	Open Elective Part-III
6	Р	roject and Industrial	Training								



	SCHEME OF TEACHING AND EXAMINATION											
	MASTERS OF COMPUTER APPLICATIONS											
Semester-I	Semester-I											
Course Type	Course	Course Title	P	eriod	ds	Credits	Evaluation Scheme					
	Code		L	Т	Р		ESE		Intern	nal	Total	
								Α	ssessn	nent		
								СТ	TA	Total		
F-SBM	MCA-F11	Business Communication	3	0	0	3	60	24	16	40	100	
C-SD	MCA-C11	Programming Methodologies (C,C++)	3	1	0	4	60	24	16	40	100	
C-IT	MCA-C12	Fundamental of IT and Digital Electronics	3	1	0	4	60	24	16	40	100	
C-IT	MCA-C13	Computer Architecture	3	1	0	4	60	24	16	40	100	
C-IT	MCA-C14	Software Engineering	3	1	0	4	60	24	16	40	100	
C-SD	MCA-C15	Programming- Lab	0	0	3	1	50	25	25	50	100	
C-IT	MCA-C16	IT-Lab	0	0	3	1	50	25	25	50	100	
	Total		15	4	6	21	400	170	130	300	700	

Legend:	L-Lecture	T -Tutorial				
	P-Practical	CT-Class Test				
	TA-Teacher's Assessment	ESE-End Semester Examination				

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SCHEME OF TEACHING AND EXAMINATION MASTERS OF COMPUTER APPLICATIONS

Semester-II

Semester II											
Course Type	Course	Course Title	P	eriod	ls	Credits		Eval	uation	Scheme	2
	Code		L	Т	Ρ		ESE		Intern	nal	Total
								A	ssessn	nent	
								СТ	TA	Total	
F-MA	MCA-F21	Mathematics	3	1	0	4	60	24	16	40	100
C-SD	MCA-C21	Object Oriented Programming and Data Structures Using Java	3	1	0	4	60	24	16	40	100
C-IT	MCA-C22	Data Base Management System	3	1	0	4	60	24	16	40	100
C-IT	MCA-C23	Computer Networks	3	1	0	4	60	24	16	40	100
C-IT	MCA-C24	Operating System	3	1	0	4	60	24	16	40	100
C-SD	MCA-C25	Data Structure- Lab	0	0	3	1	50	25	25	50	100
C-IT	MCA-C26	DBMS-Lab	0	0	3	1	50	25	25	50	100
Total			15	5	6	22	400	170	130	300	700

Legend:	L-Lecture	T-Tutorial				
	P-Practical	CT-Class Test				
	TA-Teacher's Assessment	ESE-End Semester Examination				



	SCHEME OF TEACHING AND EXAMINATION										
	Μ	ASTERS OF CO	MP	UTI	ER /	APPLIC	ΑΤΙΟ	ONS			
Semester	Semester-III										
Course Type	Course	Course Title	P	erioc	ls	Credits		Eval	uation	Scheme	
	Code		L	Т	Ρ		ESE		Intern	al	Total
								A	ssessm	ient	
								СТ	TA	Total	
F-SBM	MCA-F31	Fundamental of Management	3	1	0	4	60	24	16	40	100
C-SD	MCA-C31	Web Technology (HTML,XHTML,CSS)	3	1	0	4	60	24	16	40	100
C-SD	MCA-C32	Visual Programming Using Java	3	1	0	4	60	24	16	40	100
C-MT	MCA-C33	Discrete Mathematics	3	1	0	4	60	24	16	40	100
C-SD	MCA-C34	Web Tech-Lab + Minor Case Study	0	0	3	1	50	25	25	50	100
C-SD	MCA-C35	Visual Programming- Lab + Minor Case Study	0	0	3	1	50	25	25	50	100
Elective	•										
E-IT		Elective-1	3	1	0	4	60	24	16	40	100
Total			15	5	6	22	400	170	130	300	700
Open Elective	e (Additional)										
O-IT		Open Elective-1	3	0	0	3	60	24	16	40	100
	Total*		18	5	6	25	460	194	146	340	800

The total indicated by asterisk (*) mark will be applicable for the students who opt open elective subject along with the other foundation, compulsory and elective subjects.

Note: 20 Marks for Minor Case Study and 30 Marks for Other Lab work for End Semester Examination

Legend:	L-Lecture	T-Tutorial				
	P-Practical	CT-Class Test				
	TA-Teacher's Assessment	ESE-End Semester Examination				

Elective

Sr. No.	Course Type	Course Code	Course Title
1.	E-IT	MCA-E31	Artificial Intelligence
2.	E-IT	MCA-E32	Software Quality Assurance
3.	E-IT	MCA-E33	Information Security



Open Elective

Sr. No.	Course Type	Course Code	Specialization	Course Title	
1.	O-IT	MCA-031	Mobile Computing (Part-I)	Mobile Computing and Wireless Networks	
2.	O-IT	MCA-032	Data Analytics (Part-I)	Simulation and Modeling using MATLAB	
3.	O-IT	MCA-033	Artificial Intelligence(Part-I)	Natural Language Processing	
4.	O-IT	MCA-034	Information Security (Part-I)	Computer and Information Security	



	SCHEME OF TEACHING AND EXAMINATION MASTERS OF COMPUTER APPLICATIONS										
Semester-	Semester-IV										
Course Type	Course	Course Title	Р	erioc	ls	Credits		Eval	uation	Scheme	
	Code		L	Т	Ρ		ESE		Intern	al	Total
								A	ssessn	nent	
								СТ	TA	Total	
F-SBM	MCA-F41	Operational Research	3	1	0	4	60	24	16	40	100
C-SD	MCA-C41	Fundamentals of Scripting Languages Using Java Script and PHP	3	1	0	4	60	24	16	40	100
C-SD	MCA-C42	Mobile Computing	3	1	0	4	60	24	16	40	100
C-IT	MCA-C43	Theory of Computation	3	0	0	3	60	24	16	40	100
C-SD	MCA-C44	Scripting Language- Lab + Minor Case Study	0	0	3	1	50	25	25	50	100
C-SD	MCA-C45	Mobile Computing- Lab + Minor Case Study	0	0	3	1	50	25	25	50	100
Elective											
E-IT		Elective-2	3	0	0	3	60	24	16	40	100
	Total		15	3	6	20	400	170	130	300	700
Open Elective	(Additional)										
O-IT		Open Elective-2	3	0	0	3	60	24	16	40	100
	Total*		18	3	6	23	460	194	146	340	800

The total indicated by asterisk (*) mark will be applicable for the students who opt open elective subject along with the other foundation, compulsory and elective subjects.

Note: 20 Marks for Minor Case Study and 30 Marks for Other Lab work for End Semester Examination

Legend:	L-Lecture	T -Tutorial
	P-Practical	CT-Class Test
	TA-Teacher's Assessment	ESE-End Semester Examination

Elective

Sr. No.	Course Type	Course Code	Course Title
1.	E-IT	MCA-E41	Parallel Computing
2.	E-IT	MCA-E42	Cloud Computing
3.	E-IT	MCA-E43	Compiler Design



Open Elective

Sr. No.	Course Type	Course Code	Specialization	Course Title		
1.	O-IT	MCA-041	Mobile Computing (Part-II)	Mobile Architecture and Security		
2.	O-IT	MCA-042	Data Analytics (Part-II)	Data Analysis using R-Tool		
3.	O-IT	MCA-043	Artificial Intelligence(Part-II)	Image and speech recognition		
4.	O-IT	MCA-044	Information Security (Part-II)	Network and Web Security		



	SCI	HEME OF TEA	ACHI	NG	A١	ID EXA	MIN	ATIO	N		
	Ν	ASTERS OF O	CON	IPU	TE	R APPL	ICAT	IONS	5		
Semest	Semester-V										
Course	Course	Course Title	Pe	eriod	5	Credits		Evalu	ation	Scheme	
Туре	Code		L	Т	Ρ		ESE		Intern	al	Total
								A	ssessm	nent	
								СТ	TA	Total	
F-SBM	MCA-F51	Presentation and Interview Skills	3	0	2	4	60	24	16	40	100
F-PSE	MCA-F52	Human Values and Professional Ethics	3	0	0	3	60	24	16	40	100
C-SD	MCA-C51	Web Programming Using Perl & Python	3	1	0	4	60	24	16	40	100
C-SD	MCA-C52	Server Side Programming Using JSP	3	1	0	4	60	24	16	40	100
C-SD	MCA-C53	Web Programming-Lab + Major Case Study	0	0	3	1	50	25	25	50	100
C-SD	MCA-C54	JSP Lab + Major Case Study	0	0	3	1	50	25	25	50	100
A-IT	MCA-A51	IT and Cyber Laws in India	3	0	0	0					S**
Elective											
E-IT		Elective-3	3	0	0	3	60	24	16	40	100
Total				2	8	20	400	170	130	300	700
Open Ele	ctive										
O-IT		Open Elective-3	3	1	0	4	60	24	16	40	100
Total*				3	8	24	460	194	146	340	800

The total indicated by asterisk (*) mark will be applicable for the students who opt open elective subject along with the other foundation, compulsory and elective subjects.

Note:S**- S grade for satisfactory.

Note: 30 Marks for Major Case Study and 20 Marks for Other Lab work for End Semester Examination

Legend:	L-Lecture	T -Tutorial
	P-Practical	CT-Class Test
	TA-Teacher's Assessment	ESE-End Semester Examination



Elective

Sr. No.	Course Type	Course Code	Course Title
1.	E-IT	MCA-E51	Algorithm Design
2.	E-IT	MCA-E52	Image Processing
3.	E-IT	MCA-E53	Linux Operation System

Open Elective

Sr. No.	Course Type	Course Code	Specialization	Course Title		
1.	O-IT	MCA-051	Mobile Computing (Part-III)	Programming for Mobile Devices		
2.	O-IT	MCA-052	Data Analytics(Part-III)	Big Data Analysis		
3.	O-IT	MCA-053	Artificial Intelligence(Part-III)	Soft Computing		
4.	O-IT	MCA-054	Information Security(Part-III)	Mobile and Cloud Security		



	SCHEME OF TEACHING AND EXAMINATION								
		MASTERS OF CON	IPUTER APP	LICATIONS					
Seme	Semester-VI								
Course	Course	Course Title	Marks Credits			Credits			
Туре	Code		Internal	External	Total				
			Examiner Examiner						
Professi	Professional Core Courses (Industrial Training and Project)								
C-ITP	C-ITP MCA-P61 Industrial Training and Project 50 50 100 15								
		Total	50	50	100	15			

Marks distribution for Industrial Training and Project

Internal Examiner	50 Marks will be awarded by internal examiner on the bases ofSynopsis (2), Presentation (2), Concept&Design of the Project, Contribution in the Project and Project Report.
External	50 Marks will be awarded by external examiner on the bases of Project Report and Vive-Voice. The Project Report (20 Marks),
	End Semester External Vive-Voice (30 Marks).

Note:

- 1. In 3rd year (Sixth semester) the student has to develop one project, which will be evaluated by the internal examiner and external examiner. Internal examiner will be appointed by respective college principal or director. External examiner will be appointed by Himachal Pradesh Technical University, Hamirpur.
- 2. Student have to follow Annexure-I to VIII for Project report.



MCA-F11 Business Communication

Теас	hing Sch	ieme	Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Foundation Course INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide knowledge about formal standards used in Business Communication (Written and Oral). After completing the course the student should be competent in oral and writing communication, and able to handle real life complications in professional communication.

UNIT-I

Introduction to Business Communication: Importance of communication in business, process and models of communication, Types of information- order, advise, suggestion, motivation, persuasion, warning and education.

(10 L)

UNIT-II

Written Communication: Letters, Cover Letter, Differences between bio-data, CV and Resume, Letter for Job Application, Thank You Letter, Letter of Complaint, Memos, Memorandum drafting. E. Communication: Email, Social Media, Website Copy and Reports.

Oral Communication: Types of oral communication, Barriers to oral communication, MassCommunication – Nature & Scope of Mass Communication, function of mass communication – Media of
mass communication.(10 L)

UNIT-III

Report Writing: Types, Structure of a report, Methods and Models of Report Writing, Technical Proposal-Concept, Kinds, Layout, and Examples of Technical Proposals.



Types of reports: progress reports, routine reports – Annual reports – format – Analysis of samplereports from industry – Synopsis and thesis writing.(10 L)

UNIT-IV

Spoken and Presentation Skills: Impromptu speech – tackling hesitation, shyness and nervousness in speaking –Public speaking, academic and professional presentations – Group discussions – facilitators and impedimentsPlanning, preparing and delivering a presentation, essentials of presentation - etiquette, clarity, lively delivery – speech rhythm, speech initiators body language – voice, posture & gesture, eye contact, dress codes. Speech Drill, Interviewing, Negotiating a job offer.

(10 L)

Text Books:

- 1. Essentials of Business Communication by R. Pal and JS Korlahhi, Sultan Chand & amp; Sons, New Delhi.
- 2. Basic Communication Skills for Technology by Andre J. Rutherford, Pearson Education Asia, patparganj, New Delhi

Reference Books:

- 1. Business Communication by Meenakshi Raman and Prakash Singh (Oxford)
- 2. Advanced Communication Skills, V. Prasad, Atma Ram Publications, New Delhi.



MCA-C11 Programming Methodologies (C, C++)

Teaching Scheme			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Software Development) INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.
- IV. At least 50% questions are based on applied knowledge remaining 50% questions are based on concepts and illustration of concepts with practical approach.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of basic programming tools and various methodologies used in programming. After completing the course the student should be competent in programming tools, methodologies and able to use these tools and methodologies to solve real life problems.

UNIT-I

Programming Tools: Problem analysis, Algorithm, Types of Algorithms, Flowchart, Modular programming, Top Down and Bottom up approaches, Type of errors, **Object Oriented Programming**-Object, Classes, Features of Object Oriented Programming.

Overview of C/C++ - History & Features of C & C++, General Structure of C Program, Datatypes, Constants and Variables, Operators and expressions, Storage Classes, Different types of expressions and their Evaluation, Conditional Expression, Assignment statement, Enumerated data type, Redefining/ Creating data types, Type casting. (10-L,3-T=13)

UNIT-II

Input/Output- Unformatted and formatted I/O Functions, **Control Statements**- Decision making using *if, if-else, elseif* and *switch* statements, Looping using *for, while* and *do-while* statements, Transferring Programcontrolling*goto, break* and *continue* statements.

Functions- Library functions (Standard Input/output and Math libraries), User defined functions, Defining a function, *return* statement, invoking a Function, specifying and passing arguments to a



function, Local , External, static, and register variable, block structure, recursive functions. (10-L,3-T=13)

UNIT-III

Pointers- Definition, Need of pointers, Types of Pointers, Declaring Pointers, Accessing Values via Pointers, Operations on Pointer, Pointer to Pointer, Pointer to function, Invoking a function through Pointer, Self-referencing pointers.

Array & strings- Introduction to arrays, Declaring arrays, Initializing, arrays, Processing arrays, Pointers to array, Array of Pointers, Passing arrays as arguments to functions, Introduction to strings, Pointers to strings, Passing strings and Arrays of strings as arguments to a function. (10-L,3-T=13)

UNIT-IV

Structures- Declaring a structure type, Declaring Variables of structure type, Initializing Structures, Accessing Elements of structures, Arrays of structures, Nested structures, Pointers to structures, Union. **Preprocessors-** Definition, Types of preprocessors, Conditional and Unconditional preprocessors.

Dynamic memory allocation-Allocating a block of memory - Malloc, Allocating multiple blocks of memory -Calloc, Releasing the used space - Free, Altering the size of block –Realloc. **Data files**-Definition of data files, Types of files, Input/output Streams, File opening modes, Description of various library functions for file handling, Updating files, Accessing data randomly from file.

(10-L,3-T=13)

TEXT BOOKS:

- 1. Ajay Mittal, "Programming in C a Practical Approach", Pearson Publication.
- 2. Mullis Cooper, "Spirit of C", Jacob Publications.
- 3. B. Gottfried, "Schaum' s Programming with C," Tata McGraw-Hill.
- 4. Y. Kanetkar, "Let us C," BPB Publications.
- 5. E. Balagurusamy,"Object Oriented Programming in C++", McGraw Hill Education (India).

REFERENCE BOOKS:

- 1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language," Prentice Hall of India.
- 2. Kerninghan B.W. & Ritchie D. M., "The C Programming Language", PHIPublications.
- 3. "Complete reference to C"- Tata Mcgraw Hill.
- 4. YashwantKanetkar, "Understanding Pointers in C", BPB Publications.
- 5. Y. Kanetkar, "Let us C++", BPB Publications.



MCA-C12 Fundamentals of IT and Digital Electronics

Teaching Scheme			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Information Technology) INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.
- IV. At least 40% questions are based on applied knowledge remaining 60% questions are based on concepts and illustration of concepts with practical approach.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge about computer system, Information technology, the role of digital electronic in the working of computer system and practical knowledge of Different components of Microsoft Office. After completing the course the student should be competent in DOS commends, designing of digital circuits and have proficient knowledge in Office automation tools like Microsoft Office.

UNIT-I

Introduction:Characteristics of Computers, Input/output Devices, Storage Units, CPU, Computer System. Primary and Secondary Storage Devices, Mass Storage Devices: USB thumb drive.Managing disk Partitions, Multimedia Application,Common multimedia file formats, Software types, High level languages, Free domainsoftware.

Microsoft Windows: An overview of different versions of Windows, Filemanagement through Windows, Basic troubleshooting in Windows. Security tools firewalls and antiviruses. DOS Internal and External Commands. An overview ofLinux, File handling in Linux, Installation of Virtualization tool (Virtual Box/VMware) (10-L,3-T=13)

UNIT-II

Digital Electronics:Number systems, conversion between various number systems, Error detection and correction codes, Logic gates, Boolean algebra, Demorgan's theorem. Minimization techniques, K-Map, Sum of Product, Product of Sum.



Combinational and sequential circuits: Full Adder, Full Subtractor, FlipFlops, Integrated Circuits, Characteristics of digital logic families-TTL, ECL, CMOS. Digital components: Decoders, multiplexers, registers, shift resisters, binary counters. (10-L,3-T=13)

UNIT-III

Word Processing: Finding and replacing text, Creating and Printing Merged Documents, Page Design and Layout. Editing and Profiling Tools: Checking and correcting spellings. Handling Graphics, Creating Tables and Charts, Document Templates and Wizards.

Presentation Package: Creating and Saving Presentations, Creating the Look of Your Presentation, Working in Different Views, Working with Slides, Making Notes Pages and Handouts, Drawing and Working with Objects, Adding Clip Art and other pictures, Designing Slide Shows, Running and Controlling a Slide Show, Animations in Slide Shows, Printing Presentations. Collaborators: Collaborative projects, Collaborative projects tools, GitHub. (10-L,3-

T=13)

UNIT-IV

Spreadsheet Package: Spreadsheet Concepts, Creating, Saving and Editing a Workbook, Inserting, Deleting Work Sheets, entering data in a cell / formula Copying and Moving from selected cells, handling operators in Formulae.

Functions: Mathematical, Logical, statistical, text, financial, Date and Time functions, Using Function Wizard. Formatting a Worksheet, Charts and Graphs - Creating, Previewing, Modifying Charts. Integrating word processor, spread sheets, web pages. Macros: Developer Tab, Command Button, Assign a Macro, Visual Basic Editor. (10-L,

3-T=13)

Text Books:

- 1. P.K. Sinha and P. Sinha, "Foundations of Computing", BPB Publication.
- 2. Fundamentals of Computer, JB Dixit, Luxmi Publications.
- 3. Microsoft office Bible, John Walkenbach Herb, Wiley India
- 4. Rajaraman V. & Radhakrishnan, —An Introduction to Digital Computer Design, PHI.
- 5. 2. Morris M. M., Digital Logic and Computer Design, PHI

Reference Books:

- 1. ITL Educational Society, "Introduction to IT", Pearson Education.
- 2. Miller M, "Absolute Beginners Guide to Computer Basics", Pearson Education.
- 3. Turban, Mclean and Wetherbe, "Information Technology and Management" John Wiely & Sons.
- 4. Balagurusamy E, "Fundamentals of Computers", Tata McGraw-Hill
- 5. D'Suoza&D'souza, "Learn Computer Step by Step", Pearson Education.
- 6. Kulkarni, "IT Strategy for Business", Oxford University Press
- 7. "The Complete reference Unix" Second Ed, Tata McGraw Hills.
- 8. The Conceptual Guide to Openoffice.org, Gabrial Gurley R, Concise Concepts Inc



MCA-C13 Computer Architecture

Teaching Scheme			Credits	Marks			Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination	
3	1	0	4	40	60	100	3 hours	

Course Type: Professional Core Courses (Information Technology) INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge about computer organization and architecture, instruction format and actual data processing inside CPU. After completing the course the student should be able to understand all the components of computer system, as well as the organization of these components inside computer system, various data processing mechanism used inside CPU.

UNIT-I

Digital components: integrated circuits, decoders, multiplexers, registers, shift resisters, binary counters, memory unit.

Register transfers & micro-operations: Register Transfer Language, Register transfer, Bus & memory transfers, Arithmetic loops, Logic loops, Shift loops, Arithmetic, logic, shift unit.

Basic computer organization & design: Instruction codes, Computer registers, Computer Instructions, Timing & Control, Instruction cycle, memory reference instruction, I-O interrupt, Design of basic computer, Design of accumulator logic. (10-L,3-T=13)

UNIT-II

Programming the basic computer: Machine language, Assembly language, Assembler, program loops, programming arithmetic and logic operations, subroutines, input-output programming. **Micro-programmed Control:** Control Memory, Address sequencing, Design of control unit.

Central Processing Unit: General Register Organization, Stack organization, Instruction formats (zero, one, two, three), Address Instructions, Addressing Modes (direct, indirect, Immediate, relative, indexed),



(10-L,3-

UNIT-III

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Computer Arithmetic: Addition & Subtraction, Multiplication algorithms, Division Algorithms, Floating point arithmetic operations, Decimal Arithmetic unit, Decimal Arithmetic operations. (10-L,3-T=13)

UNIT-IV

IO Organization: Peripheral devices, I/O interfaces, asynchronous data transfer, Modes of Data transfer, Priority Interrupts, DMA, I-O processors, Serial Communication. **Memory Organization:** Memory Hierarchy, Main Memory, Associative Memory, Cache Memory, Virtual Memory, Memory management hardware.

Multiprocessors:Characteristics, Interconnection structures: Time Shared, Common bus, Multi-port,
Crossbar switch, Multistage, Inter-processor arbitration, Inter-processor communication &
synchronization, cache coherence.(10-L,3-T=13)

Text Books:

1. Morris M. Mano, —Computer System & Architecture, PHI Publications.

2. Stallings & Williams, —Computer Organization & Architecture, Maxwell Macmillan.

Reference Books

1. V.Rajaraman&Radhakrishnan, —Introduction to Digital Computer Design, PHI Publications. 2.P.PalChowdhary, —Computer Organization & Design, PHI Publications



MCA-C14 Software Engineering

Teaching Scheme			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Information Technology) INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide knowledge about various methodologies used in software engineering, various models used in software development. After completing the course the student should be competent in all the phases of software development life cycle, able to develop software by following software engineering principles, and proficiently write reports for software project.

UNIT-I

Introduction: Evolving Role of Software, Software Engineering, Changing nature of Software, Software Myths, Terminologies, Role of management in software development Software Process and desired Characteristics, Software Life Cycle Models: Build & Fix Model, Water Fall Model, Incremental Process Model, Evolutionary Process Models, Unified Process, Comparison of Models, Other Software Processes, Selection of a Model, Software Requirements Analysis & Specifications: Requirements Engineering, Types of Requirements, Feasibility Studies, Requirements Elicitation, Requirements - Analysis Documentation, Validation and Management. (10-L,3-T=13)

UNIT-II

Agile Methodology: Agile Modeling, Its use and advantages, Scrum, Advantages and disadvantages of
agile Modeling. Software Architecture: It's Role, Views, Component & Connector View and its
architecture style, Architecture Vs Design, Deployment View & Performance Analysis, Documentation,
Evaluation.Software Project Planning: Size estimation, Cost Estimation, COCOMO, COCOMO – II,
Software Risk Management.(10-L,3-T=13)



UNIT-III

Function Oriented Design: Design principles, Module level Concepts, Notation & Specification, Structured Design Methodology, Verification. **Object-Oriented Design:** OO Analysis & Design, OO Concepts, Design Concepts, Noun Phrase Analysis, Sequence & Collaboration Diagram, CRC cards, UML – Class Diagram, Other diagrams & Capabilities, Design Methodology – Dynamic and Functional Modeling, Internal Classes & Operations. **Detailed Design:** PDL, Logic/Algorithm Design, State Modeling of Classes, Verification – Design Walkthroughs, Critical Design Review, Consistency Checkers.

(10-L,3-T=13)

UNIT-IV

Coding: Programming Principles & Guidelines, Coding Process, Refactoring, Verification. Software Metrics: What & Why, Token Count, Data Structure Metrics, Information Flow Metrics, Object-Oriented Metrics, Use Case Oriented Metrics, Web Engineering Project Metrics, Metric Analysis.Software Maintenance & Certification: Maintenance, MaintenanceProcess and Models, Estimation of Maintenance Costs, Regression Testing, Reverse Engineering, Software Re engineering, Configuration Management, Documentation, Requirements of Certification, Types. (10-L,3-T=13)

Text Books:

1. PankajJalote, —An Integrated Approach to Software Engineering, Narosa Publishing House.

2. K.K. Aggrawal and Yogesh Singh, —Software Engineering, New Age International (P) Ltd.

Reference Books:

1. Pressman, R.S., —Software Engineering – A Practitioner's Approach, McGraw Hills.

2. Mall Rajib, —Fundamentals of Software Engineering, PHI, New Delhi.



MCA-C15 Programming Lab

Teaching Scheme			Credits	Marks			Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination	
0	0	3	1	50	50	100	3 hours	

Course Type: Professional Core Courses (Practical Labs) INSTRUCTIONS:

1. For External Examiner:50% marks (25 marks) will be awarded on the basis of practical implementation and lab performance in final practical examination, and remaining 50% marks (25 marks) will be awarded on the basis of vive-voice and written script.

Objective: The main objective of this course is to cover practical implementation part of **MCA-C11**. After completing the course the student should be competent in handling real life problems on C and C++ platform.

Total Lab Hours: 40

Suggested List of Practical Topics:

- 1. Different data Types
- 2. Different Operators
- 3. Input/output Functions
- 4. Decision making statement
- 5. Looping Statements
- 6. Functions
- 7. Array and Strings
- 8. Pointers
- 9. Structures
- 10. Preprocessor
- 11. Dynamic Memory Allocation
- 12. File handling



MCA-C16 IT Lab

Teaching Scheme			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
0	0	3	1	50	50	100	3 hours

Course Type: Professional Core Courses (Practical Labs) INSTRUCTIONS:

1. For External Examiner:50% marks (25 marks) will be awarded on the basis of practical implementation and lab performance in final practical examination, and remaining 50% marks (25 marks) will be awarded on the basis of vive-voice and written script.

Objective: The main objective of this course is to cover practical implementation part of **MCA-C12**. After completing the course the student should be competent in handling DOS Internal and External commands, handling virtual machine (VirtualBox/ VMware) and proficient in office automation tools like MS-Office.

Total Lab Hours: 40

Suggested List of Practical Topics:

- 1. DOS Internal and External Commands
- 2. Creating virtual machine (VirtualBox/VMware)
- 3. Windows File Management
- 4. Linux File Management
- 5. Security through firewall and antivirus
- 6. Basic troubleshooting (Windows environment)
- 7. Formatting and printing document (word processor)
- 8. Table operations in Word processor
- 9. Mail merge and macro
- 10. Creating presentation with different objects
- 11. Creating a database in spread sheet
- 12. Formula and functions in spreadsheet


MCA-F21 Mathematics

Teaching Scheme Credits			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Foundation Courses INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide mathematical knowledge of statistics, probability and number theory. After completing the course the student should be competent in handling mathematical problems related with statistics, probability and basis number theory.

UNIT-I

Measure of Central Value: Average, Types of Averages, Arithmetic Mean, Weighted Arithmetic Mean, Median, Mode, Geometric Mean, Weighted Geometric Mean, Harmonic Mean, Weighted Harmonic Mean, Relationship among the averages. **Measures of Dispersion:** Measuring Variation, Methods of studying variation, Range, Interquartile Range or the Quartile Deviation, Percentile Range, Mean Deviation, Standard Deviation, Combined Standard Deviation, Variance, Lorenz Curve.

(10-L,3-T=13)

UNIT-II

Skewness, Moments and Kurtosis: Skewness, Measures of Skewness, Karl Pearson's Coefficient of Skewness, Bowley's Coefficient of Skewness, Kelly's Coefficient of Skewness, Moments, Measure of Skewness based on Moments, Measures of Kurtosis. Correlation and Regression Analysis: Correlation, Types of Correlation, Methods of studying Correlation, Karl Pearson' Cofficient of correlation, Rank Correlation Coefficient, Correlation in Time Series, Regression, Use of Regression Analysis, Difference between correlation and Regression analysis. (10-L,3-T=13)

UNIT-III



Probability and Expected Value: Classical or a priori Probability, Relative Frequency Theory of Probability, Calculation of Probability, Addition Theorem of Probability, Multiplication Theorem, Conditional Probability, Bayes' Theorem, Random Variable and Probability Distribution.

Theoretical Distributions: Binomial Distribution, Coefficient of Binomial, Multinomial Distribution,
Negative Binomial Distribution, Poisson Distribution, Hypergeometric Distribution, Normal Distribution,
Areas under the normal Curve, Fitting a Normal Curve, Methods of fitting.(10-L,3-T=13)

UNIT-IV

The Fundamental Theorem of Arithmetic: Introduction, Divisibility, Greatest Common Divisor, Prime Numbers, The Fundamental Theorem of Arithmetic, The Series of Reciprocals of the Primes, The Euclidean Algorithm, The Greatest Common Divisor of More Than Two Numbers. **Arithmetical Functions and Dirichlet Multiplication:** Introduction, The Möbius Function $\mu(n)$, The Euler Totient Function $\varphi(n)$, A Relation Connecting φ And μ , A Product Formula For $\varphi(n)$, The Dirichlet Product Of Arithmetical Functions, Dirichlet Inverses And Möbius Inversion Formula, The Mangoldt Function $\Lambda(n)$, Multiplicative Functions, Multiplicative Functions And Dirichlet Multiplication. The Inverse of a Completely Multiplicative Function, Liouville's Function $\lambda(n)$. **(10-L,3-T=13)**

Text Books:

- 1. S.P. Gupta Statistical Methods, Sultan Chand & Sons, New Delhi
- 2. Tom M. Apostal Introduction to Analytic Number Theory, Narosa Publishing House, New Delhi
- 3. John Stillwell, "Elements of Number Theory", Springer Publisher.

References Books:

- 1. Shailesh A. Shirali and C.S. Yogananda, "Number Theory", Universities Press
- 2. V.K. Krishnan, "Elementary Number Theory: A Collection of problems with solutions", Universitites Press.
- 3. Murray Spiegel, John Schiller, R. AluSrinivasan, DebasreeGoswami, "Probability and Statistics (Schaum's Outline Series)", McGraw Hill Education (India) Private Limited.
- 4. Douglas C. Montgomery, George C. Runger, "Applied Statistics and Probability for Engineers", Wiley India Private Limited.



MCA-C21 Object Oriented Programming and Data Structures Using Java

Теас	Teaching Scheme Credits				Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Software Development)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.
- IV. At least 50% questions are based on applied knowledge remaining 50% questions are based on concepts and illustration of concepts with practical approach.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Object Oriented Programming approach and data structures along with Java programming language tools. After completing the course the student should be competent in Object Oriented programming tools and data structures, and able to use these tools and methodologies to solve real life problems on Java platform.

UNIT-I

Object Oriented Programming: Introduction to OOP's Paradigm, Characteristics of OOP's. **History and Basics of Java:** Java's History and Creation, Java's Magic: Byte-code, it's Features, Architecture of Java Virtual Machine, and Importance of Java for the Internet, JDK, Java Program Structure and Java'sClass Library, Java Data Types, Variables, and Operators, Operator Precedence. Scope of Variables, Control Structure **Array and String:** Declaration and Definition, String Handling Using String Class and it functions. **Input/Output in Java:** I/O Basic, Byte and Character Structures, I/O Classes, Reading Console Input Writing Console Output, Wrapper classes. **Introduction of Classes:** Fundamental of Classes & Methods, Constructors, Creating Objects of a Class, Assigning Object Reference Variables, Variable **this**, Overloading Methods.**Exception Handling in Java:** Exception Handling basics, try, catch and finally, throw and throws clause, re-throwing of exceptions, handling user defined exceptions.

(10-L,3-T=13)



Extending Classes and Inheritance: Fundamental of Inheritance, Using Existing Classes, Polymorphism, Multiple Levels of Inheritance, Super keyword, super-class constructor, Abstraction through Abstract Classes, Using Final Modifier.**Packages & Interfaces:** Understanding Packages, Defining a Package, Packaging up Your Classes, Adding Classes from a Package to Your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages, Concept of Interface, Multiple Inheritance through Interfaces.**Multithreading Programming:** Understanding Threads, The Java Thread Model and life cycle of thread, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Inter-thread communication, Deadlocks., **File Handling:**Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File, Stream Benefits.**Collections:** ArrayList, LinkedList, collections Methods, Stack, Sets, Maps. (10-L,3-T=13)

UNIT-III

Introduction to data structure: data structure Definition, types of data structures. **Arrays**: Memory representation and various operations. Address calculation, sparse arrays. **Linked List**: Definition, type (linear, circular, doubly linked, inverted), representing linked lists in memory, advantages of using linked list over arrays, various operations on Linked list (traversal, insertion, deletion). **Stacks**: Definition & concepts of stack structure, Implementation of stacks, Operation on stacks (push & pop), Application of stacks (converting arithmetic expression from infix notation to polish and their subsequent evaluation, quick sort technique to sort an array, recursion). **Queue**: Definition & concept of queues, implementation of queue, operation on queues (insert & delete), Type of queues (circular queue, priority queue).

(10-L,3-T=13)

UNIT-IV

Trees Structures: Tree, Binary Trees, Tree Traversal Algorithms (Pre-Order, In-Order, Post- Order), Threaded Trees, Trees in various Sorting & Searching Algorithms & their Complexity (Heap Sort, Binary Search Trees). **Graphs:** Description of graph structure, Implementing graphs in memory, Graph traversals (Depth First Searching, Breadth First Searching, and Shortest Paths Problems).**File organization:**Structure and Processing of Sequential files, Indexed Sequential and Direct files, Hashing.Algorithm complexity, time-space trade-off between algorithms, **Asymptotic notations:** Big- O, omega, theta. **Sorting & Searching:** Selection sort, Bubble sort, Merge sort, Radix sort, Quick sort, Sequential search, Linear search and their complexity.

(10-L,3-T=13)

Text books:

1. R. NageswaraRao, "Core Java an integrated approach", Dreamtech Press

- 2. Paul Deitel, HarveryDeitel, "Java How to Program", PHI New Delhi
- 3. The Complete Reference JAVA by Herbert Schildt, TMH Publication.
- 4. Beginning JAVA, Ivor Horton, WROX Public.
- 8. Robert Lafore, "Data Structures and Algorithms in Java", Sams Publishing.
- 9. Koffman& Wolfgang," Data Structure 2E abstraction and design Using Java", Wiley

References Books:



- 1. JAVA 2 UNLEASHED, Tech Media Publications.
- 2. JAVA 2 API Documentations.
- 3. John R., Hubbard, Data Structure using Java, Schaum'sOutLine.

MCA-C22 Data Base Management System

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.
- IV. At least 50% questions are based on applied knowledge remaining 50% questions are based on concepts and illustration of concepts with practical approach.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Database, various methodologies and applications software used for data base management. After completing the course the student should be competent in data base handling, able to design and manage database for real life problems and the student should by proficient in query handling.

UNIT-I

Introduction: Basic Concepts, Records and Files, Abstraction and Data Integration, Three-Level Architecture Proposal for DBMS, Components of a DBMS, Advantages and Disadvantages of a DBMS. Data Models: Relational Data Model, Network Data Model, Hierarchical Model. Manipulation, Updates, Implementation of data models. Relational Model: Relational Database Constraints, Relational Algebra, Relational Calculus. Relational Database Design by ER. (10-L,3-T=13)

UNIT-II

Database Design : A Consequence of Bad Design, Universal Relation, Functional Dependencies and Normalization for relational databases 1NF, 2NF, 3NF, BCNF, 4NF, and other higher normal forms., SQL, Data Manipulation, Basic Data Retrieval, Condition Specification, Arithmetic and Aggregate Operators.**SQL Join:** Multiple Tables Queries, Set Manipulation, Categorization, Updates, Views. **SQL Programming:** Procedures, Cursors, Triggers.

(10-L,3-T=13)



Transaction Management and Concurrency Control:Serializability, Concurrency Control, Locking Scheme, and Timestamp- Based Order, Optimistic Scheduling, Multiversion Techniques. Database security and recovery: Database security requirements, Data Encryption, Type of failure, recovery concepts, shadow paging.

(10-L,3-T=13)

UNIT-IV

Distributed Database and Client-server Architecture: Distributed Database concepts. Components of Distributed Database, Types of Distributed Database. Data Fragmentation, Replication and allocation techniques for distributed database design. Query processing. An overview of Client- Server Architecture. (10-L,3-

T=13)

Text Books:

1. Desai, B., —An Introduction To Database Concepts, Galgotia Publications, New Delhi.

2. Elimsari And Navathe, —Fundamentals of Database Systems, Addison Wesley, New York.

Reference Books:

1. Date C.J., —An Introduction to Database Systems, Narosa Publishing House, New Delhi.

2. Ullman, J.D, — Principals of Database Systems, Galgotia Publications, New Delhi.

3. M. Tamer Ozsu& Patrick Valduriez, —Principles of Distributed Database Systems∥, Pearson Education Asia.



MCA-C23 Computer Networks

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide knowledge about various protocols and layers used in Computer Networks and basics of various communication mechanisms used to send and receive data. After completing the course the student should be competent in basics of computer networking and communication system, and understand the significance of various protocols and layers used in computer Networks.

UNIT-I

Introduction:Data Communication, Network Components. OSI Reference Model: Layered architecture, Functions of layers, TCP/IP reference model, Comparison of OSI & TCP/IP models. Internet, frame relay, ATM, Ethernet, Wireless LAN.Physical layer: Theoretical basis for data communications-Fourier analysis, bandwidth limited signals, maximum data rate of a channel, Public switched telephone networks, mobile telephone system. (10-L,3-

T=13)

UNIT-II

Data Link and Mac Layer: Design issues, Framing techniques, Flow control, Error Control, **Data link Control and Protocols:** For noiseless Channel – Simplest Protocol, Stop-and-Wait Protocol, For Noisy Channel-- Stop-and-Wait ARQ, Go-Back-N ARQ, and Selective-Repeat ARQ Protocol, HDLC Protocol, and PPP Protocol, Multiple Access-- Random Access-- MA, CSMA, CSMA/CD, CSMA/CA, Controlled Access-- Reservation, Polling, Token passing, Channelization-- FDMA, TDMA, CDMA, and IEEE standards-- 802.3



(Ethernet), 802.4 (Token Bus), 802.5 (Token Ring), 802.11(Wireless LAN), 802.15 (Bluetooth). (10-L,3-T=13)

UNIT-III

Network and transport Layer: Network layer design issues, Routing algorithms-shortest path routing, flooding, distance vector routing, link state routing, hierarchical routing, broadcast routing, multicast routing, routing for mobile hosts, **Congestion Control algorithms**: congestion prevention policies, congestion control in virtual circuit & datagram sub-networks, definition of quality of service.

(10-L,3-T=13)

UNIT-IV

Internetworking: Tunneling, internet-work routing, fragmentation, Network layer in Internet: IP protocol, IP Address, OSPF, BGP, Internet multicasting, Mobile IP, Ipv6.Transport Layer: Concept of transport service, elements of transport protocols, a simple transport protocol, Remote procedure call, Performance issues in computer networks, Application layer services protocols:DNS, SMTP, FTP, TELNET, HTTP, WWW. (10-L,3-

T=13)

Text books:

- 1. B.A. Forouzan, —Data Communication & Networking, Tata Mcgraw Hill.
- 2. A.S. Tanenbaum, —Computer Networks, Prentice Hall.

References Books:

- 1. William Stallings, —Data & Computer Communication, McMillan Publishing Co.
- 2. Black, —Data Networks, PHI.
- 3. Fred Halsall, —Data Communications, Computer Networks, Pearson Education.



MCA-C24 Operating System

Теас	Teaching Scheme Credits				Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge about Operating system (Windows and UNIX). After completing the course the student should be able to understand various methodologies used by operating system to manage different types of tasks and able to use Windows and UNIX operating system proficiently.

UNIT-I

Introduction: Definition Of The Operating System, Functions Of An Operating System, Different Types Of Systems - Simple Batch System, Multi-Programmed Batched System, Time Sharing System, Personal Computer Systems, Parallel Systems, Distributed Systems, Real Time Systems, Computer System Structure- operation, I/O structure, storage structure, hardware protection, Operating System Services. (10-L,3-T=13)

UNIT-II

Process Management: Process- Process Concept, Process Scheduling, Operation On Processes, Cooperating Processes, Threads, Inter-Process Communication, **CPU Scheduling:**scheduling criteria, scheduling algorithms – FCFS, SJF, priority scheduling, round robin scheduling, multilevel queue scheduling, multilevel feedback queue scheduling, multiple processor scheduling, real time scheduling. **Process Synchronization:** The Critical Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions. **Deadlocks:** Deadlock Characterization, Methods for



Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. (10-L,3-T=13)

UNIT-III

Memory Management: Logical & physical address space, Swapping, Continuous Allocation (single partition, multiple partition), internal, external fragmentation, Paging, Segmentation, Segmentation With Paging, Virtual Memory, Demand Paging, Performance Of Demand Paging, Page Replacement, Page Replacement Algorithms– FIFO, optimal, LRU, LRU approximation algorithms, counting algorithms Thrashing, Demand Segmentation. File System Interface: File Concept, Access Methods–sequential, direct, index, Directory Structure–single-level, two–level, tree-structured, acyclic-graph, general graph. (10-L,3-T=13)

UNIT-IV

File System Implementation: File System Structure, Allocation Methods-contiguous allocation, linked allocation, indexed allocation, Free Space Management-bit vector, linked list, grouping, counting, Directory Implementation linear list, hash table, Efficiency and Performance, **Recovery:**consistency checking, backup and restore. **Secondary Storage Structure:** Disk Structure, Disk Scheduling, FCFS, SSTF, SCAN, C-SCAN, Look Scheduling, Selection of A Scheduling Algorithm, Disk Management-disk formatting, boot block, bad blocks. **UNIX:**Operating System, Structure of UNIX Operating System, UNIX Commands, Interfacing with UNIX, Editors & Compilers for UNIX. **(10-L,3-T=13)**

Text Book:

Silberschatz, Galvin, —Operating System Concepts, Addison Wesley Publishing Company.
Tanenbaum, A.S., —Modern Operating System, Prentice Hall of India Pvt. Ltd.

Reference Books:

1. William Stallings, —Operating Systems, Macmillan Publishing Company.

2. Deitel H.M., —An Introduction to Operating System, Addison Wesley Publishing Company.

3. Kenneth Rosen, Douglas Host, The Complelete Reference, Unix, Tata McGraw Hill.



MCA-C25 Data Structure Lab

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
0	0	3	1	50	50	100	3 hours

Course Type: Professional Core Courses (Practical Labs) INSTRUCTIONS:

1. For External Examiner:50% marks (25 marks) will be awarded on the basis of practical implementation and lab performance in final practical examination, and remaining 50% marks (25 marks) will be awarded on the basis of vive-voice and written script.

Objective: The main objective of this course is to cover practical implementation part of **MCA-C21**. After completing the course the student should be competent in handling various data structures and different operations on these data structures using Java platform and proficiently implement all the object oriented concepts using Java platform.

Total Lab Hours: 40

Suggested List of Practical Topics:

- 1. Java Basics, Control Structure
- 2. Arrays and Strings
- 3. Fundamentals Of Classes
- 4. Extending Classes and Inheritance
- 5. Packages & Interfaces
- 6. Exception Handling
- 7. Multithreading Programming
- 8. Input/ Output in Java
- 9. Link Lists(linear, circular, doubly linked, inverted)
- 10. Queues (Simple, Circular Queue, Priority Queue)
- 11. Different Trees, Binary Search Trees
- 12. Heap Sort
- 13. Graph Implementation, Graph traversals
- 14. Different File Organization
- 15. Sorting & Searching



MCA-C26 DBMS Lab

Теас	Teaching Scheme Credits				Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
0	0	3	1	50	50	100	3 hours

Course Type: Professional Core Courses (Practical Labs) INSTRUCTIONS:

1. For External Examiner:50% marks (25 marks) will be awarded on the basis of practical implementation and lab performance in final practical examination, and remaining 50% marks (25 marks) will be awarded on the basis of vive-voice and written script.

Objective: The main objective of this course is to cover practical implementation part of **MCA-C22**. After completing the course the student should be competent in defining and manipulating database through MySQL/Oracle and proficient in query handling by using MySQL/Oracle.

Total Lab Hours: 40

Suggested List of Practical Topics:

- 1. Data Definition Language
 - a. Create
 - b. Alter
 - c. Drop
- 2. Data Manipulation Language
 - a. Insert
 - b. Select
 - c. Delete
 - d. Update
- 3. Clauses
 - a. Where
 - b. Having
 - c. Order By

- d. Group By
- e. Exists
- f. In
- g. Notin
- h. Any
- 4. Arithmetic and Aggregate Operators
- 5. Set Manipulation operations
- 6. Joins
- 7. Natural, Inner, Outer
- 8. Sub queries
- 9. Data Control Language
- 10. Transaction Control Language



Duration of End Semester		Marks		Credits	eme	hing Sch	Теас
Examination	Total	End Semester Exam	Sessional	С	Р	т	L
3 hours	100	60	40	4	0	1	3

MCA-F31 Fundamental of Management

Course Type: Foundation Courses

INSTRUCTIONS:

- 1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.
 - I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
 - II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of basis Management tools and techniques. After completing the course students can implement these Management tools in their respective organization.

UNIT-I

Introduction to management: Organization and the need for management. The management Process.Challenges of management.**Evolution of management thought**: Classical organization theory school. Behavioral school. System approach Scientific Management and Administrative management. Recent developments in management theory.

(10-L)

UNIT-II

Introduction to Organization design and organization structure: Organization design, Types of organization structures Span of control, Delegation of authority, Authority and Responsibility. HRM: Human resource planning, Recruitment, selection, Performance Appraisal. Decision Making: Decision making process. Bounded rationality model of decision making. (10-L)



Management and Society: External environment, Social responsibility and ethics. Social responsibility of managers, Making Social responsibility operational. Ethical Issues in management. Social Audit, The tools of ethics. Harassment of Women at work place. (10-L)

UNIT-IV

Recent Trends in management: Digital economy, E-Commerce, M-Commerce. Information systems: Information and control, Management Information System and Decision Support System, Implementing a computer based MIS, Expert Systems and artificial Intelligence. Opportunities and challenges created by IT. (10-L)

Text Books:

1. LM Ogranizational Behavior, Sultan Chand and Sons, New Delhi.

- 2. MonappaArun and Salyajain M.S, Personal Management, Tata Mc.Graw-Hill Publications.
- 3. Rudrabasavaraj M.N., Dynamic Personnel Administration, Himalaya Publishing House, Bombay.
- 4. Edwin B Flippo, Priciples of Personal Management.

Reference Books:

1. Torrington and Hall, —Personnel Management: A New Approach, Prentice-Hall International Publications.

2. Hellrigel Don, Solum, John W. and Wooden Richard, W., —OraganisationBehaviour, Web Publishing Company, New York.

- 3. McCocmio, E.U., —Human Factor in Engineering in Design, McGraw-Hill Publications, New Delhi.
- 4. Koontz Harold & Weihrich Heinz-Essential of Management (Tata McGraw Hill, 5thEdition 2008)
- 5. Robbins, Stephgen P, Ogranizational behavior Sultan Chand and Sons



MCA-C31 Web Technology (HTML, XHTML, CSS)

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Software Development)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.
- IV. At least 60% questions are based on applied knowledge remaining 40% questions are based on concepts and illustration of concepts with practical approach.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of web-development Languages and web-designing tools. After completing the course the student should be competent in basic web-development as well as web-designing tools, and able to use these tools and to design and develop web-pages professionally.

UNIT-I

Introduction to Internet: Client-Server Technology, World Wide Web, Web-servers, Web Browsers, Web Hosting, Email. Internet Protocols: FTP, HTTP, HTTPS. HTML: Document Structure, html elements, tags and attributes, Basic elements (html, head, title body, p, heading, marquee behavior) Basic text formatting, List (ordered and unordered), Hyper linking; handling images, audio and videos; table elements; Form elements. Introduction to HTML5: New elements, Video/DOM, Audio, Drag and Drop, Canvas/SVG, App Catch, SSE and Tags. (10-L,3-T=13)

UNIT-II

Styling Pages (CSS): Introduction to CSS; types of CSS (CSS-1, CSS-2, CSS-3), applying CSS (inline, embedded, external). CSS Properties: Text properties, font-properties, border properties. Selectors, universal, element selector, class selector, ID Selector, decedent selector, pseudo selector.Box Model: border properties, padding properties, margin properties. List properties, background properties, table properties. (10-L,3-T=13)



XML:XML Document Structure, parsers and well-formed XML Documents, Defining DTD, XML Namespaces. XML Schema: Schema v/s DTD, Simple API for XML (SAX), eXtensibleStyle sheet Language Transformation (XSLT) Custom Markup Language: Introduction, Mathematical Markup Language (MathML), Chemical Markup Language (CML), Wireless Markup Language (WML), Geography Markup Language (GML), Scalable Vector Graphics (SVG), Bean Markup Language (BML), Extensible 3D Language (X3D). (10-L,3-T=13)

UNIT-IV

Introduction to Dreamweaver: Dreamweaver tools, DIVs, Library Items, Jquery, Spry, .DWT Templates,
Rollover Images, Sprite, Search Engine Optimization and Forms. Introduction to Image Processing Tools:
Photoshop tools, Creating, Editing and saving images, Layers, Masks and filters.(10-L,3-T=13)

Text Books:

1. Programming with world wide web by Robert Sebesta on Pearson

2. Beginning with HTML, XHTML, CSS and Javascript by John Duckett, Wiley- Wrox

References Books:

1. XML How to Program by Deitel and Deitel, Pearson.

2. Shroff, Dreamweaver Cs6 The Missing Manual, Shroff Publishers & Distributors.

3. Adobe Dreamweaver Cs Classroom In A Book, Person.

4. Photoshop Cc The Missing Manual, Shroff Publishers & Distributors.



MCA-C32 Visual Programming Using Java

Teaching Scheme Credits			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Software Development)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.
- IV. At least 60% questions are based on applied knowledge remaining 40% questions are based on concepts and illustration of concepts with practical approach.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of basic Visual programming tools (In Java) and various methodologies used in visual programming. The main emphasis of this course is on Java Swings classes. After completing the course the student should be competent in visual programming tools (In Java) and methodologies, and able to use these tools and methodologies to solve real life problems.

UNIT-I

Creating Applets in Java: Applet Basics, Applet Architecture, Applet Life Cycle, SimpleApplet Display Methods **Working with Abstract Windows Toolkit:** AWT Classes, Window Fundamentals, Working with Frame, Creating a Frame Displaying Information within a Window. **Working with Graphics and Text** :Working with Graphics, Working withColor, Setting the Paint Mode, Working with Fonts, Drawing Lines, Rectangles, Ovals, Arcs and Polygons **GUI Components:** Label, Buttons, Checkboxes, Choice, Lists, Scroll Bar, Text Field, Text Area, Menus and Layout Managers. **(10-L,3-T=13)**

UNIT-II

Java Swings: Java Foundation Classes, Hierarchy of Java Swing classes, Swing components(Container: Window, Frame ,Dialog, Panel and Applet; JComponent: JLabel, JList, JTable, JComboBox, JSlider, JMenu, Abstract Button, JButton). **Multimedia Applications:** Multimedia, Images (Loading, Displaying and Scaling), Animating a Series of Images, Image Maps, Loading and Playing Audio Clips, Playing Video and Other Media with Java Media Framework. **Look-and-Feel:** Look-and-Feel of Swing GUI Components,



Swing's pluggable look-and-feel (PLAF), standard look-and-feels (Nimbus, Motif, Windows). (10-L,3-T=13)

UNIT-III

Event Handling: Event Handling and its Importance, Introduction to Event Classes and Listener Interfaces. **Event Classes:**ActionEvent, MouseEvent, MouseWheelEvent, KeyEvent, ItemEvent, TectEvent, AdjustmentEvent, WidowEvent, ComponentEvent, ContainrEvent, FocusEvent. **Listener Interface:** ActionListener, MouseListener&MouseMotionListener, MouseWheelListener, KeyListener, ItemListener, ComponentListener, ContainerListener, FocusListener.

(10-L,3-T=13)

UNIT-IV

Networking: Introduction to networking in Java, Manipulating URLs Reading a File on a Web Server, Establishing a Server Using Stream Sockets, Establishing a Client Using Stream Sockets, Client/Server Interaction with Stream Socket Connections, Datagrams the Connectionless Client/Server Interaction. **Accessing Databases with JDBC:** Installing MySQL, Setting up a MySQL User Account, Creating Database books in MySQL, Manipulation Databases with JDBC, RowSet Interface, ResultSet, Java DB/Apache Derby PreparedStatements, Stored Procedures, Transaction Processing. (10-L,3-T=13)

Text books:

- 1. R. NageswaraRao, "Core Java an integrated approach", Dreamtech Press
- 2. Paul Deitel, HarveryDeitel, "Java How to Program", PHI New Delhi
- 3. The Complete Reference JAVA by Herbert Schildt, TMH Publication.
- 4. Beginning JAVA, Ivor Horton, WROX Public.

References Books:

- 1. JAVA 2 UNLEASHED, Tech Media Publications.
- 2. JAVA 2 API Documentations.



MCA-C33 Discrete Mathematics

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Mathematics)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Discrete Mathematics. After completing the course the student can solve real life problems with discrete mathematics and its related fields.

UNIT-I

Mathematical Logic: Statements and Notation, Connectives: negation conjunction, disjunction, statement formulas & truth tables, logical capabilities of programming languages, conditional & biconditional, well-formed formulas, tautologies, equivalence of formulas, duality law, tautological implications, formulas with distinct truth tables, functionally complete set of connectives, other connectives, two state devices and statement logic.**Normal forms:** disjunctive normal forms, connective normal forms, principal disjunctive normal forms, principal conjunctive normal forms, ordering and uniqueness of normal forms, completely parenthesized infix notation and polish notation.

(10-L,3-T=13)

UNIT-II

Relations and Functions: A relational model for databases, properties of binary relations, equivalence relations and lattices, chains and anti-chains. **Boolean Algebra:** Lattices and algebraic systems, principle of quality, basic properties of algebraic systems defined by lattices, distributive and complimented lattices, Boolean lattices and Boolean algebra, Boolean function and Boolean expressions, switching circuits. **(10-L,3-T=13)**



Trees and Cut-Sets: Trees rooted trees; path lengths in rooted trees; prefix codes; binary search trees; spanning trees and cut-sets; Minimum spanning trees. Discrete Numeric Functions and Generating **Functions:** Manipulation of numeric functions, asymptotic behavior of numeric functions, generating functions, combinatorial problems. **Graphs and Planar Graphs:** Basic terminology; Multi-graphs and weighted graphs; Paths and circuits; Eulerian paths and circuits; Hamiltonian paths and circuits.

(10-L,3-T=13)

UNIT-IV

Recurrence relations and Recursive algorithms: Recurrence relations, linear recurrence relation with constant coefficients, homogeneous solutions, particular solutions, total solutions, solution by method of generating functions, sorting algorithms.**Groups and Rings:**Groups, sub-groups, generators and evaluation of powers, co-sets and Lagranges' theorem, permutation groups and Burnsides' theorem, codes and group codes, isomorphism and automorphism, homomorphism and normal sub-groups, rings, internal domains, fields, definitions and examples of groups, rings and fields. **(10-L,3-T=13)**

Text Books:

1. Tremblay J.P. & Manohar R, —Discrete Mathematical Structure with Applications to Computer Science (Topics: Mathematical Logic)

2. Kenneth H. Rosen, Discrete Mathematics and its Applications, Mc.Graw Hill.

3. Kolman, Dicreter Mathematical Structures, Prentice Hall International.

Reference Books:

1. Liu C.L., —Elements of Discrete Mathematics (Topics: Graphs and Plainer graphs, Trees & Cut sets, Discrete Numeric functions and generating functions, Recurrencerelations and Recursive algorithms, Groups and Rings, Boolean algebra)



MCA-C34 Web Tech-Lab + Minor Case Study

Теас	Teaching Scheme Credits		Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
0	0	3	1	50	50	100	3 hours

Course Type: Professional Core Courses (Practical Labs) INSTRUCTIONS:

1. For External Examiner:50% marks (25 marks) will be awarded on the basis of practical implementation and lab performance in final practical examination, and remaining 50% marks (25 marks) will be awarded on the basis of vive-voice and written script.

Objective: The main objective of this course is to cover practical implementation part of **MCA-C31**. After completing the course the student should be competent in designing web pages by using HTML/XHTML and CSS.

Note: Implementation of all practical must be on Dreamweaver CS6 or higher version. For Image Processing Photoshop CS4 or higher version might be used.

Total Lab Hours: (24-Practical + 16-Case Study) 40

Suggested List of Practical Topics:

- 1. Lists in HTML
- 2. Tables in HTML
- 3. Hypertext
- 4. Image and Videos in HTML
- 5. Hypermedia

8. Audio HTML5

- 6. Forms
- 7. Video/DOM HTML5

- 9. SVG HTML5
- 10. CSS (Inline, Embedded, External)
- 11. Well-Formed XML Document
- 12. XML Schema
- 13. Image Editing in Photoshop
- 14. Layers and Masks in Photoshop
- 15. Filters in Photoshop

Minor Case Study:

One minor case study must be the part of practical file. Student have to develop a web site comprises at least 10 pages. Tables, lists, Hypertext, Hypermedia, Forms, Video, Images, Audio, CSS, XML must be the part of these web-pages. Dreamweaver and Photoshop must be used in the development and designing of these web pages. Web site must be realistic and showing students own work, and must not be copied from any other resource.

Note:40 % weightage is given to this Case Study and remaining 60% weightage is given to other practical work.



MCA-C35 Visual Programming-Lab + Minor Case Study

Teaching Scheme			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
0	0	3	1	50	50	100	3 hours

Course Type: Professional Core Courses (Practical Labs) INSTRUCTIONS:

1. For External Examiner:50% marks (25 marks) will be awarded on the basis of practical implementation and lab performance in final practical examination, and remaining 50% marks (25 marks) will be awarded on the basis of vive-voice and written script.

Objective: The main objective of this course is to cover practical implementation part of MCA-C32. After completing the course the student should be competent in Applets and Swing components, AWT, Event Handling, JDBC connectivity and Client/Server communication using Stream Sockets.

Total Lab Hours: (24-Practical + 16-Case Study) 40 Suggested List of Practical Topics:

- 1. Applet
- 2. Applet Life Cycle (init, start, stop, destroy).
- 3. Frame
- 4. Pain, Repaint
- 5. Fonts
- 6. Graphics (Lines, Rectangles, Ovals, Arcs and Polygons).
- 7. GUI Components (Label, Buttons, Checkboxes, Choice, Lists, Scroll Bar, Text Field, Text Area, Menu and layouts)
- 8. Swing Container (Windows, Frame, Dialog, Panel).

must not be copied from any other resource.

- 9. Swing Jcomponents (JLabel, Jlist, JTable, JComboBox, JSlider, JMenu, AbstractButton, JButton).
- 10. Images

Minor Case Study:

- 11. Animation of Series of Images
- 12. Image Maps
- 13. Loading and Playing Audio Clip.
- 14. Loading and Playing Video Clip.
- 15. Look-and-Feel (PLAF, Nimbus, Motif, Windows).
- 16. Event Handling (Key Listeners, Mouse Listeners, Mouse Wheel Listeners, Windows Listeners, Item Listeners, and Action Listeners).
- 17. Establishing a Client using Stream Sockets.
- 18. Establishing a Server using Stream Sockets.
- 19. Creating Database books in MySQL.
- 20. Manipulation in Database using JDBC.
- 21. RowSet

One minor case study must be the part of practical file. Student have to develop an application

by using Java Swing components. Event Handling, Database handling and Socket Programming must be

22. ResultSet



Note:40 % weightage is given to this Case Study and remaining 60% weightage is given to other practical work.

Teaching Scheme Cred			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Artificial Intelligence and related technologies. After completing the course the student should be competent in Prolog Programming tools and also able to understand the Artificial Intelligence and its applications for real life problems.

UNIT-I

Introduction to AI: Definitions, Importance of AI, AI application Areas. **Knowledge Base Systems:** Components of knowledge Base System. **Knowledge Representation:** Types of knowledge, structured knowledge representation semantic nets, graphs, conceptual dependencies, frames, Scripts.

(10-L,3-T=13)

UNIT-II

Fuzzy System: Definition of Fuzzy set, Fuzzy relations, fuzzy function, fuzzy measure, fuzzy reasoning,
application of fuzzy system. Neural network: neural network terminology, Functional unit of ANN,
application area of ANN.(10-L,3-T=13)

UNIT-III

Natural language processing:Phonological, Morphological, syntactic processing, semantic analysis,
discourse and pragmatic processing.Heuristic Searching Techniques:Hill climbing, A*, AO*, Searching
(10-L,3-T=13)OR and AND-OR graphs.(10-L,3-T=13)



UNIT-IV

Expert System: Introduction, feature of expert system, Basic activities of expert system, Rule Based Architectures, Non-Production System architecture, Applications, ES-Shells. ES application in computer science. (10-L,3-T=13)

Text Book:

1. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", PHI.

2. M. Ganesh, "Introduction to Fuzzy Sets and Fuzzy Logic", PHI Publication.

3. B. Yegnanrayana, "Artificial Neural Networks", PHI Pulbication.

Reference Books:

1. E. Rich and K. Knight," Artificial Intelligence", Tata McGraw Hill.

2. E. Charnaik and D. McDermott," Introduction to artificial Intelligence", Addison- Wesley Publishing Company.

3. Nils J. Nilson, "Principles of Artificial Intelligence", Narosa Publishing Co.

4. M. Chandwick and J.A. Hannah, "Expert Systems for Personal Computers", GalgotiaPublications.

5. Donald A.Waterman, "A Guide to Expert System", Pearson Publication.



MCA-E32 Software Quality Assurance

Teaching Scheme Cred			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge to assure quality of software. After completing the course the student should be competent in handling various quality assurance issues practically and able to these methodologies in software development.

UNIT-I

Software and Quality Concept: Objectives, overview, Software perspective, Software Quality, Software Quality Assurance, Software Quality models, Software Quality measurement and metrics. **Assuring Software Quality Assurance (SQA):** Objectives, goals, responsibilities, life cycle, SQA planning, SQA monitoring and controlling, testing, setting standards and procedures, Developing and controlling relevant metrics, SQA activitiesrevision, process evaluation, software standards. **(10-L,3-T=13)**

UNIT-II

Software Quality Meterics: Objectives, Software metrics, Software Quality metrics framework, Software Quality metrics features, Development of software quality metrics- SATC's approach, Kitchenham's approach, Abreu's approach, Victor's approach, Selection of Software Quality metrics- Size related metrics, complexity metrics, Halstead metrics, quality metrics. Software Quality Models: Objectives, Hierarchical model- factor-criteriametricsmodel, McCall's model, Boehm model, ISO 9126 model, Dromey's Quality model, Non-hierarchical model-Bayesian belief networks, star model, capability maturity models. (10-L,3-T=13)



Software Testing: Introduction, Definition (testing, fault, error, failure, bug, mistake), test oracle, test case, Process, Limitations of Testing. Functional Testing: Boundary Value Analysis- Introduction &Definition, Generalising, limitations, Robustness testing, Worstcase testing, Test cases. Equivalence Class Testing - Introduction & Definition, Weak normal, strong normal, Weak robust, Strong robust, Test cases. Decision Table Based Testing- Introduction & Definition, technique, test cases. (10-L,3-T=13)

UNIT-IV

Structural Testing: Path testing - Introduction & definition, DD-path, Test coverage metrics, McCabe's basis path method, its observations and complexity. Data Flow Testing: Definition, data flow graphs, data flow model, Data flow testing strategies. Levels of Testing: Traditional view of testing levels, Integration Testing (Decomposition based integration), Unit Testing, System Testing. Metrics and Complexity: Metrics definition, objectives, Linguistic Metrics: definition, LOC, Statement counts, Related metrics, Halstead's Metrics, Token count. Structural Metrics -Definition, Cyclomatic complexity, Hybrid Metrics.

(10-L,3-T=13)

Text Books:

1. R A Khan, K Mustafa, SI Ahson, —Software Quality- Concepts and Practices, NarosaPublishing House, 2. Boris Beizer, —Software Testing Techniques, Dreamtech press.

- 2. Don's Delzer, Software resting reeningdes, Dreamteen press.
- 3. Paul C. Jorgensen. —Software Testing- A Craftsman Approach, CRC Press

Reference Books:

1. Alan C Gillies, —Software Quality: Theory and Management, Cengage Learning, India.

- 2. Nina S Godbole, —Software Quality Assurance: Principles and Practice, NarosaPublishing House.
- 3. K.K. Aggarwal&Yogesh Singh, —Software Engineering, New Age International Publishers.
- 4. Bharat BhushanAggarwal&SumitPrakashTayal, —Software Engineering, University Science Press.
- 5. Aditya P. Mathur, —Fundamentals of Software Testing, Pearson Education.



MCA-E33 Information Security

Teaching Scheme Credits			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Information Security and various tools and techniques used to secure Information. After completing the course the student should be competent in Information Security tools and techniques, and able to use these tools and techniques to secure information in real world.

UNIT-I

Introduction to Information Security: History and evaluation of Information security CIA triangle ,Components of IS, Control in IT environment, Information security Managementsystem, components of ISMS and conceptual framework , Steps for developing ISMS **Need of Information security:** Threats to information security, Risk to Information systems Information security in organization, Introduction to cyber crimes and attacks , Information security policy, policy definition and security life cycle.

(10-L,3-T=13)

UNIT-II

Information Security Policy and Standards: Security principles, Types of Information security policies-Administrative and Technical, A structure and framework of compressive security policy, policy infrastructure, policy design life cycle and design processes, PDCA model, Security policy standards and practices - BS7799, ISO/IEC 17799, ISO 27001. Auditing tools such as ISO 27001 ISMS TOOL KIT, NGS AUDITOR, Windows password auditor, ISO IES 27002 2005 IS AUDIT TOOL. **(10-L,3-T=13)**



IT Governance: What is IT Governance, good governance, objectives and dimensions, foundation,
structure, processes,IT governance framework- COBIT, ITIL, ISO 17799, IT governance maturity model.
Ethical hacking.(10-L,3-T=13)

UNIT-IV

Audit:Auditing concepts ISA need, concept, standards, performance, steps, Techniques, methodologies, around and through computer, Controls – Concept objectives, types, risk. Controls: Input, process, validation, output, logical access, physical access, Database, network, environment, BCP, Evidence collection, evaluation and Reporting methodologies. (10-L,3-T=13)

Text Books:

1. Information security policies, procedures and standards by Thomas Pettier.

2. Information security Management Hand book- 5th Edition-HAROLD F. TIPTON

3. Computer security by Alfred Basta, Wolf Halton

Reference Books:

1. Information security policies- Thomas R.Peltier, Peltier R. Peltier

2. Electronic Signature law by L Padmavathi

3. Network Security by AnkitFadia

4. Security Plus study guide by Michael Cross, Norrris Johnson

5. Information systems control and Audit by Ron Weber, Pearson Pub.

6. IS control journals from ISACA

7. Information Systems Security: Security Management, Metrics, Frameworks And Best Practices (With Cd) : Nina Gobole

8. Information Security policies made easy version 10: Charles Cresson Wood



MCA-O31 Mobile Computing and Wireless Network

Teaching Scheme Credits			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Open Elective (Informational Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide the conceptual as-well-as practical knowledge of Mobile computing and wireless network. After completing the course the student should be competent in the use of various tools and techniques used in mobile computing and wireless networking.

UNIT-I

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS. Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications. Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks.

(10 L)

UNIT-II

Introduction to Adhoc networks: definition, characteristics features, applications. Characteristics of Wireless channel, Adhoc Mobility Models:- Indoor and outdoor models. MEDIUM ACCESS PROTOCOLS MAC Protocols: design issues, goals and classification. Contention based protocols-with reservation, scheduling algorithms, protocols using directional antennas. IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN. NETWORK PROTOCOLS Routing Protocols: Design issues, goals and classification.

(10 L)



Routing:ProactiveVs reactive routing, Unicast routing algorithms, Multicast routing algorithms, hybrid routing algorithm, Energy aware routing algorithm, Hierarchical Routing, QoS aware routing. END-END DELIVERY AND SECURITY Transport layer: Issues in desiging- Transport layer classification, adhoc transport protocols. Security issues in adhoc networks: issues and challenges, network security attacks, secure routing protocols. Cross Layer Design and Integration of Adhoc for 4g Cross Layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, Cross layer cautionary perspective.

(10 L)

UNIT-IV

Introduction to sensor networks and its applications: Architecture and factors influencing the sensor network design. Routing protocols- data centric routing protocols, hierarchical routing protocols, location based routing, energy efficient routing etc; Node Scheduling and coverage issues, topology control. Querying, data collection and processing, Collaborative information processing and group connectivity.Target tracking and identity management using sensor networks.Localization. Application & future research Challenges.

(10 L)

Text Books:

- 1. Frank Adelstein, S.K.S. Gupta, Golden G. Richard III and Loren Schwiebert, "Fundamentals of Mobile and Pervasive Computing", McGraw-Hill Professional.
- 2. David Taniar, "Mobile Computing: Concepts, Methodologies, Tools, and Applications".
- 3. R. Jurdak "Wireless Ad Hoc and Sensor Networks". Springer Publications.
- 4. Toh C.K., Ad-Hoc Mobile Wireless Networks Protocols and Systems, Prentice Hall.
- 5. Edgar H. Callaway, Wireless sensor networks: architectures and protocols, Auerbach Publications.

Reference Books:

- 1. Feng Zhao, Leonidas Guibas "Wireless Sensor Networks-An Information Processing Approach". Morgan Kauffman.
- 2. Siva-RAM-Murthy, Ad-Hoc Wireless Networks Architectures and Protocols, Addison-Wesley.
- 3. Stojmenovic and Cacute, Handbook of Wireless Networks and Mobile Computing, Wiley.
- 4. Feng Zhao, Leonidas J. Guibas, Wireless sensor networks: an information processing approach.
- 5. Asoke. K Talukder, Roopa R. Yavagal, Asoke K. Talukder, "Mobile Computing".
- 6. J. Schiller, Mobile Communications, Addison Wesley.
- 7. M. V. D. Heijden, M. Taylor, Understanding WAP, Artech House.
- 8. Charles Perkins, Mobile IP, Addison Wesley.
- 9. Charles Perkins, Ad hoc Networks, Addison Wesley.



MCA-O32 Simulation and Modeling Using MATLAB

Teaching Scheme Cred			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of various simulation and modeling tools and techniques. After completing the course the student should be competent in basic of Simulink and METLAB tools for simulation and modeling, and able to use these tools and methodologies for real life problems.

UNIT-I

Introduction: Definitions of Modeling and Simulation, When to apply these techniques, Its Applications, Terminology & Components, Discrete vs. Continuous time, Process flow in simulation study Simulation Examples: Queuing systems, Communications networks General Principles: Event -driven simulation, World Views, List processing. (10 L)

UNIT-II

Simulation software: History, Selection process, Simulation in High Level Language (C, C++, Pascal, Fortran), Simulation packages (Matlab/Simulink), Interpreted vs. compiled simulators, Future trends**Statistical models:** Terminology and Concepts, Useful Statistical Models, Distributions**Queuing models:** Characteristics, Performance Measures, Steady-State Behavior, Networks of Queues.

(10 L)

UNIT-III

Random Number Generation: Properties of Random Numbers, Generation of Pseudo-Random Numbers, Testing for Randomness, Pitfalls**RandomVariate Generation:** Inverse Transform, Direct Transform, Convolution, Accept-RejectInput Modeling: Collecting Data, Identifying Distribution,



Histograms, Parameter Estimation, Goodness-of-Fit, Selecting Input Model without Data. (10 L)

UNIT-IV

Verification and Validation of Simulation Models: Model Building, Verification, and Validation, Verification of Simulation Models, Calibration and Validation of Models**Output Analysis:** Types of Simulations with Respect to Output Analysis, Stochastic Nature of Output Data, Measures of Performance, Output Analysis for Termination Simulations, Output Analysis for Steady-State Simulations. **(10 L)**

Text Books:

1. Agam Kumar Tyagi, "MATLAB and Simulink for Engineers", Oxford University.

2. Bansal/Goel/Sharma, "MALAB and its Applications in Engineering", Pearson India.

3. Stephen J. Chapman, "MATLAB Programming for Engineers", CENGAGE Learning.

Reference Books:

1. S.N. Alam, "Understanding MATLAB: A Textbook for Beginners", IK International Publishing House Pvt. Ltd.

2. Brian R. Hunt, "A Guide to MATLAB for Beginners and Experienced Users", Cambridge

3. Y. Kirani Singh, "MATLAB Programming", PHI



MCA-O33 Natural Language Processing

Teaching Scheme Credi			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to introduce the fundamental concepts and ideas in natural language processing (NLP), and to get them up to speed with current research in the area. It develops an in-depth understanding of both the algorithms available for the processing of linguistic information and the underlying computational properties of natural languages. After completing the course the student should be competentinmodern quantitative techniques in NLP: using large corpora, statistical models for acquisition, disambiguation, and parsing.

UNIT-I

Introduction:Overview of NLP, Statistical machine translation, Language models and their role in speech processing, Course introduction and administration, *N*-gram Language Models and Information Theory*n*-gram models, Entropy, relative entropy, cross entropy, mutual information, perplexity. **Statistical estimation and smoothing for language models**:Statistical Machine Translation (MT), Alignment ModelsSmoothing,Smoothing absolute discounting, proving you have a proper probability distribution. **(10 L)**

UNIT-II

Good-Turing implementation: Information theory examples and intuitions, Java implementation issues, Statistical Alignment Models and Expectation Maximization (EM), EM and its use in statistical MT alignment models, Putting together a complete statistical MT system, Decoding and A* Search. **Recent, work in statistical MT:** statistical phrase based systems and syntax in MT, The EM algorithm, Information Extraction (IE) and Named Entity Recognition (NER), rule-based methods, evaluation (recall, precision).

(10 L)



Introduction to supervised machine, learning methods: Naïve Bayes (NB), classifiers for entity classification, Maximum Entropy Classifiers, Corpora and other resources, Maximum Entropy Sequence Classifiers, IE and text mining, Maximum entropy sequence models. Syntax and Parsing for Context-Free Grammars (CFGs): Parsing, treebanks, attachment ambiguities. Context free grammars. Top-down and bottom-up parsing, empty constituents, left recursion, and repeated work, Probabilistic CFGs, Dynamic Programming for Parsing Dynamic programming for parsing, The CKY algorithm, Accurate unlexicalized PCFG parsing, Parsing, PCFGs, Semantic Role Labeling. (10 L)

UNIT-IV

Lexicalized Probabilistic Context-Free Grammars (LPCFGs):Lexicalization and lexicalized parsing, The Charniak, Collins/Bikel, and Petrov& Klein parsers. Modern Statistical Parsers Search methods in parsing: Agenda-based chart, A*, and "best-first" parsing. Dependency parsing.DiscriminativeparsingComputational Semantics Semantic representations, lambda calculus, compositionality, syntax/semantics interfaces, logical reasoning, Lexical Semantics.

(10 L)

Text Books:

- Daniel Jurafsky and James H. Martin, Speech and Language Processing: An Introduction to Natural LanguageProcessing, Computational Linguistics and Speech Recognition. Second Edition. Prentice Hall.
- 2. Christopher D. Manning and HinrichSchütze, Foundations of Statistical Natural Language Processing. MITPress.

Reference Books:

- 1. James Allen, Natural Language Understanding. Benjamin/Cummings, 2ed.
- 2. Frederick Jelinek, Statistical Methods for Speech Recognition. MIT Press.



MCA-O34 Computer and Information Security

Teaching Scheme Credit			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as-well-as practical knowledge about various issues in computer and information security. After completing the course the student should be competent in understanding various tools and techniques used to manage the various security issues in computer and information system.

UNIT-I

Introduction: Computer Security Concepts, Threats, Attacks, and Assets, Security Functional Requirements, Security Architecture for Open Systems, Computer Security Trends, Computer Security Strategy. **Computer Security Technology and Principles**: Cryptographic Tool, Confidentiality with Symmetric Encryption, Message Authentication and Hash Functions, Public-Key Encryption, Digital Signatures and Key Management, Random and Pseudorandom Numbers. (10 L)

UNIT-II

Practical Application:Encryption of Stored Data, User Authentication, Means of Authentication,
Password-Based Authentication, Token-Based Authentication, Biometric Authentication, Remote User
Authentication, Security Issues for User Authentication, Practical Application:
An Iris Biometric System.Access Control:Access Control Principles, Subjects, Objects, and Access Rights, Discretionary Access
Control, Example:
UNIX File Access Control, Role-Based Access Control.

UNIT-III

Database Security: The Need for Database Security, Database Management Systems, Relational Databases, Database Access Control, Inference, Statistical Databases, DatabaseEncryption.Denial-of-Service Attacks: Denial-of-Service Attacks, Flooding Attacks, Distributed, Denial-of-Service Attacks, Application-Based, Bandwidth Attacks, Reflector and, Amplifier Attacks, Defenses Against, Denial-of-Service Attacks, Responding to a Denial-of-Service Attack. (10 L)



UNIT-IV

Trusted Computing and Multilevel Security: The Bell-LaPadula Model for Computer Security, Other Formal Models for Computer Security, The Concept of Trusted Systems, Application of Multilevel, Security, Trusted Computing and the Trusted Platform Module, Common Criteria for Information Technology Security Evaluation, Assurance and Evaluation. **Physical and Infrastructure Security:** Overview, Physical Security Threats, Physical Security Prevention and Mitigation Measures, Recovery from Physical Security Breaches, Example: A Corporate Physical Security Policy, Integration of Physical and Logical Security.

(10 L)

Text Books:

- 1. Computer Security: Principles and Practice 2nd Edition, By W. Stallings, Prentice Hall.
- 2. Information Security: Principles and Practice, By M. Stamp, Wiley.

Reference Books:

- 1. Principles of Information Security, By M.E. Whitman and H.J. Mattord, Course Technology.
- 2. Computer Security: Art and Science, By M. Bishop, Addison Wesley.
- 3. Software Security: Building Security In, By G. McGraw, Addison Wesley.


MCA-F41 Operational Research

Teaching Scheme Credits			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Foundation Courses

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of optimization techniques and various tools used in Operational Research. After completing the course the student can able to use these tools and techniques to find optimized solution for real life problems.

UNIT-I

Introduction to O.R. – Definition, Uses and Limitations of Optimization method. The Linear Programming Problem: Introduction, Formulation Of LPP, Graphical Solution And Some Exceptional Cases, Canonical And Standard Form Of LPP. The Simplex Method: Solution of LPP By Simplex Method, Exceptional Cases, Artificial Variable Techniques (Big M), Two Phase Of Simplex Method, Problem of Degeneracy.

(10-L,3-T=13)

UNIT-II

The Dual Simplex Method: Dual And Primal Problem, Duality And Simplex Method, dual simplex method, Revised Simplex Method, Solution Of LPP Using Revised Simplex Method. **Networking Scheduling By PERT/CPM:** Introduction, Basic Concepts, Constraints In Network, Construction Of The Network, Time Calculation In Networks, Critical Path Method (CPM), PERT, PERT Calculation, Advantage Of Network (PERT/CPM).

(10-L,3-T=13)



UNIT-III

The Transportation Problem: Introduction, Basic Feasibility Solution, Standard Transportation Problem,
Balanced Transportation Problem, Multicommodity Transportation Problem, Row Minimum, Column
Minimum, Matrix Minimum Method, Vogel Approximation Method (VAM), Optimality In Transportation
Problem,(stepping stone and modified distribution methods) Degeneracy In Transportation Problem,
Assignment And Routing Problem.(10-L,3-T=13)

UNIT-IV

Game theory: Significance, essential features and limitations; Maximax and minimax principle, Game with pure & mined strategies, sul-game method (caseof 2xn or mx2 methods), Probability method, graphic method, algebraic method. **Inventory Control:**Introduction, Inventory Control, Selective Control Techniques, ABC Analysis Procedure, Economics Lot Size Problems, Problem of EQQ With shortage, Inventory Control Techniques Uncertain Demand, Stochastic Problems. **(10-L,3-T=13)**

Text Book:

1. KantiSwarup, P.K. Gupta and Manmohan, —Operations Research, Sultan Chand & Sons.New Delhi. **Reference Books:**

1. H.A. Taha, —Operation Research - An Introduction, Macmillan Publications.

2. S.D. Sharma, —Operation Research, KedarNath Ram Nath& Company, Meerut.

3. K.K. Chawla, Vijay Gupta, Bhushan K Sharma, —Operations Research: Quantization Analysis for Management, Kalyani Publishers, Kolkata.

4. V.K. Kapoor, —Operation Research, Sultan Chand & sons, New Delhi.



MCA-C41 Fundamentals of Scripting Languages Using Java Script and PHP

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Software Development)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.
- IV. At least 60% questions are based on applied knowledge remaining 40% questions are based on concepts and illustration of concepts with practical approach.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Scripting Languages (Java Script and PHP) and tools used in these languages. After completing the course the student should be competent in scripting language tools and able to use these tools to create dynamic web pages.

UNIT-I

Introduction to server:Server and it's Use, Types of Servers, Proxy Server, Web server, Application Server, Virtual server, Mail Server, FTP Server, Telnet Server, Two-tier Client Server Architecture, Three-tier Client Server Architecture, Thin and Fat Client, Load Balancing in server, Advantages and Disadvantages of virtual server, Installing and configuring Web server(Apache/Tomcat/Glassfish/IIS).

(10-L,3-T=13)

UNIT-II

Introduction to Java Script: Basic functions (alert, confirm, prompt), adding javascript in page body. Document object model (DOM), Defining and calling functions: variables, operators, control structures. JavaScript Events, Predefined objects (String, date, math, array, window). Validating form using JavaScript; Enhancing form with javascript: Focusing on form element, Auto-tabbing between fields, disabling text input, Case Conversion. Javascript Libraries: Introduction, jquery, creating sliders using jquery. (10-L,3-T=13)



UNIT-III

PHP: Overview of server side scripting, phpinfo(); embedding PHP Codes in HTML,generating HTML Codes using PHP. PHP Operators and Expressions. PHP Control Statements PHP: Arrays. Functions, Pattern Matching, Form handling, File handling, cookies, Session Tracking; Database access using PHP and MySQL: Connecting to database-server, Selectingdatabase, creating query, reading records from database, storing records in database. (10-L,3-

T=13)

UNIT-IV

Advanced Web development tools: CMS Systems, Need of CMS, Types of CMS, Introduction to Open Source website creation tools (WordPress, Joomla, Magento, Drupal). WordPress: Basics of WordPress, components of WordPress, WordPress Plugins and themes. **Responsive Web Tools:** Introduction to Responsive web designs, Responsive web development tools, Bootstrap, Bootstrap Editor, Bootstrap Tools and Resources. (10-L,3-T=13)

Text Books:

1. Programming with world wide web by Robert Sebesta on Pearson.

2. Javascript Bible, Wiley India.

3. Beginning with HTML, XHTML, CSS and Javascript by John Duckett, Wiley- Wrox

Reference Books:

1. PHP and MySQL5 Larry Ulman, Pearson .

2. Building PHP Applications WithSymfony, CakePHP, And Zend, Framework by BartoszPorebski Karol PrzystalskiLeszek Nowak, Wiley India.



MCA-C42 Mobile Computing

Teaching Scheme Credits			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	al End Semester Total Examinati Exam		Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Software Development)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.
- IV. At least 60% questions are based on applied knowledge remaining 40% questions are based on concepts and illustration of concepts with practical approach.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Mobile Computing and various languages used to create mobile applications. The main emphasis of this course is on Android Operating System and various tools used to create mobile applications for Android Mobiles. After completing the course the student should be competently develop mobile applications for Android on Eclipse IDE.

UNIT-I

Introduction: History of wireless communication, Mobile computing, applications, limitations and Mobile computing architecture, cellular network concepts, location management, handoffs. **Wireless LAN:** WAP Introduction, Architecture, Applications, MAC issues (Hidden and exposed terminals, Near and far terminals), MANET. **Mobile Operating Systems:** Window CE, Palm OS, Symbian OS, J2ME, iOS and android.

(10-L,3-T=13)

UNIT-II

Introduction to Android: Overview, History, Comparison, Advantages, Open Handset Alliance, Android Internals, Android Architecture. **Android Development Environment:** Android development frameworks, Android-SDK, Eclipse, Creating Android Emulator, Android AVD, Android Application Structure, Android Project Framework, Crating a Project. **Android Activities and UI Design:** Intent, Activity, Activity Lifecycle, Manifest, Creating application and new activity, Testing and debugging (DDMS, Step Filters and LogCat). **Layouts and Layout properties**:Layouts, Drawable Resources,



Resolution and density independence (px,dip,dp,sip,sp) (10-L,3-T=13)

UNIT-III

GUI objects: Push Button,Text / Labels, EditText, ToggleButton, WeightSum, Padding, Layout Weight.**Advanced UI Programming:** Event driven Programming in Android (Text Edit, Button clicked etc.) Creating a splash screen, Threads, Understanding Exception handler, Animation, View animation, Drawable animation.**Toast, Menu, Dialog, List and Adapters:**Status bar, Menu, Custom Vs. System Menus, Creating and Using Handset menu Button, Themes, Dialog, Alter Dialog, Toast in Android, List & Adapters, Manifest.xml File Update. **Notifications:** Notification Manager, Pending Intent, Toast Notifications.

(10-L,3-T=13)

UNIT-IV

Multimedia Programming using Android:Multimedia audio formats – Creating, Playing, Kill / Releasing (Memory Management), Associate audio in any application, Associate video playback with an event. **Database – SQLite:** Shared preferences, Preferences activity, Files access, SQLite, SQLiteOpenHelper, Creating a database, Opening and closing a database, Working with cursors Inserts, updates, and deletes. **Location Based Services and Google Maps:** Using Location Based Services, Working with Google Maps, Using GPS to find current location. **Installation of .apk:** How to install .apk into your Android Mobile.

(10-L,3-T=13)

Text Books:

1. Mobile Communications J. Schiller, Addition Wesley Publication.

2. Professional Android[™] Application Development Wrox Publications, Reto Meier

3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer, second edition.

4. Principles of Mobile computing, Hansmann, Merk, Nicklous, Stober, Springer International Edition.

Reference Books:

1. GSM System Engineering A.Mehrotra, Addition Wesley Publication

2. Understanding WAP M. Heijden, M. Taylor, Artech House Publication

3. Hello Android, Introducing Google's Mobile Development Platform, Ed Burnette, Pragmatic Programmers, ISBN: 978-1-93435-617-3

4. Sams teach yourself Android application development, Lauren Dercy and ShandeConder, Samspublishing

5. Mobile Computing: Asoke K Talukdar, Roopa R. Yavagal, TataMcGrawHill



MCA-C43 Theory of Computation

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Professional Core Courses (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Automata theory and various other theories used in computation. After completing the course the student should be competent to solve computation problems by applying these theories.

UNIT-I

Introduction to theory of computation, Finite state automata – description of finite automata, Properties of transition functions, Designing finite automata, NFA, 2 way finite automata, equivalence of NFA and DFA, Mealy and Moor machine.

(10-L,3-T=13)

UNIT-II

Finite automata with epsilon moves, Minimization of FSA. Regular sets and regular grammars, regular expressions, pumping lemma for regular languages, closure properties of regular sets and regular grammars, Application of finite automata, Decision algorithms for regular sets, Chomsky classification of languages. (10-L,3-T=13)

UNIT-III

CFGs, Derivation trees, ambiguity, simplification of CFLs, normal forms of CFGs, pumping lemma for CFGs, decision algorithms for CFGs, designing CFGs, PDA – formal definition, examples of PDA, , PDA and CFG, Chomsky hierarchy. (10-L,3-

T=13)



UNIT-IV

Turing machines basics and formal definition: Language acceptability by TM, examples of TM, variants of TMs – multitape TM, NDTM, Universal Turing Machine, offline TMs, Equivalence of single tape and multitape TMs, recursive and recursively enumerable languages, decidable and undecidable problems – examples, halting problem, reducibility. (10-L,3-T=13)

Text Books:

1. Hopcroft and Ullman., Introduction to Automata Theory, Languages and Computation. 2nd ed., Pearson EducationNarosa,

References Books:

- 1. Manna, Mathematical theory of computation –McGraw Hill
- 2. Peter Linz., Introduction to Formal Languages and Automata Theory, NarosaPublishing., 1997.
- 3. Zvi Kohai., Switching and Finite Automata Theory , Tata McGraw Hill



MCA-C44 Scripting Language-Lab + Minor Case Study

Teaching Scheme Credits			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	nal End Semester Total Examination Exam		
0	0	3	1	50	50	100	3 hours

Course Type: Professional Core Courses (Practical Labs) INSTRUCTIONS:

1. For External Examiner:50% marks (25 marks) will be awarded on the basis of practical implementation and lab performance in final practical examination, and remaining 50% marks (25 marks) will be awarded on the basis of vive-voice and written script.

Objective: The main objective of this course is to cover practical implementation part of **MCA-C41**. After completing the course the student should be competent to design and develop responsive web pages on CMS system, and also competent in JavaScript and PHP tools.

Note: Implementation of all practical must be on WordPress or on any other CMS tool. Bootstrap Editor may also be used as enhancement tool.

Total Lab Hours: (26-Practical + 14-Case Study) 40 Suggested List of Practical Topics:

- 1. Adding JavaScript in HTML page body.
- 2. Defining and calling a function in JavaScript.
- 3. Variables in JavaScript.
- 4. Operators in JavaScript.
- 5. Control Structures in JavaScript.
- 6. JavaScript Events.
- 7. Predefined objects (String, date, math, array, window).
- 8. Focusing on Form Element.
- 9. Auto tabbing between fields.
- 10. Jquery.
- 11. Slider using Jquery.
- 12. Embedding PHP codes in HTML.

- Generating HTML codes using PHP.
 PHP operators and Expressions.
- 15. PHP control structure.
- 16. Arrays, functions and Pattern Matching in PHP.
- 17. Form Handling using PHP.
- 18. File Handling using PHP.
- 19. Cookies.
- 20. Session Tracking.
- 21. Database accessing using PHP.
- 22. Reading and Storing records in Database using PHP.
- 23. WordPress Plugins and Themes.
- 24. Bootstrap tools and resources.

Minor Case Study:

One minor case study must be the part of practical file. Student have to develop a responsive web-site comprises at least 10 pages. Web-pages must be enhanced by JavaScript and PHP tools. The Entire web site must by managed by CMS System (WordPress). Web site must be realistic and showing students own work, and must not be copied from any other resource.

Note:40 % weightage is given to this Case Study and remaining 60% weightage is given to other practical work.



Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
0	0	3	1	50	50	100	3 hours

MCA-C45 Mobile Computing-Lab + Minor Case Study

Course Type: Professional Core Courses (Practical Labs) INSTRUCTIONS:

1. For External Examiner:50% marks (25 marks) will be awarded on the basis of practical implementation and lab performance in final practical examination, and remaining 50% marks (25 marks) will be awarded on the basis of vive-voice and written script.

Objective: The main objective of this course is to cover practical implementation part of **MCA-C42**. After completing the course the student should be competent to develop Mobile applications for Android Mobiles. Students should also be competent to use Eclipse IDE for Mobile application development.

Note: All the practical work must be implemented on latest version of Eclipse IDE. **Total Lab Hours: (26-Practical + 14-Case Study) 40**

Suggested List of Practical Topics:

- 1. Creating application and New Activity.
- 2. Activity life Cycle.
- 3. Intent and Layouts.
- 4. Drawable Resources.
- 5. GUI objects (Push Button, Text/Labels, Edit Text, Toggle Button, Weight Sum, Padding, layout Weight).
- 6. Event Driven Program (Text Edit, Button Clicked).
- 7. Creating a Splash Screen.
- 8. Threads and Animation.
- 9. Statius Bar and Menu.
- 10. Creating and Using Handset menu Buttons.

- 11. Themes, Dialog, Alter Dialog.
- 12. Toast, List and Adapter.
- 13. Pending Intent, Toast Notifications.
- 14. Playing Audio.
- 15. Associate audio/video in application.
- 16. Shared Preferences, preferences activity.
- 17. File access and SQLite.
- 18. Working with Cursors, Inserts, Updates and Delete.
- 19. Using GPS to find current location.
- 20. Google Maps.

Minor Case Study:

One minor case study must be the part of practical file. Student have to develop a mobile application by using Latest Eclipse IDE and Android development Kit. The application must be realistic and showing students own work, and must not be copied from any other resource.

Note:40 % weightage is given to this Case Study and remaining 60% weightage is given to other practical work.



MCA-E41 Parallel Computing

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Parallel Computing. After completing the course the student should be competent in basic of Parallel Computing techniques.

UNIT-I

Parallel Computers-Introduction: The Demand of Computational Speed, Types of Parallel Computers, Architectural Features of Message passing Multicomputer, Networked Computers as a Multicomputer Platform, Potential for increased computational speed. Parallel Computer Architecture: A Taxonomy of Parallel Architectures, Control Mechanism, Address-space Organization, Interconnection Networks, Processors Granularity ;SIMD Architecture : Overview of SIMD Architecture, Design and Performance Issues; MIMD Architecture : Shared Memory Architecture, Uniform and Non-uniform Memory Access Multi Processors, Parallel Vector Processors (PVP), Symmetric Multiple Processors (SMP), CC-NUMA, NUMA and COMA Architectures. Distributed Memory Architecture: Cluster Architecture - Design and other Issues ,MPP Architecture. (10-L,3-T=13)

UNIT-II

System Interconnection and Gigabit Network Basics of Interconnection Network: Network Topologies and Properties, Buses, Crossbar, and Multistage switches, Gigabit Network Technologies, Comparison of Network Technologies Parallel Programming: Paradigms and Programmability: Algorithmic Paradigms, Programmability issues Parallel Programming Examples; **Parallel Programming Models** :Implicit Parallelism, Explicit Parallel Models, Other Parallel Programming Models ;Shared Memory Programming : The POSIX Threads (P-threads) Model, The Open MP Standard; **Message-Passing Programming :** The



Message Passing Paradigm, Message Passing Interface (MPI), Parallel Virtual Machine (PVM). Data Parallel Programming: The Data Parallel Model, The Fortran 90 Approach, Other Data Parallel Approaches. (10-L,3-T=13)

UNIT-III

Performance Metrics and Benchmarks: Performance Metrics for Parallel Systems, Run Time, Speedup, Efficiency Cost. **Scalability and Speedup Analysis:** Amdahl's Law: Fixed Problem Size, Gustafson's Law: Fixed Time, Sun and Ni's Law: Memory Bounding, Iso performance Models. **System and Application Benchmarks :** Micro Benchmarks, Parallel Computing Benchmarks, Business and TPC Benchmarks, SPEC Benchmark Family ; Performance v/s Cost, Performance of parallel Computers, Performance of Parallel Programs. **Parallel Paradigms and Programming Models:** Parallel Programming Models, Implicit Parallelism, Explicit Parallel Models, Other Parallel Programming Models. **Shared Memory Programming:** The POSIX Threads (P-threads) Model, The Open MP Standard.

(10-L,3-T=13)

UNIT-IV

Message-Passing Programming: The Message Passing Paradigm, Message Passing Interface (MPI), Parallel Virtual Machine (PVM).Data Parallel Programming: The Data Parallel Model, the FORTRAN 90 Approach, Other Data Parallel ApproachesParallel Algorithms and Applications Sorting Algorithms, Searching Algorithms, Dynamic Programming, Matrix Multiplication, Dense Matrix Computations, Sparse Matrix Computations. (10-L,3-T=13)

Text Books:

1. Kai Hwang and ZhiweiXu, "Scalable Parallel Computing", 1997, McGraw Hill New York.

2. Barry Wilkinson and Michael Allen, "Parallel Programming", 1999, Pearson Education Asia. **Reference Books**:

1. Steven Brawer, "Introduction to Parallel Programming"

2. M. Shasikumar, Dinesh shikhare and P. Ravi Prakash, "Introduction to Parallel Processing".

3. V. Rajaraman and C. Siva Ram Murthy, "Parallel Computers-Architecture and Programming"



MCA-E42 Cloud Computing

Teaching Scheme Credits			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of basic of Cloud Computing, Various Cloud Computing terminologies and Platforms. After completing the course the student should be competent in cloud computing concepts and platforms.

UNIT-I

Introduction to Cloud Computing: Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS Cloud computing platforms: Infrastructure as service: Amazon EC2,Platform as Service: Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing. (10-L,3-T=13)

UNIT-II

Introduction to Cloud Technologies: Study of Hypervisors Compare SOAP and REST Webservices, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization Multitenant software: Multi-entity support, Multi-schema approach, Multi-tenance using cloud data stores, Data access control for enterprise applications,

Cloud Middleware. Mobile Cloud Computing. Inter Cloud issues. A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamic reconfiguration, Monitoring in Cloud. **(10-L,3-T=13)**



UNIT-III

Data in the cloud: Relational databases **Cloud file systems:** GFS and HDFS, BigTable, HBase and Dynamo. **Map-Reduce and extensions:** Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Mapreduce, Features and comparisons among GFS, HDFS etc, Map- Reduce model . **Issues in cloud computing:** Implementing real time application over cloud platform. Issues in Intercloud environments, QOS Issues in Cloud, Dependability, datamigration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud computing environment.

(10-L,3-T=13)

UNIT-IV

Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud **Cloud computing security architecture:** Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures;Identity Management and Access control-Identity management, Access control, Autonomic Security **Cloud computing security challenges**: Virtualization security management- virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud. Cloud computing platforms, Installing cloud platforms and performance evaluation. Features and functions of cloud platforms: Xen Cloud Platform, Eucalyptus, OpenNebula, Nimbus, TPlatform, Apache Virtual Computing Lab (VCL), EnomalyElastic Computing Platform.

(10-L,3-T=13)

Text Book:

1. Cloud Computing for Dummies by Judith Hurwitz, R.Bloor, M.Kanfman,

F.Halper (Wiley India Edition)

2. Enterprise Cloud Computing by GautamShroff,Cambridge

3. Cloud Security by Ronald Krutz and Russell Dean Vines, Wiley-India

Reference Book:

1. Google Apps by Scott Granneman, Pearson

2. Cloud Security & Privacy by Tim Malhar, S.Kumaraswammy, S.Latif(SPD,O'REILLY)

3. Cloud Computing : A Practical Approach, Antohy T Velte, et.al McGraw Hill,

4. Cloud Computing Bible by Barrie Sosinsky, Wiley India

5. Stefano Ferretti et.al.QoS-awareClouds", 2010 IEEE 3rd International Conference on Cloud Computing



MCA-E43 Compiler Design

Teaching Scheme Credits			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of architecture and working of compilers. After completing the course the student should be able to understand the architecture and working of compiler.

UNIT-I

Introduction to compilers and interpreters – Overview of compilation and different phases, Issues in compilation – structure of a compiler – compiler writing tools – bootstrapping – notations and concepts for languages and grammars – regular expressions – context free grammar, derivations and parse trees, BNF notations. (10-L,3-T=13)

UNIT-II

Context of a lexical analyzer:construction of lexical analyzer, deterministic and non-deterministic finite automata. Syntax analyzer, context free grammars, top down parsing, brute force parser, recursive descent parser, LL(1) parser, Bottom up parsing, operator precedence parsing, simple precedence parsing, LR parser, LALR parser, YACC – the parser generator. (10-L,3-T=13)

UNIT-III

Compile time error handling: error detection, reporting, recovery and repair. Intermediate languages, postfix notation, syntax trees, parse trees, three address code, triples and indirect triples. Translation of assignment statements, Boolean expressions, Syntax Directed Definition, S-attributed, L-attributed, translation Scheme, Applications of Syntax directed translation. **(10-L,3-T=13)**



UNIT-IV

Run time storage management: storage allocation and referencing data in block structured language, storage allocation. Code optimization, sources of optimization, loop optimization, DAG and optimization of basic blocks. Code generation, a machine model, next useinformation register allocation and assignment, a simple code generator, code generation from DAG's, Peephole optimization.(10-L,3-T=13)

Text books:

1. Alfred V Aho and Jeffery D Ullman Principles of Compiler Design ,Narosa/Addison Wesley

Reference Books:

1. Aho, Sethi,& Ullman., Compilers Principles, Techniques and Tools , Addison Wesley

2. Jean Paul Tremblay and Sorenson., The Theory and Practice of Compiler Writing McGraw Hill



MCA-O41 Mobile Architecture and Security

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	I End Semester Total Examinatio		
3	0	0	3	40	60	100	3 hours

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as-well-as practical knowledge about basic Mobile architecture, Mobile Database and various security issues in Mobile computing. After completing the course the student should be competent in understanding the mobile architecture and security issues in mobile computing.

UNIT-I

Hardware Architecture, Symmetric Multiprocessing, Distributed and Shared Memory. Multicomputers. Software Architecture, Client server architecture, 3-tier architecture, N-tier architecture, Peer-to-peer. Cluster computing concepts, Grid computing, Virtualisation and Cloud Computing.Recent trends in processor technologies -Superscalar processors, Multi-core processors, Embedded processors. (10 L)

UNIT-II

Introduction to conventional databases, distributed databases Mobile Data Access Systems: Mobility issues, On-demand services, Broadcast services, Transaction Processing, Security Moving Object Databases: Basic concepts and challenges, Accessing methods of moving object databases, Current Information Oriented Indexing, Historical Information Oriented Indexing, Mixed-type indexing, Indexing Moving Objects with Special Characteristics. (10 L)

UNIT-III

IP Layer Security, Link Layer Security, Network Security options. Security Issues in a Mobile IPV6 Network, Mobile Code Issues: Security Measures for Mobile Agents, Security Issues for Downloaded code in Mobile phones Secure Mobile Commerce: MCommerce and its security challenges, Security of the radio interface.



Security Issues in Single Hop Wireless Networks: Cellular Network Security, Access Control and Roaming Issues, Mobile IP Security Security Issues in Multihop Wireless Networks: Mobile Adhoc Network Security, Trust Management and Routing Issues, Wireless Sensor Network Security, Key Management, Sybil Attacks and Location Privacy, Vehicular Network Applications and Security, Wireless Metropolitan Area Networks (e.g. 802.11b)

UNIT-IV

(10 L)

Text Books:

- 1. Nichols and Lekkas, Wireless Security Models, Threats, and Solutions, McGraw-Hill.
- 2. Kumar Vijay, Mobile Database Systems. John Willy & Sons.
- 3. Mobile Vas by R Krishna Kumar, McGraw-Hill

Reference Books:

- 1. Mobile Applications: Architecture, Design, and Development by Valentino Lee, Heather Schneider, Robbie Schell, Pearson Education.
- 2. Mobile Security by Steven Furnell, IT Governance Publishing, 2009
- 3. Databases and Mobile Computing by N. Krishankumar, Springer



MCA-O42 Data Analysis Using R-Tool

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of various data analysis techniques and methodologies and to provide a comprehensive knowledge of R-Tool for data analysis. After completing the course the student should be competent in data analysis basics and able to use R-Tool for analysis the data generated by real life software.

UNIT-I

Introduction and preliminaries : The R environment, Related software and documentation, R and statistics, R and the window system, Using R interactively,Getting help with functions and features, R commands, Recall and correction of previous commands, Executing commands from or diverting output to a file, Data permanency and removing objects. Simple manipulations: Numbers and vectors, Vectors and assignment, Vector arithmetic, Generating regular sequences, Logical vectors, Missing values, Character vectors, Index vectors; selecting and modifying subsets of a data set, Other types of objects Objects, their modes and attributes: Intrinsic attributes, mode and length, Changing the length of an object, Getting and setting attributes, The class of an object. Ordered and unordered factors:A specific example, The function tapply() and ragged arrays Ordered factors. (10 L)

UNIT-II

Arrays and matrices: Arrays, Array indexing. Subsections of an array, Index matrices, The array() function, The recycling rule, The outer product of two arrays, Generalized transpose of an array, Matrix facilities, Forming partitioned matrices, cbind() and rbind(). The concatenation function, c(), with arrays, Frequency tables from factors. **Lists and data frames**: Lists, Constructing and modifying lists, Data frames, **Reading data from files:**Theread.table() function, The scan() function, Accessing builtin datasets, Loading data from other R packages, Editing data. **Probability distributions:** R as a set of statistical



tables, Examining the distribution of a set of data, One- and two-sample tests.

(10 L)

UNIT-III

Grouping, loops and conditional execution: Grouped expressions, Control statements, **Writing your own functions**:Defining new binary operators, Named arguments and defaults, The '...' argument, Assignments within functions, Efficiency factors in block designs, Dropping all names in a printed array, Recursive numerical integration, Scope, Customizing the environment, Classes, generic functions and object orientation, **Statistical models in R:** Defining statistical models; formulae, Linear models, Generic functions for extracting model information, Analysis of variance and model comparison, ANOVA tables, Updating fitted models, Generalized linear models, Families, The glm() function, Nonlinear least squares and maximum likelihood models, Least squares, Maximum likelihood, Some non-standard models.(10 L)

UNIT-IV

Graphical procedures:High-level plotting commands, The plot() function, Low-level plotting commands, Interacting with graphics, Using graphics parameters, Permanent changes: The par() function, Temporary changes: Arguments to graphics functions, Graphics parameters list, Graphical elements, Axes and tick marks, Figure margins, Multiple figure environment, Device drivers, PostScript diagrams for typeset documents, Multiple graphics devices, Dynamic graphics **Packages:** Standard packages, Contributed packages and CRAN, Namespaces. **OS facilities**: Files and directories, File paths, System commands, Compression and Archives.

(10 L)

Text Books:

1. W. N. Venables, "An Introduction to R", R Core Team.

2. Bansal/Goel/Sharma, "MALAB and its Applications in Engineering", Pearson India.

3. Stephen J. Chapman, "MATLAB Programming for Engineers", CENGAGE Learning.

Reference Books:

1. S.N. Alam, "Understanding MATLAB: A Textbook for Beginners", IK International Publishing House Pvt. Ltd.

2. Brian R. Hunt, "A Guide to MATLAB for Beginners and Experienced Users", Cambridge

3. Y. Kirani Singh, "MATLAB Programming", PHI



MCA-O43 Image and Speech Recognition

Teaching Scheme Credits			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	onal End Semester Total Examinatio		
3	0	0	3	40	60	100	3 hours

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as-well-as practical knowledge about Image and Speech Recognition. After completing the course the student should be competent in understanding the various tools and techniques used to recognize various types of images and speech.

UNIT-I

Introduction to Pattern Recognition, Feature Detection, Classification, Review of Probability Theory, Conditional Probability and Bayes Rule, Random Vectors, Expectation, Correlation, Covariance, Review of Linear Algebra, Linear Transformations, Decision Theory, ROC Curves, Likelihood Ratio Test, Linear and Quadratic Discriminants, Fisher Discriminant, Sufficient Statistics, Coping with Missing or Noisy Features, Template-based Recognition, Feature Extraction, Eigenvector and Multilinear Analysis, Training Methods, Maximum Likelihood and Bayesian Parameter Estimation.

(10 L)

UNIT-II

Linear Discriminant/Perceptron Learning, Optimization by Gradient Descent, Support Vector Machines, K-Nearest-Neighbor Classification, Non-parametric Classification, Density Estimation, Parzen Estimation, Unsupervised Learning, Clustering, Vector Quantization, K-means, Mixture Modeling, Expectation Maximization, Hidden Markov Models, Viterbi Algorithm, Baum-Welch Algorithm, Linear Dynamical Systems, Kalman Filtering, Bayesian Networks, Decision Trees, Multi-layer Perceptron, Reinforcement, Learning with Human Interaction, Genetic Algorithms, Combination of Multiple Classifiers "Committee Machines". (10 L)



UNIT-III

Basic Concepts: Speech Fundamentals: Articulatory Phonetics, Production and Classification of Speech Sounds; Acoustic Phonetics acoustics of speech production; Review of Digital, Signal Processing concepts; Short, Time Fourier Transform, Filter, Bank and LPC Methods. **Speech Analysis:** Features, Feature Extraction and Pattern Comparison Techniques: Speech distortion measures mathematical and perceptual Log Spectral Distance, Cepstral Distances, Weighted CepstralDistances and Filtering, Likelihood Distortions, Spectral Distortion using a Warped Frequency Scale, LPC, PLP and MFCC Coefficients, Time Alignment and Normalization, Dynamic Time Warping, Multiple Time, Alignment Paths. **(10 L)**

UNIT-IV

Speech Modeling: Hidden Markov Models: Markov Processes, HMMs, Evaluation, Optimal State Sequence Viterbi Search, BaumWelch Parameter Re-estimation, Implementation issues.**Speech Recognition:** Large Vocabulary Continuous Speech Recognition: Architecture of a large vocabulary continuous speech recognition system acoustics and language models-n-grams, context dependent sub -word units; Applications and present status. Speech Synthesis:Textto**Speech Synthesis**:Concatenative and waveform synthesis methods, subword units for TTS, intelligibility and naturalness role of prosody, Applications and present status. **(10 L)**

Text Books:

- 1. Pattern Recognition and Image Preprocessing, by Sing T. Bow, CRC Press.
- 2. Pattern Recognition, by SergiosTheodridis, KonstantionsKautroumbas, Academic Press.
- 3. Fundamentals of Speech Recognition, Lawrence RabinerandBiing-Hwang Juang, Pearson Education.
- Speech and Language Processing-An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition, by Daniel Jurasky and James H Martin, Pearson Education.

Reference books:

- 1. Pattern Recognition: Concepts, Methods and Applications, By J.P. Marques de Sa, Springer Science & Business Media.
- 2. The Scientist and Engineer's Guide to Digital Signal Processing, By Steven W. Smith, California Technical Publishing.
- 3. Time Speech Signal Processing- Principles and Practice, By Thomas F Quatiere, Pearson Education.
- 4. Speech Recognition, By Claudia Becchetti and LucioPrinaRicotti, John Wiley and Sons.
- 5. Speech and audio Signal processing- processing and perception of speech and music, By Ben gold and Nelson Morgan, Wiley.
- 6. Statistical Methods of Speech Recognition, By Frederick Jelinek, MIT Press.



MCA-O44 Network and Web Security

Teaching Scheme Cre			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as-well-as practical knowledge about various issues in network and web security. After completing the course the student should be competent in understanding various tools and techniques used to manage the various security issues in networking and web development.

UNIT-I

Software Security and Trusted Systems: Buffer Overflow, Stack Overflows, Defending Against, Buffer Overflows, Other Forms of Overflow Attacks, Software Security, Software Security Issues, Handling Program Input, Writing Safe, Program Code, Interacting with the Operating System and Other Programs, Handling Program Output. **Operating System Security:** Introduction to Operating System Security, System Security Planning, Operating Systems Hardening, Application Security, Security Maintenance, Linux/Unix Security, Windows Security, Virtualization Security.

(10 L)

UNIT-II

Control hijacking attacks: exploits and defenses, Principle of least privilege, access control, Tools for writing robust application code. **Dealing with legacy code:** sandboxing and isolation, Exploitation techniques and fuzzing. **Security issues in Internet protocols:** TCP, DNS, and routing. **Network defense tools:** Firewalls, VPNs, Intrusion Detection, and filters. (10 L)



UNIT-III

Basic web security model: Web application security, Session management and user authentication, Overview of cryptography. **HTTPS:** goals and pitfalls, Content Security Policies (CSP), Web workers, and extensions. **IT Security Controls, Plans, and Procedures:** IT Security Management Implementation, Security Controls or Safeguards, IT Security Plan, Implementation of Controls, Implementation Followup. **Legal and Ethical Aspects:** Cybercrime and Computer Crime, Intellectual Property, Privacy, Ethical Issues.

(10 L)

UNIT-IV

PART THREE MANAGEMENT ISSUES: IT Security Management and Risk Assessment, IT Security Management, Organizational Context and Security Policy, Security Risk Assessment, Detailed Security Risk Analysis. **Human Resources Security**: Security Awareness, Training, and Education, Employment Practices and Policies, E-Mail and Internet Use Policies, Computer Security, Incident Response Teams, Security Auditing, Security Auditing Architecture, The Security Audit Trail, Implementing the Logging Function, Audit Trail Analysis.

(10 L)

Text Books:

1. Computer Security: Principles and Practice 2nd Edition, By W. Stallings, Prentice Hall.

2. Information Security: Principles and Practice, By M. Stamp, Wiley.

Reference Books:

- 1. Principles of Information Security, By M.E. Whitman and H.J. Mattord, Course Technology.
- 2. Computer Security: Art and Science, By M. Bishop, Addison Wesley.
- 3. Software Security: Building Security In, By G. McGraw, Addison Wesley.



MCA-F51 Presentation and Interview Skills

Teaching Scheme Cred			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	2	4	40	60	100	3 hours

Course Type: Foundation Courses

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide practical knowledge of Presentation and Interview basic programming tools and various methodologies used in programming. After completing the course the student should be competent in programming tools, methodologies and able to use these tools and methodologies to solve real life problems.

UNIT-I

Presentation: Need and Importance of presentation, Types of Presentation, Parts of Presentation, Audience requirements, Rehearsals, Fear Overcome techniques, Pre-presentation preparation (On the day of Presentation), Question Handling during and after presentation. **Presentation Tools:** Types of Presentation tools, Importance and need of Presentation tools, Animation and other tools for presentation enhancement. **Successful Presentation Secretes:** Body Language, Positive Attitude, Eye contact, Anticipate the questions. (10-L+2-P)

UNIT-II

Personality Development: Personality and its types, Attitude and its types, Attitude and Personality grooming techniques. **Body Language:** Body language and its reflection in Personality, Gesture and Posture, Confidence, Confidence building techniques. **Group Discussion:** GD and its types, Parts of GD (Initiation, Follow-up, Arguments and Conclusion), Role of listening and speaking, Do(s) and Don't(s) in GD, Pre-preparations for GD. (10-L+2-P)

UNIT-III

Professional Resume writing: Resume, Parts of resume, Standard formats for professional resume, Questions based on resume, Do(s) and Don't(s) in resume writing. Profession Email drafting: Email,



Parts of Email (Email-Address, Subject, CC, BCC and Text), Standard Email drafting, Attachments, Digital Signatures, Cover letter, Do(s) and Don't(s) in email drafting. Profession Letter drafting: Joining Letter(s), Letters to avail Casual Leave, Resignation Letter(s). (10-L+2-P)

UNIT-IV

Interview: Interview and its types (HR, Technical, Telephonic, Online), Introduction and its types, Do(s) and Don't(s) in Introduction, Question based on your introduction, Analysis of SWOT, Hobbies and interests, Pre-preparations for interview, Do(s) and Don't(s) in Interview. **Offer letter:** Offer letters and its legal obligations, Things to check before signing any offer letter. **(10-L+2-P)**

Text Book:

1. Carole Martin, Boos your Interview IQ, McGraw Hill Education (India) Private Limited.

- 2. Laslie Rae, The Sills of Interviewing, Jaico Publishing House.
- 3. PriyadarshiPatnaik, Group Discussion and Interview Skills, Foundation Books.
- 4. Barun K Mitra, Personality Development and Soft Skills, Oxford University Press.

Reference Books:

1. Praveen Joe I.R., Interview Skills and Group Discussions, Laxmi Publications.

- 2. S. Hundiwala, Tricks and Techniques of Group Discussions, Arihant.
- 3. Brian Tracy, Speak to Win: How to Present With Power in any Situation, Amacom.
- 4. Michael Nir, Influence: Body Language Silent Infuencing A Practical Guide, Wordsharp.



MCA-F52 Human Values and Professional Ethics

Teaching Scheme Crec			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Foundation Courses

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is, to aware the students about human values and professional ethics and also aware them about their various social and professional responsibilities. After completing the course the student should be aware about their social and professional responsibilities towards, self, society and nature.

UNIT-I

Introduction to Value Education: Understanding Value Education, Self-exploration as the Process for
Value Education, The Basic Human Aspirations-Continuous Happiness and Prosperity, The Program to
Fulfil Basic Human Aspirations.(10 L)

UNIT-II

Understanding The Harmony At Various Levels: Understanding the Human Being as Co-existence of Self ('1') and Body, Harmony in the Self ('1')- Understanding Myself, **Harmony with the Body**-Understanding *"Sanyama"* and *"Svasthya"*. (10 L)

UNIT-III

Harmony in the Family- Understanding Values in Human Relationships, Harmony in the society- From Family Order to World Family Order, **Harmony in Nature**- Understanding the Interconnectednee and Mutual Fulfilment, Harmony in Existence Understanding Existence as Co-existence. (10 L)

UNIT-IV

Implications of the Right Understanding: Providing the Basis for Universal Human Values and Ethics Human Conduct, Basis for the Holistic Alternative towards Universal Human Order, Professional Ethics in



the Light of Right Understanding, Vision for Holistic Technologies, Production Systems and Management Models, Journey towards the Holistic Alternative. (10 L)

Text Book:

- 3. RR Gaur, R Sangal, GP Bagaria, A foundation course in Human Values and professional ethics, Excel Book, New Delhi.
- 4. S. Kannan, K. Srilakshmi, Human Values and Professional Ethics with relevant case studys, Taxmann Publications Private Limited.
- 5. M. Govindarajan, S. Senthikumar, M.S. Natarajany, Professional Ethics and Human Values, PHI



MCA-C51 Web Programming Using Perl & Python

Teaching Scheme Cred			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Software Development)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.
- IV. At least 60% questions are based on applied knowledge remaining 40% questions are based on concepts and illustration of concepts with practical approach.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Web-programming languages (Perl and Python). The main emphasis of this course is on Python Programming Language and basics of Perl Programming Language. After completing the course the student should be competent in web programming tools (In Perl and Python) and able to use these tools to create dynamic web pages.

UNIT-I

Perl: Introduction, History and application of Perl, Perl Environment Setup, Perl Syntax Overview, DataTypes, Variables, Scalars, Arrays, Hashes, Loops, Operators, Subroutines, References, Formats, File I/O,Directories, Error Handling, Special Variables, Coding Standards, Regular Expressions, Sending Emails,Basics of Perl CGI Programming.(10-L,3-T=13)

UNIT-II

Introduction to Python: What is Python, History and applications of Python, Features of Python, Integrating Development Environment for Python, Python Programming, How to launch Python and Python Script. Basics of Python Programming: Python Identifiers, Reserved Words, Lines and Identation, Multi-Line Statements, Quotation, Comments, Command Line Arguments, Variables, Data types (Numbers, String, List, Tuple, Dictionary, Date & Time), Operators, Decision Making statement and Loop control statement. (10-L,3-T=13)



UNIT-III

Python Functions: Defining a function, Calling a function, Function Arguments and its Types, Anonymous functions, Scope of Variables. Import statement, Locating Modules, PYTHONPATH variable, Namespaces and Scoping, In-build functions in Python, Packages in Python.**Python Files I/O:** Reading Keyboard Input, Opening and Closing Files, Files Object Attributes, File Positions, Renaming and Deleting Files. Directories in Python, Files and Directory related methods. **Exception Handling:** Exceptions, Handling Exceptions, try-except clause, try-finally clause, Argument of an exception, Raising an exception, User-Defining exception.

(10-L,3-T=13)

UNIT-IV

Advanced Python Programming: Classes and objects in Python, Instance Objects, Accessing Attributes, Built-In-Class Attributes, Destroying Object (Garbage Collection), Class Inheritance, Method Overriding, Base Overriding Methods, Operators Overriding, Data Hiding, Regular Expressions, Regular Expression Modifiers, Regular Expression Patterns, CGI Programming, Python Database MySQL Access, Network Programming, Sending Email using SMTP, Multithreading, Python XML Processing, Python GUI Programming (Tkinter). (10-L,3-T=13)

Text Book:

1. Martin C. Brown, Python: The Complete Reference, McGraw Hill Education.

- 2. Larry Wall, Programming Perl, Oreilly.
- 3. Ryan, Mitchell, Web Scripting with Python, Oreilly.

Reference Books:

- 1. Brian d foy, Mastering Perl, Oreilly.
- 2. Bill Lubanovic, Introducing Python, Oreilly.
- 3. Mark Lutz, Learning Python, 5th Edition, Oreilly.



MCA-C52 Server Side Programming Using JSP

Teaching Scheme Cree			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	1	0	4	40	60	100	3 hours

Course Type: Professional Core Courses (Software Development)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.
- IV. At least 60% questions are based on applied knowledge remaining 40% questions are based on concepts and illustration of concepts with practical approach.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of server side programming and JSP tools for Server Side Programming. After completing the course the student should be competent in Servlets and JSP tools and able to use these tools and methodologies to solve real life problems.

UNIT-I

An Overview of Servlet and JSP Technology: Servlet, Dynamic web Pages with Servlet, Advantages of servlets over "Tradional CGI", Role of JSP. Server Setup And Configuration: Configure Server, Apache Tomcat, Macromedia, JRun, Caucho Resin. Servlet Basic: Basic Servlet Structure, Servlet Packaging, Servlet Life cycle, Servlet Debugging. (10-L,3-

T=13)

UNIT-II

Handling The Client Request and Generating Server Response: Form Data, Reading Form Data from Servlet, HTTP Request Headers, Reading Request Header, Accessing the standard CGI variables, HTTP Status Codes, HTTP Response Header.Handling Cookies: Cookies, It's Benefits and Problems, Sending Receiving and Deleting Cookies, Modifying Cooking Values.Session Tracking: Need for Session Tracking, Session Tracking Basics, Session Tracking API, Browser Sessions and Server Sessions, Shopping cart Session Tracking for On-Line Store. (10-L,3-T=13)



UNIT-III

JSP Technology: Need for JSP, Benefits of JSP over competing Technologies, Misconceptions about JSP, Installation of JSP Pages, Basic Syntax of JSP, Invoking Java Code with JSP Scripting Elements, Invoking Java code with JSP scripting Elements, Controlling the structure of Generated Servlets using JSP Page Directive, Including Files and Applets in JSP Pages, Using Java Beans components in JSP Documents, MVC architecture, Simplifying Access to Java Code with JSP 2.0 Expression Language. (10-L,3-T=13)

UNIT-IV

Accessing Databases with JDBC: Introduction to JDBC, Establishing and closing JDBC connection, JDBC Utilities, Creating Callable statements, Using Database Transactions, ORM Frameworks.Configuring MS Access, MySQL and Oracle: Configuring Microsoft Access for Use with JDBC, Installing and Configuring MySQL, Installing and Configuring Oracle Database, Testing Your Database through a JDBC Connection. Creating and Processing HTML Forms:Default Web Applications, Transmit Data from HTML forms, FORM. Elements, File Upload Controls, Server-Side Image Maps (IMAGE, ISMAP), Hidden Fields, Groups of Controls, Tab Order Control, Echo Server. (10-L,3-T=13)

Text Book:

Hall Brown, Core Servlets and JavaServer Pages Volume1: Core Technologies Second Edition, Pearson.
 Deital&Deital, Java How to Program Ninth Edition, PHI Publication

Reference Books:

1. Santosh Kumar K, Jdbc, Servlets, AndJsp Black Book, New Edition, Kogent Learning Solutions.

2. Mahesh P. Matha, JSP and Servlets: A Comprehensive Study, PHI



MCA-C53 Web Programming-Lab + Major Case Study

Teaching Scheme Crec			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
0	0	3	1	50	50	100	3 hours

Course Type: Professional Core Courses (Practical Labs) INSTRUCTIONS:

1. For External Examiner:50% marks (25 marks) will be awarded on the basis of practical implementation and lab performance in final practical examination, and remaining 50% marks (25 marks) will be awarded on the basis of vive-voice and written script.

Objective: The main objective of this course is to cover practical implementation part of **MCA-C51**. After completing the course the student should be competent to design and develop web pages by using Perl and Python tools.

Total Lab Hours: (14-Practical + 26-Case Study) 40

Suggested List of Practical Topics:

- 1. Perl data Types, Variables and Scales.
- 2. Perl Arrays, Hashes, Loops, Operators, Subroutines, References and Formats.
- 3. Perl File I/O, Directories, Error Handling and special variables.
- 4. Regular Expressions in Perl.
- 5. Sending Emails using Perl.
- 6. Perl CGI Programming.
- 7. Python Command Line Arguments.
- 8. Variables in Python.
- 9. Data Types in Python (Number, String, List, Tuple, Dictionary, Date & Time).
- 10. Operators in Python.
- 11. Decision Making Statements and Loop control statements in Python.
- 12. Python functions, Anonymous functions.
- 13. Import statement and Locating modules.

- 14. In-build functions in Python.
- 15. Packages in Python.
- 16. Reading Keyboard Input.
- 17. Opening and Closing Files, Files Object Attributes, File positions, Renaming and Deleting Files.
- 18. Directories in Python, Files and Directory related functions.
- 19. Exception Handling and User-Defining exceptions in Python.
- 20. Classes and Objects in Python.
- 21. Inheritance and Regular Expressions in Python.
- 22. CGI Programming in Python.
- 23. Python Database and MySQL Access.
- 24. Sending Email using SMTP in Python.
- 25. Multithreading in Python.
- 26. Python XML Processing.

Major Case Study:

One major case study must be the part of practical file. Student have to develop a responsive web application by using Java Script, PHP, Perl, Python and CMS System. The web application must be



comprises of at least 30 dynamic and responsive web pages. Student must have to develop this web application on live tools, and must be hosted on web. The web application must be realistic and showing students own work, and must not be copied from any other resource.

Note:60 % weightage is given to this Case Study and remaining 40% weightage is given to other practical work.



MCA-C54 JSP Lab + Major Case Study

Teaching Scheme Credit			Credits		Marks	Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
0	0	3	1	50	50	100	3 hours

Course Type: Professional Core Courses (Practical Labs) INSTRUCTIONS:

1. For External Examiner:50% marks (25 marks) will be awarded on the basis of practical implementation and lab performance in final practical examination, and remaining 50% marks (25 marks) will be awarded on the basis of vive-voice and written script.

Objective: The main objective of this course is to cover practical implementation part of **MCA-C52**. After completing the course the student should be competent in develop Java Server pages for real life applications.

Total Lab Hours: (14-Practical + 26-Case Study) 40

Suggested List of Practical Topics:

- 1. Servlet Packaging.
- 2. Servlet Life cycle.
- 3. Servlet Debugging.
- 4. Form Data, Reading Form Data from Servlet.
- 5. HTTP Request Headers.
- 6. Reading Request Header.
- 7. Accessing the standard CGI variables.
- 8. HTTP Status Codes.
- 9. HTTP Response Header.
- 10. Cookies.
- 11. Sending Receiving and Deleting Cookies.
- 12. Modifying Cooking Values.
- 13. Browser Sessions.
- 14. Server Sessions.
- 15. Shopping cart Session Tracking for On-Line Store.

- Invoking Java Code with JSP Scripting Elements.
 Controlling the structure of Generated
- Servlets using JSP Page Directive.
- 18. Including Files and Applets in JSP Pages.
- 19. Using Java Beans components in JSP Documents.
- 20. Establishing and closing JDBC connection.
- 21. JDBC Utilities.
- 22. Creating Callable statements, Using Database Transactions.
- 23. Testing Your Database through a JDBC Connection.
- 24. Default Web Applications.
- 25. Transmit Data from HTML forms.

Major Case Study:

One major case study must be the part of practical file. Student have to develop a real life application by using Programming tools like Java, Android and JSP. The application must be realistic and showing students own work, and must not be copied from any other resource.

Note:60 % weightage is given to this Case Study and remaining 40% weightage is given to other practical work.



MCA-E51 Algorithm Design

Teaching Scheme Credits			Credits	Marks			Duration of End Semester
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination
3	0	0	3	40	60	100	3 hours

Course Type: Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of various Algorithm Designing techniques and their impact on programming. After completing the course the student should be competent in algorithm designing techniques, and able to use these techniques to design various algorithms for real life problems.

UNIT-I

Introduction: Definition, How to Analyze Algorithms, Elementary Data Structures-Stacks and Queues, Trees, Heaps and Heap Sort, Sets and Disjoint Set Union Graphs, Hashing. (10-L,3-T=13)

UNIT-II

Divide and Conquer: The General Method, Merge Sort, Quick Sort, Finding the Maximum and Minimum,Selection sort. The Greedy Method: The General Method Knapsack Problem, Job Sequencing WithDeadlines, Minimum Spanning Trees, Single Source Shortest Paths.(10-L,3-T=13)

UNIT-III

Dynamic Programming: The General Method Multistage Graphs, All Pairs Shortest Paths, Optimal BinarySearch Trees, 0/1 Knapsack, Reliability Design, Traveling Salesperson Problem, Flow Shop Scheduling.Basic Search and Traversal Techniques: The Techniques Code Optimization and/or Graphs, Game Trees,Bi-Connected Components and Depth First Search.(10-L,3-T=13)


UNIT-IV

Back Tracking: The General Method, The 8 Queens Problem, Sum Of Subsets, Graph Coloring, Hamiltonian Cycles. NP Hard And NP Complete Problems- Basic Concepts, Cooks Theorem NP Hard Graph Problems, NP Hard Scheduling Problems.

(10-L,3-T=13)

Text Book:

1. Ellis Horowitz, SartajSahni, — Fundamental Of Computer Algorithms.

Reference Books:

1. Aho, Hopcroft, Ullman, The Design And Analysis Of Computer Algorithms.

2. Sara Basse, —Computer Algorithms – An Introduction to Design and Analysis.



MCA-E52 Image Processing

Теас	hing Sch	eme	Credits	Marks		Duration of End Semester		
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination	
3	0	0	3	40	60	100	3 hours	

Course Type: Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of basic Images, Digital Images and various Image Processing Techniques. After completing the course the student should be competent in Image Processing Techniques and can use these techniques to process real Images.

UNIT-I

Introduction: Image Processing, Applications of Image Processing, Elements of Image Processing Systems—Image Acquisition, Processing, Communication, Display Digital Image Processing, Goals of Image Processing, Sources of Images, Image Classification and Formation, Image Representation and Sampling, Basic operations on Images. **Digital Image Fundamentals:** Uniform and Non-uniform Sampling and Quantization, Basic Relationships between pixels— Neighbours of a pixel, Connectivity, Distance Measures, Imaging Geometry—Perspective transformations, Camera Model, Stereo Imaging.

(10-L,3-T=13)

UNIT-II

Image Transforms: Introduction to Fourier Transform, Discrete Fourier Transform, Properties of the Two - Dimensional Fourier Transform, The Fast Fourier Transform (FFT), Inverse FFT, Walsh, Hadamard and Discrete Cosine Transforms. Image Enhancement: Histogram Processing, Image Averaging, Smoothing Filters, Sharpening Filters, Low Pass and High Pass Filtering, Generation of Spatial Masks from frequency Domain Specifications. (10-L,3-T=13)

UNIT-III

Colour Image Processing: Colours Fundamentals, Colour Models, Pseudo-Colour image processing. **Image Restoration:** Degradation Model, Circulant and Non-circulant Matrices, Algebraic Approach to



Restoration, Inverse Filtering, Wiener Filter, Constrained Least Square Restoration, Geometric Transformations. (10-L,3-T=13)

UNIT-IV

ImageCompression:Fundamentals, ImageCompressionmodels, LowCompression, ImageCompressions standards.ImageSegmentation:Detection of Discontinuities, Edge Linking and BoundaryDetection, Hough Transform, Thresholding, Region Oriented Segmentation.Representation, Description,recognition and Interpretation Fundamentals.(10-L,3-T=13)

Text Book:

1. Gonzalez & Woods : Digital Image Processing, Pearson Publishing Company Ltd.

2. Jain , Anil K. : Fundamentals of Digital Image Processing, Pearson.

Reference Books:

1. Jensen, John R. : Introductory Digital Image Processing, Prentice Hall.

2. Dougherty, Edward R. : Image Processing Digital Techniques.



MCA-E53 LINUX Operation System

Теас	hing Sch	eme	Credits	Marks			Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination	
3	0	0	3	40	60	100	3 hours	

Course Type: Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of Linux Operating System and Shell Programming. After completing the course the student should be competent in basic of Linux Operating System and Shell programming tools and methodologies, and able to use these tools and methodologies to solve real life problems.

UNIT-I

Theoretical Concepts of LINUX Operating System: Basic Features of Operating System, File Structure, CPU Scheduling. **Memory management:** Swapping, Demand Paging; File system: ext2 and ext3 architecture, Blocks and Fragments, Inodes Directory Structure. **Getting Started with LINUX:** User Names and Groups; Logging in; Changing your password; Format of LINUX commands.

(10-L,3-T=13)

UNIT-II

Characters with special meaning, LINUX Documentation, Files and Directories: Current Directory, Access the directory contents, absolute and relative pathnames, some LINUX directories and files, Access file contents, file permissions, changing permission modes, Standard files, Standard output, Standard input, Standard Error, Filters and Pipelines, Processes: PID,PPID, Process creation, killing a process, stopping background process; LINUX VIth Editor. **Text Manipulation:** Inspecting Files; File Statistics; Searching for Patterns, Comparing Files; Operating on Files; Printing Files; Rearranging Files; Sorting Files; Splitting Files; Translating characters.

(10-L,3-T=13)



UNIT-III

Shell Programming: Programming in the Borne and the C-shell: Wild cards, simple shell programs, shellvariables, shell programming constructs, interactive shell scripts, Advanced features.Administration: Definition, Booting the system, Maintaining user accounts, File system and special files,Backups and restoration, Role and functions of a system manager.(10-L,3-T=13)

UNIT-IV

System Calls : C as System Programming Language, I/O system calls – umask(); create(); open(); read(); write(); lseek(); dup(); link(); access(); chmod(); chown(); Process management system calls; fork(); getpid(); getppid(); exit(); wait(); sleep() ; Signal system calls – kill(); signal(). (10-L,3-T=13)

Text Books:

1. Parker, Tim: Linux Unleashed, Latest Edition, Techmedia.

- 2. Tackett, J.: Special Edition using LINUX, PHI.
- 3. Norton, P.: Complete Guide to LINUX, Techmedia.

Reference Books:

- 1. Komarinski, M.: LINUX System Administration Handbook, Prentice Hall.
- 2. Stones, Richard and Mathew Neil: Beginning Linux Programming, 3rd Edition, Wrox.
- 3. Nyus, Christopher, 2006: Linux Bible, Wiley.
- 4. Graham, Steven: Linux Administration, Tata McGraw.
- 5. Jones, Tim: GNU/Linux Application Programming, Wiley India Pvt. Ltd.



MCA-O51 Programming for Mobile Devices

Теас	hing Sch	ieme	Credits Marks			Duration of End Semester		
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination	
3	1	0	4	40	60	100	3 hours	

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide knowledge about various issues, tools and techniques used for mobile devices programming. After completing the course the student should be competent in mobile device programming and iOS for iPhone.

UNIT-I

Memory Management - Design Patterns for Limited Memory, Memory Management in Mobile Java, Memory Management in example OS **Applications** - Workflow for Application Development, Techniques for Composing Applications, Application Models in Mobile Java, Case study: iOS Application Infrastructure

(10 L+3T)

UNIT-II

Dynamic Linking - Implementation Techniques, Implementing Plugins, Managing Memory ConsumptionRelated to Dynamically Linked Libraries, Rules of Thumb for Using Dynamically Loaded Libraries, MobileJava and Dynamic Linking.(10 L+3T)

UNIT-III

Concurrency - Infrastructure for Concurrent Programming, MIDP Java and Concurrency, Case study: iOS and Concurrency **Resource Management** - Resource-Related Concerns in Mobile Devices, MIDP Java. (10 L+3T)



UNIT-IV

Networking - MIDP Java and Web Services, Bluetooth Facilities with an example OS Security - SecureCoding and Design, Infrastructure for Enabling Secured Execution, Security Features in MIDP Java, Casestudy: iOS Security Features.(10 L+3T)

Text Books:

- 1. Steve Atkinson, Rob Machin, Professional Java Mobile Programming.
- 2. TommiMikkonen, Programming Mobile Devices An Introduction for Practitioners.

Reference Books:

- 1. Programming the Mobile Web by MaximilianoFirtman, O'Reilly Media, Inc.
- 2. LiveCode Mobile Development Beginner's Guide, by Colin Holgate, Packt Publishing Ltd.



MCA-O52 Big Data Analysis

Теас	hing Sch	ieme	Credits	Marks			Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination	
3	1	0	4	40	60	100	3 hours	

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as well as practical knowledge of current problems in database analysis (Big Data) and the various tool and techniques used to mitigate Big Data problem. After completing the course the student should be competent in the use of various tools and techniques used to manage Big Data problem, and able to use these tools and methodologies for real life problems.

UNIT-I

Introduction to the Big Data problem: Current challenges, trends, and applications, **Web data**: Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting – Modern data analytic tools, **Statistical concepts:** Sampling distributions, resampling, statistical inference, predictionerror.**Algorithms for Big Data analysis.** Mining and learning algorithms, Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods.

(10 L+3T)

UNIT-II

Analysis of time series: linear systems analysis, nonlinear dynamics, Rule induction, Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods. Introduction to Streams Concepts: Stream data model and architecture – Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream. (10 L+3T)



UNIT-III

Estimating moments: Counting oneness in a window – Decaying window. **Real-time Analytics Platform(RTAP) applications**: case studies – real time sentiment analysis, stock market predictions. R language for statistical analysis.**Mining Frequent itemsets** – Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream.(**10 L+3T**)

UNIT-IV

Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data – CLIQUE and PROCLUS.**Frequent pattern based clustering methods**: Clustering in non-euclidean space – Clustering for streams and Parallelism.**Technologies for Big Data management**: Big Data technology and tools, MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases – S3 – Hadoop Distributed file systems – YARN, Spark, **Visualizations**: Visualizing Large Data Sets with D3. Neo4J, a Graph Database.**(10 L+3T)**

TEXT BOOKS:

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer

2. AnandRajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press

REFERENCES:

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analystics, John Wiley & sons

2. Glenn J. Myatt, Making Sense of Data, John Wiley & SonsPete Warden, Big Data Glossary, O'Reilly

3. Jiawei Han, MichelineKamber "Data Mining Concepts and Techniques



MCA-053 Soft Computing

Teaching Scheme Credits			Marks		Duration of End Semester			
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination	
3	1	0	4	40	60	100	3 hours	

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as-well-as practical knowledge about Neural Networks, Fuzzy Logic and soft computing. After completing the course the student should be competent in understanding various mathematical and logical tool behind the intelligence of computer and how computer process the information as human.

UNIT-I

Introduction: Neural Networks, Application Scope of Neural Network, Fuzzy Logic, Genetic Algorithm, Hybrid Systems and Soft computing. Artificial Neural Network: Fundamental Concept, Evolution of Neural Networks, Basic Models of Artificial Neural Network, Important Terminologies of ANNs, McCulloch-Pitts Neuron, and Hebb Network.

(10 L+3T)

UNIT-II

Introduction to Fuzzy Logic, Classical Sets and Fuzzy Sets: Introduction to Fuzzy logic, Classical Sets (Crisp Sets), Operations of Classical Sets, Fuzzy Sets Operations. Classical Relations and Fuzzy Relations: Cartesian Product of Relation, Classical Relation, Fuzzy Relations, Tolerance and Equivalence Relations, No interactive Fuzzy Sets. Membership Functions: Features of Membership Functions, Fuzzification and Defuzzification. (10 L+3T)

UNIT-III

Fuzzy Rule Base and Approximate Reasoning: Introduction, Truth Values and Table in Fuzzy Logic, Fuzzy Propositions, Fuzzy Reasoning, Fuzzy Inference System.
Fuzzy Decision Making: Individual Decision Making, Multiperson Decision Making, Multiobjective Decision Making, Multiattribute Decision Making, Fuzzy Bayesian Decision Making.
Fuzzy Logic Control Systems: Control System Design, Architecture and Operation of FLC system, FLC System Models, Application of FLC Systems.



UNIT-IV

Hybrid Soft Computing Techniques:Neuro-Fuzzy Hybrid Systems, Generic Neuro-Hybrid Systems, Genetic Fuzzy Hybrid and Fuzzy Genetic Hybrid Systems, Simplified Fuzzy ARTMAP. **Applications of Soft Computing:** A Fusion Approach of Multispectral Images with SAR (Synthetic Aperture Rader), Optimization of Traveling Salesmen Problem using Genetic Algorithm Approach, Genetic Algorithm-Based Internet Search Technique, Soft computing Based Hybrid Fuzzy Controllers.

(10 L+3T)

Text Books:

- 1. Principles of Soft Computing by S.N. Sivanandam, S.N. Deepa, Wiley.
- 2. Fuzzy Logic and Soft Computing by Bernadette Bouchon-Meunier, World Scientific.

Reference Books:

- 1. Soft Computing: Techniques and its Applications in Electrical Engineering, by ByDevendra K. Chaturvedi, Springer Science & Business Media.
- 2. Soft Computing: Integrating Evolutionary, Neural, and Fuzzy Systems by Andrea G.B. Tettamanzi, Marco Tomassini, Springer Science & Business Media.



MCA-O54 Mobile and Cloud Security

Теас	hing Sch	eme	Credits	Marks			Duration of End Semester	
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination	
3	1	0	4	40	60	100	3 hours	

Course Type: Open Elective (Information Technology)

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide conceptual as-well-as practical knowledge about various issues in mobile and Cloud security. After completing the course the student should be competent in understanding various tools and techniques used to manage the various security issues in cloud computing and mobile development.

UNIT-I

Introduction:Wireless threats, vulnerabilities and security, Wireless LANs, War Driving, War Chalking, War Flying, Common Wi-fi security recommendations, PDA Security, Cell Phones and Security, Wireless DoS attacks, GPS Jamming, Identity theft. **Security Framework for Mobile Systems:**CIA triad in mobile phones-Voice, SMS and Identification data interception in GSM, practical setup and tools, implementation- Software and Hardware Mobile phone tricks, Netmonitor, GSM network service codes, mobile phone codes, catalog tricks and AT command set- SMSsecurity issues. **(10 L+3T)**

UNIT-II

Mobile Phone Forensics:Crime and mobile phones, evidences, forensic procedures, files present in SIM card, device data, external memory dump, evidences in memory card, operators systems- Android forensics: Procedures for handlingan android device, imaging android USB mass storage devices, logical and physical techniques. (10 L+3T)

UNIT-III

Introduction to Digital Forensics: Introduction – Evidential potential of digital devices, closed vs. open systems, evaluating digital evidence potential- Device handling: seizure issues, device identification, networked devices and contamination. **Analysis of Digital Forensic Techniques:**Digital forensics examination principles: Previewing, imaging, continuity, hashing and evidence locations- Seven element



security model- developmental model of digital systems- audit and logs- Evidence interpretation: Data content and context. (10 L+3T)

UNIT-IV

Cloud Security: Malicious Software, Types of Malicious Software (Malware), Propagation–Infected Content–Viruses, Propagation–Vulnerability, Exploit–Worms, Propagation–Social, Engineering–SPAM, Email, Trojans, Payload–System Corruption, Payload–Attack, Agent–Zombie, Bots, Payload–Information Theft–Key loggers, Phishing, Spyware, Payload–Steal, thing–Backdoors, Rootkits, Countermeasures. (10 L+3T)

Text Books:

- 1. Gregory Kipper, "Wireless Crime and Forensic Investigation", Auerbach Publications, 2007.
- 2. Iosif I. Androulidakis, "Mobile phone security and forensics: A practical approach", Springer publications, 2012.
- 3. GautamShroff, "Enterprise Cloud Computing Technology Architecture Applications", Cambridge University Press
- 4. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", Tata McGraw-Hill Osborne Media.

Reference Books:

- 1. Andrew Hoog, "Android Forensics: Investigation, Analysis and Mobile Security for Google Android", Elsevier publications.
- 2. Angus M.Marshall, "Digital forensics: Digital evidence in criminal investigation", John Wiley and Sons.
- 3. Tim Mather, SubraKumaraswamy, ShahedLatif, "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance", O'Reilly Media
- 4. Ronald L. Krutz, Russell Dean Vines, "Cloud Security", Wi



MCA-A51 IT and Cyber Laws in India

Teaching Scheme Credits Marks				Duration of End Semester				
L	Т	Р	С	Sessional	End Semester Exam	Total	Examination	
3	0	0	0	40	60	100	3 hours	

Course Type: Audit Course

INSTRUCTIONS:

1. For Paper Setters: The question paper will consist of five sections A, B, C, D& E.

- I. Section A, B, C & D will have two questions from the respective sections of the syllabus.
- II. Section E will be compulsory, it will consist of a single question with 4-12 subparts of short answer type questions, which will cover the entire syllabus.
- III. Each Section will have a weightage of 20% of the total marks of the end semester examination for the course.

2. For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E.

Objective: The main objective of this course is to provide knowledge about Information Technology Act and Cyber Laws in India and various other Issues and the provisions in Laws to tackle these issues in cyberspace and Information Technology. After completing the course the student should be aware about Information Technology Act and Cyber Laws in India.

UNIT-I

Introduction – Cyberspace vs. Physical space; Scope of Cyber Laws.

Components of Cyber Laws in India - Information Technology Act, 2000; Relevant provisions from Indian Penal Code, Indian Evidence Act, Bankers Book Evidence Act, Reserve Bank of India Act, etc.

Information Technology Act – a brief overview; Documents or transactions to which IT Act shall not be applicable; meaning of Computer, Computer system and Computer network; E – commerce; E – governance; Concept of Electronic Signature; Concept of Cyber contraventions and Cyber Offences.

(10 L)

UNIT-II

E- Contract – legal provisions regulating the e – contract with special reference to the provisions of IT Act, 2000.

Copyright issues in Cyberspace – relevant provisions under Copyright Act, 1957 regulating copyright issues in Cyberspace; Online Software Piracy – legal issues involved; Analysis of sufficiency of provisions of Copyright Act to deals with Online Software Piracy.



Trademark issues in Cyberspace – Domain Name; Cybersquatting as a form of Domain Name dispute; Case law. (10 L)

UNIT-III

Concept of Cyber Crimes – 'Cyber Contraventions' & 'Cyber Offences' "Study Of Some Specific Kinds Of Cyber Crimes"

- 1. **'Unauthorised Access' & 'Accessing the Protected System'-** meaning with reference to an idea of Cyber Hacking; the legal issues involved.
- 2. Introducing Computer contaminant or virus legal issues involved.
- Denial Of Access To Authorised Person e.g.- Denial of Service (DoS) Attacks; E mail bombing legal issues involved.
- 4. Web jacking, Web Defacement & Salami Attacks legal issues involved.
- 5. **Cyber Defamation** meaning; applicability of provisions of IPC; penal liabilities. (10 L)

UNIT-IV

Concept of Cyber Crimes – 'Cyber Contraventions' & 'Cyber Offences' "Study Of Some Specific Kinds Of Cyber Crimes"

- 6. **Phishing** a kind of online fraud; meaning; legal issues involved with reference to applicable provisions from IT Act, 2000.
- 7. Cyber Stalking meaning; elements; applicable provisions from IT Act, 2000.
- 8. **Cyber pornography** meaning; relevant provisions from Constitution of India; relevant provisions from IPC; relevant provisions from IT Act; reported case law.
- 9. **Cyber Terrorism** meaning; various modes of committing Cyber terrorism; applicable provisions from IT Act.

Information Security Management System and other Security Compliances.

Text Book:

- 1. RohasNagpal, Fundamentals of Cyber Law, ASCL Publication
- 2. AnirudhRastogi, Cyber Law Law of Infromation Technology and Internet, LexisNexis Publication
- 3. Karnika Seth, Computers, Internet and New Technology Laws- A comprehensive reference work with special focus on developments in India, LexisNexis Publication
- 4. Apar Gupta, Commentary on Information Technology Act- With rules, regulations, Orders, Guidelines and reports etc., LexisNexis Publication



(10 L)

Annexure-I (Format of Cover Page)

TITLE OF PROJECT REPORT

By

Name of Student

A PROJECT REPORT

Submitted to the

HIMACHAL PRADESH TECHNICAL UNIVERSITY (HPTU) HAMIRPUR, H.P.

In partial fulfillment of the requirements

for the award of the degree

of

MASTER OF COMPUTER APPLICATION (MCA)

IN

6th Semester Training



Month, Year

Name of the Department



College/Institution Name

Annexure-II (Format for inside Cover Page)

PROJECT REPORT

ON

TITLE OF PROJECT

SUBMITTED IN PARTIAL FULFILLMENT FOR AWARD OF

DEGREE

In

MASTER OF COMPUTER APPLICATION

(BATCH)

BY

NAME OF THE STUDENT

ROLL NO

UNDER THE GUIDANCE OF

NAME OF GUIDE (Internal, External)

College Logo (If any)

Name of the Department

College/ Institution Name

Month, Year



HIMACHAL PRADESH TECHNICAL UNIVERSITY, HAMIRPUR-H.P.

Annexure-III

CERTIFICATE OF ORIGINALITY

I hereby declare that the Project entitled **"Title of the Project"** submitted to the Department of Computer Applications, **Name of the College** in partial fulfillment for the award of the Degree of **MASTER OF COMPUTER APPLICATIONS** in session <Session> in an authentic record of my own work carried out under the guidance of Dr./Ms./Mr. **"External**

and Internal Guide Name" and that the Project has not previously formed the basis for the award of any other degree.

Place:

Date:

(Signature of the candidate)

Name of Student (Roll No.)

This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

(Signature of Internal Guide)

(Signature of External Guide)



Name

Designation

Name

Designation

Annexure-IV

INDUSTRY/COMPANY CERTIFICATE

Industry/Company Certificate on the letter head of respective company duly signed by External Guide/Project Manager/Supervisor.

Date:

(Name of External Guide/Project Manager/Supervisor)Designation:Name of Organization:Address:



Annexure-V

PROJECT-TEAM CERTIFICATE

(In case the entire project is developed by team not by an individual student)

Name of the Project:

Team Members Details

Sr. No.	Name of Candidate	College/Institute Name	University /Organization
1.			
2.			
3.			
4.			

I hereby declared that the project entitled "Title of the Project", is developed by the above mentioned team. In the team "Name of candidate" have developed/designed the following module(s) under the esteemed guidance of "Name of External Guide with his/her Designation".

- 1. Details of module one including its name and candidate's responsibilities.
- 2. Details of module twoincluding its name and candidate's responsibilities.
- 3.
- 4.

Date:

(Name of Project Manager/Supervisor) Designation: Name of Organization: Address:



Annexure-VI

ACKNOWLEDGEMENT

Acknowledgement should be brief and should not exceed one page when typed double spacing.

Date:

Signature of Candidate Name: Roll No.:



Annexure-VII

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Note: DFD diagram /Use case diagram/ UML diagram is to be given under 4.1.1. (CRC and Class Diagrams can also be used in case of Object Oriented Approach). Flow chart is to be given under 4.1.3. Screen Short are to be given under 4.1.4., 4.1.5., 4.1.6. ER diagrams are to be given under 4.1.7. Database table designs are to be given under 4.2.



Annexure-VIII

<u>A MANUAL FOR PREPARATION OF PROJECT REPORT</u> (MCA)

CONTENTS

- 1. GENERAL
- 2. NUMBER OF COPIES TO BE SUBMITTED
- 3. SIZE OF PROJECT REPORT
- 4. ARRANGEMENT OF CONTENTS OF PROJECT REPORT
- 5. PAGE DIMENSIONS AND MARGIN
- 6. TYPING INSTRUCTIONS
- 7. BINDING SPECIFICATIONS



1. GENERAL

The manual is intended to provide broad guidelines to the M.C.A. candidates in the preparation of the project report. In general, the project report shall report, in an organized and scholarly fashion an account of original research work of the candidate leading to the discovery of new facts or techniques or correlation of facts already known (Analytical, Experiments, Software designing, Software development, Database designing, Testing, Hardware oriented etc.)

2. NUMBER OF COPIES TO BE SUBMITTED

Students should submit three copies to the Head of the Department on or before the specified date along with the soft copy of project report and executable file of application software properly write in CR, entitled "Title of the Project Report", "Name" and "Roll No" of the candidate with black or blue permanent marker. The Head of the Department should send

- 1. One copy to the University. (After final viva-voice)
- 2. One copy to the Department library. (After final viva-voice)
- 3. One copy to the Internal Examiner (Before final viva-voice) and
- 4. One copy to the student concerned (Not to be submit to the Head of the Department).

3. SIZE OF PROJECT REPORT

The size of project report should not be less than 100 pages and should not exceed 150 pages of typed matter reckoned from the first page of INTRODUCTION to the last page.

4. ARRANGEMENT OF CONTENTS OF PROJECT REPORT

The sequence in which the project report material should be arranged and bound should be as follows:

- 1. Title page (Annexure I)
- 2. Title page (Annexure II)
- 3. Certificate of Originality (Annexure III)
- 4. Industry/Company Certificate (Annexure IV)



- 5. Project-Team Certificate (Only if applicable) (Annexure V)
- 6. Acknowledgement (Annexure VI)
- 7. Table of Contents (Annexure VII)
- 8. Project Report pages as per table of contents.

5. PAGE DIMENSIONS AND MARGIN

The dimensions of the final bound copies of the project report should be 290mm x 205mm. Standard A4 size (297mm x 210mm) paper may be used for preparing the copies.

The final five copies of the project report (at the time of submission) should have the following page margins:

Top edge	:	30 to 35 mm
Bottom edge	:	25 to 30 mm
Left side	:	35 to 40 mm
Right side	:	20 to 25 mm

The project report should be prepared on good quality white paper preferably not lower than 80 grams /Sq. Meter.

Tables and figures should conform to the margin specifications. Large size figures should be photographically or otherwise reduced to the appropriate size before insertion.

6. TYPING INSTRUCTIONS

The impressions on the typed copies should be black in color. The font used for entire project report should be Times New Roman with following sizes and styles.



Text Type	Size	Style	Illustration	
Main headings	16	Bold/ UPPERCASE	1. Introduction	
Division headings	14	Bold/ Capitalized Each	2.4. Feasibility Analysis	
		Word		
Sub-division headings	12	Bold/ Capitalized Each	2.4.1. Technical	
		Word	Feasibility	
Normal text	12	Normal / Sentence	Any text under Division	
		case	headings or Sub-division	
			headings	
Any highlighted word	12	Bold/ Sentence case	Any highlighted text under	
under normal text			Division headings or Sub-	
			division headings	
Bibliography and	10	Normal/Sentence case	Bibliography and	
References			reference items.	

Uniformity in the font of letters in the same project report shall be observed.

A sub-heading at the bottom of a page must have at least two full lines below it or else it should be carried over to the next page.

The last word of any page should not be split using a hyphen.

One and a half spacing should be used for typing the general text.

Single spacing should be used for typing:

- 1. Long Tables
- 2. Long quotations
- 3. Foot notes
- 4. Multiline captions
- 5. References

All quotations exceeding one line should be typed in an indented space – the indentation being 15mm from either margins.



Double spacing should be used for typing all the Certificates and Acknowledgement.

Don't alter the format mentioned under Annexure I, II, III, V and VII. The text for Annexure IV and VI will be decided by the Industry/Company, Candidate respectively.

7. BINDING SPECIFICATIONS

Project report submitted for M.C.A. should be bound using hard cover (Hard binding). The title page (Annexure I) should be printed on the front panel of the project report. Keep the back panel of the project report blank. Course Name (MCA) and Course session (2012-15) should be printed on the spine of the project report.

