MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

GROUP A: I Semester

For batches admitted in Academic Session 2018-19 Onwards

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

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem Exam.	Quiz/ Assignment	End Sem.	Lab work & Sessional		L	T	P	
1.	100201	BSC-1	Engineering Physics	70	20	10	30	20	150	2	1	2	4
2.	100202	HSMC-1	Energy, Environment, Ecology & Society	70	20	10	-	-	100	3	-	-	3
3.	100203	ESC-1	Basic Computer Engineering	70	20	10	30	20	150	3	-	2	4
4.	100204	ESC-2	Basic Mechanical Engineering	70	20	10	30	20	150	3	-	2	4
5.	100205	ESC-3	Basic Civil Engineering &Mechanics	70	20	10	30	20	150	3	-	2	4
6.	100206	HSMC-2	Language Lab. & Seminars	-	-	-	30	20	50	-	-	4	2
Total				**350**	**100**	**50**	**150**	**100**	**750**	**14**	**1**	**12**	**21**
NSS/NCC				**Qualifier**									
Induction programme of first three weeks (MC):Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations													

GROUP A: (Electrical, Electronics, **Computer Science& Engineering**, Information Technology, Electronics & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)
01Theory Period=1 Credit; 02 Practical Periods =1 Credit

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

Group A: II Semester *For batches admitted in Academic Session 2018-19 Onwards*

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

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot			L	T	P	
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab work & Sessional					
1.	100101	BSC-2	Engineering Chemistry	70	20	10	30	20	150	3	-	2	4
2.	100102	BSC-3	Engineering Mathematics-I	70	20	10	-	-	100	3	1	-	4
3.	100103	HSMC-3	Technical English	70	20	10	30	20	150	3	-	2	4
4.	100104	ESC-4	Basic Electrical & Electronics Engineering	70	20	10	30	20	150	3	-	2	4
5.	100105	ESC-5	Engineering Graphics	70	20	10	30	20	150	3	-	2	4
6.	100106	ESC-6	Manufacturing Practices	-	-	-	30	20	50	-	-	2	1
Total				**350**	**100**	**50**	**150**	**100**	**750**	**15**	**1**	**10**	**21**
NSS/NCC				**Qualifier**									
Summer Internship Project –I (Institute Level) (Qualifier): Minimum two-week duration													

GROUP A: (Electrical, Electronics,**Computer Science & Engineering**, Information Technology, Electronics & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

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

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem	Term work / Lab Work & Sessional		L	T	P	
1.	100001	BSC-4	Mathematics-II	70	20	10	-	-	100	3	1	-	4
2.	150301	DC-1	Digital Electronics	70	20	10	-	-	100	3	1	-	4
3.	150302	DC-2	Data Structures	70	20	10	30	20	150	3	-	2	4
4.	150303	DC-3	Computer Graphics	70	20	10	30	20	150	3	-	2	4
5.	150304	DC-4	Object Oriented Programming and Methodology	70	20	10	30	20	150	3	-	2	4
6.	150305	DLC-1*	Hardware Lab	-	-	-	30	20	50	-	-	2	1
7.	150306	SEMINAR/ SELF STUDY	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)#	-	-	-	-	25	25	-	-	2	1
8.	150307	DLC-2	Summer Internship Project–I (Institute Level) (Evaluation)	-	-	-	-	25	25			4	2
Total				**350**	**100**	**50**	**120**	**130**	**750**	**15**	**2**	**14**	**24**
9.	100002$	MC-1	Biology for Engineers(Audit Course)	70	20	10	-	-	100	3		-	03
NSS/NCC				Qualifier									

#Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation.

$This course will run for GroupA/B & Architecture students in III/IV semester respectively(Marks will not be included in the aggregate; but it is compulsory to obtain pass marks in this course)

***Virtual Lab to be conducted along with the traditional lab**

GROUP A: (Electrical, Electronics, Computer Science & Engineering, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

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

For batches admitted in Academic Session 2018-19 Onwards (w.e.f. July, 2018)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem.	Term work / Lab Work & Sessional		L	T	P	
1.	100003	BSC-5	Mathematics- III	70	20	10	-	-	100	2	2	-	4
2.	150401	DC-5	Design & Analysis of Algorithms	70	20	10	30	20	150	2	1	2	4
3.	150402	DC-6	Database Management System	70	20	10	30	20	150	2	1	2	4
4.	150403	DC-7	Operating System	70	20	10	-	-	100	3	1	-	4
5.	150404	DC-8	Computer System Organization	70	20	10	-	-	100	3	1	-	4
6.	100004	MC-2	Cyber Security	70	20	10	-	-	100	2	1	-	3
7.	150405	DLC-2	Programming Lab	-	-	-	30	20	50	-	-	6	3
			Total	420	120	60	90	60	750	14	7	10	26

NSS/NCC Qualifier

Summer Internship Project-II (Softskills Based) for two weeks duration: Evaluation in V Semester

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

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

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Tot Cre
				Theory Slot			Practical Slot			L	T	P	
				End Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem.	Term work / Lab Work & Sessional					
1.	100003	BSC-5	Mathematics- III	70	20	10	-	-	100	3	1	-	4
2.	150401	DC-5	Design & Analysis of Algorithms	70	20	10	30	20	150	2	1	2	4
3.	150402	DC-6	Database Management System	70	20	10	30	20	150	2	1	2	4
4.	150403	DC-7	Operating System	70	20	10	-	-	100	3	1	-	4
5.	150404	DC-8	Computer System Organization	70	20	10	-	-	100	3	1	-	4
6.	100004	MC-2	Cyber Security	70	20	10	-	-	100	2	1	-	3
7.	150405	DLC-3*	Programming Lab	-	-	-	30	20	50	-	-	4	2
Total				**420**	**120**	**60**	**90**	**60**	**750**	**15**	**6**	**8**	**25**
NSS/NCC				**Qualifier**									
Summer Internship Project-II (Soft Skill Based) for two weeks duration: Evaluation in V Semester													

*Virtual Lab to be conducted along with the traditional lab

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

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

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem Exam.	Quiz/ Assisgnment	End Sem.	Lab work & Sessional		L	T	P	
1.	100005*	HSMC-4	Ethics, Economics, Entrepreneurship & Management	70	20	10	-	-	100	3	-	-	3
2.	150501	BSC- 6	Discrete Structures	70	20	10	-	-	100	3	1	-	4
3.	150502	DC-9	Software Engineering	70	20	10	30	20	150	2	1	2	4
4.	150503	DC-10	Theory of Computation	70	20	10	30	20	150	2	1	2	4
5.	150504	DC-11	Microprocessor & Interfacing	70	20	10	30	20	150	2	1	2	4
6.	150505	DLC-4	Minor Project-I**	-	-	-	30	20	50	-	-	2	1
7.	150506	DLC-5	Summer Internship Project-II (Evaluation)	-	-	-	25	-	25	-	-	6	3
8.	150507	SEMINAR/ SELF STUDY	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)#	-	-	-	-	25	25	-	-	2	1
Total				350	100	50	145	105	750	12	4	16	24
9.	100006$	MC-3	Indian Constitution & Traditional Knowledge (Audit Course)	70	20	10	-	-	100	3		-	03
Department level activity/workshop/awareness programme to be conducted; certificate of compliance to be submitted by HoD to the Exam Controller through Dean Academics													
		Additional Course for Honours or minor Specialization	Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization										

*Group A/B programmes will offer this course in V/VI Semester respectively.

$Group A/B programmes will offer this course in V/VI Semester respectively. (Marks will not be included in the aggregate; but it is compulsory to obtain pass marks in this course)

** The minor project-I may be evaluated by an internal committeefor awarding sessional marks.

#Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation

GROUP A: (Electrical, Electronics, Computer Science & Engineering, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

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

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot			L	T	P	
				End Sem.	Mid Sem Exam.	Quiz/ Assignment	End Sem.	Lab work & Sessional					
1.	150601	DC-12	Compiler Design	70	20	10	30	20	150	2	1	2	4
2.	150602	DC- 13	Computer Networks	70	20	10	-	-	100	4	-	-	4
3.	150603	DE-1	DE*	70	20	10	-	-	100	4	-	-	4
4.	150604	DE-2	DE*	70	20	10	-	-	100	4	-	-	4
5.	150605	OC-1	OC*	70	20	10	-	-	100	2	1	-	3
6.	100007	MC-4	Disaster Management	70	20	10	-	-	100	3	-	-	3
7.	150606	DLC-6	Minor Project-II	-	-	-	50	50	100	-	-	4	2
Total				420	120	60	80	70	750	19	2	6	24
Summer Internship-III (On Job Training) for Four weeks duration: Evaluation in VII Semester													
	Additional Course for Honours or minor Specialization		Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization										

* At least one of these courses must be run through SWAYAM/NPTEL/ MOOC

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

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

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category Code	Subject Name & Title	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem. Exam	Quiz/ Assignment	End Sem.	Term Work / Lab Work & Sessional		L	T	P	
1.	150701	DE-3	DE	70	20	10	-	-	100	3	-	-	3
2.	150702	DE-4	DE*	70	20	10	-	-	100	2	-	-	2
3.	150703	OC-2	OC	70	20	10	-	-	100	2	1	-	3
4.	150704	OC-3	OC	70	20	10	-	-	100	3	-	-	3
5.	100008	MC-5	Intellectual Property Rights (IPR)	70	20	10	-	-	100	2	-	-	2
6.	150705	DLC-7	Departmental Lab	-	-	-	50	50	100	-	-	4	2
7.	150706	DLC-8	Summer Internship Project-III (04 weeks) (Evaluation)	-	-	-	50	50	100	-	-	4	2
8.	150707	DLC-9	Creative Problem Solving (Evaluation)	-	-	-	25	25	50	-	-	2	1
Total				**350**	**100**	**50**	**125**	**125**	**750**	**12**	**1**	**10**	**18**
		Additional Course for Honours or minor Specialization	**Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization**										

***This course must be run through SWAYAM/NPTEL/ MOOC**

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

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

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category	Subject Name & Title	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credit
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem. Exam	Quiz/ Assignment	End Sem.	Term Work / Lab Work & Sessional		L	T	P	
1.	150801	DE-5	DE*	70	20	10	-	-	100	3	-	-	3
2.	150802	OC-4	OC*	70	20	10	-	-	100	3	-	-	3
3.	150803	OC-5	OC*	70	20	10	-	-	100	3	-	-	3
4.	150804	DLC-10	Internship/Project	-	-	-	250	150	400	-	-	6	3
5.	150805	DLC-11	Innovative Technical Contribution#	-	-	-	-	50	50	-	-	2	1
Total				210	60	30	250	200	750	9	-	8	13
		Additional Course for Honours or minor Specialization	Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization										

*All of these courses will run throughSWAYAM/NPTEL/ MOOC

#Evaluation will be based on participation/laurels brought by the students to the institution in National/International level technical events during the entire tenure of the UG programme.

Course Scheme Structure of

B.Tech. (Information Technology)

I - VIII Semester

Under Flexible Scheme

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Information Technology

Scheme Structure & Semester-wise credit distribution (under flexible curriculum design)

General Definition:

L	Lecture
T	Tutorial
P	Practical
HSMC	Humanities and Social Sciences including Management Courses
BSC	Basic Science Courses
ESC	Engineering Science Courses
DC	Departmental Core
DE	Departmental Elective
OC	Open Category
DLC	Departmental Laboratory Courses
MC	Mandatory Course

Definition of Credit:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
2 Hours Practical(Lab)/week	1 credit

Range of Credits:

A student will be eligible to get Under Graduate degree after earning minimum 170 credits. A student will be eligible to get Under Graduate degree with Honours or additional Minor Engineering Specialization, if he/she completes 190 credits. These could be acquired through MOOCs.

Note: In partial fulfillment of flexible curriculum design, a mandate provision to earn credits through E-Learning (NPTEL/MOOC etc.) based Departmental Core/Elective (DC/DE) has been introduced. Additionally, to give the students more flexibility to orient themselves as per their interest while retaining the discipline specific knowledge and capabilities, provision for Open Category (OC) Courses have been made.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Proposed Structure of Undergraduate Engineering program (Information Technology)

S.No.	Category	Suggested Breakup of Credits (Total 160) (as proposed by AICTE)	Component wise credit allotment (To be calculated by the concerned Department) Information Technology	No. of Subjects
1.	Humanities and Social Sciences including Management Courses (HSMC)	12**	12	4
2.	Basic Science Courses (BSC)	25**	24	6
3.	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	24**	21	6
4.	Departmental Core Courses (DC)	48**	52	13
5.	Departmental Elective Courses relevant to specialization/branch (DE)	18**	16	5
6.	Open Category- Electives from other technical and /or emerging subjects (OC)	18**	15	5
7.	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions. (DLC/SWAYAM/NPTEL/MOOC)	15**	22	11
8.	Mandatory Course(MC)		08	5
	Total	160**	170	55

***Minor variation is allowed as per need of the respective disciplines. Please consult the AICTE model curriculum as a standard reference, if needed.*

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

GROUP A: I Semester

For batches admitted in Academic Session 2018-19 Onwards

B.Tech. I Semester (Information Technology)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem Exam.	Quiz/ Assignment	End Sem.	Lab work & Sessional		L	T	P	
1.	100201	BSC-1	Engineering Physics	70	20	10	30	20	150	2	1	2	4
2.	100202	HSMC-1	Energy, Environment, Ecology & Society	70	20	10	-	-	100	3	-	-	3
3.	100203	ESC-1	Basic Computer Engineering	70	20	10	30	20	150	3	-	2	4
4.	100204	ESC-2	Basic Mechanical Engineering	70	20	10	30	20	150	3	-	2	4
5.	100205	ESC-3	Basic Civil Engineering &Mechanics	70	20	10	30	20	150	3	-	2	4
6.	100206	HSMC-2	Language Lab. & Seminars	-	-	-	30	20	50	-	-	4	2
Total				**350**	**100**	**50**	**150**	**100**	**750**	**14**	**1**	**12**	**21**
NSS/NCC				**Qualifier**									
Induction programme of first three weeks (MC):Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations													

GROUP A: (Electrical, Electronics, Computer Science& Engineering, **Information Technology**, Electronics & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)
01Theory Period=1 Credit; 02 Practical Periods =1 Credit

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

Group A: II Semester *For batches admitted in Academic Session 2018-19 Onwards*

B.Tech. II Semester (Information Technology)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab work & Sessional		L	T	P	
1.	100101	BSC-2	Engineering Chemistry	70	20	10	30	20	150	3	-	2	4
2.	100102	BSC-3	Engineering Mathematics-I	70	20	10	-	-	100	3	1	-	4
3.	100103	HSMC-3	Technical English	70	20	10	30	20	150	3	-	2	4
4.	100104	ESC-4	Basic Electrical & Electronics Engineering	70	20	10	30	20	150	3	-	2	4
5.	100105	ESC-5	Engineering Graphics	70	20	10	30	20	150	3	-	2	4
6.	100106	ESC-6	Manufacturing Practices	-	-	-	30	20	50	-	-	2	1
Total				**350**	**100**	**50**	**150**	**100**	**750**	**15**	**1**	**10**	**21**
NSS/NCC				**Qualifier**									
Summer Internship Project –I (Institute Level) (Qualifier): Minimum two-week duration													

GROUP A: (Electrical, Electronics,Computer Science & Engineering, **Information Technology**, Electronics & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

B.Tech. III Semester (Information Technology)

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credit
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem	Term work / Lab Work & Sessional		L	T	P	
1.	100001	BSC-4	Mathematics-II	70	20	10	-	-	100	3	1	-	4
2.	160301	DC-1	Digital Electronics	70	20	10	-	-	100	3	1	-	4
3.	160302	DC-2	Data Structures	70	20	10	30	20	150	3	-	2	4
4.	160303	DC-3	Computer Graphics & Multimedia	70	20	10	30	20	150	3	-	2	4
5.	160304	DC-4	Object Oriented Programming and Methodology	70	20	10	30	20	150	3	-	2	4
6.	160305	DLC-1*	Hardware Lab	-	-	-	30	20	50	-	-	2	1
7.	160306	SEMINAR/ SELF STUDY	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)#	-	-	-	-	25	25	-	-	2	1
8.	160307	DLC-2	Summer Internship Project–I (Institute Level) (Evaluation)	-	-	-	-	25	25			4	2
Total				350	100	50	120	130	750	15	2	14	24
9.	100002$	MC-1	Biology for Engineers(Audit Course)	70	20	10	-	-	100	3		-	03
NSS/NCC				Qualifier									

#Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation.

$This course will run for GroupA/B & Architecture students in III/IV semester respectively(Marks will not be included in the aggregate; but it is compulsory to obtain pass marks in this course)

***Virtual Lab to be conducted along with the traditional lab**

GROUP A: (Electrical, Electronics, Computer Science & Engineering, **Information Technology**, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

B.Tech. IV Semester (Information Technology)

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Tot Cred
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem.	Term work / Lab Work & Sessional		L	T	P	
1.	100003	BSC-5	Mathematics- III	70	20	10	-	-	100	3	1	-	4
2.	160401	DC-5	Design & Analysis of Algorithms	70	20	10	30	20	150	2	1	2	4
3.	160402	DC-6	Database Management System	70	20	10	30	20	150	2	1	2	4
4.	160403	DC-7	Operating System	70	20	10	-	-	100	3	1	-	4
5.	160404	DC-8	Computer System Organization	70	20	10	-	-	100	3	1	-	4
6.	100004	MC-2	Cyber Security	70	20	10	-	-	100	2	1	-	3
7.	160405	DLC-3*	Programming Lab	-	-	-	30	20	50	-	-	4	2
Total				**420**	**120**	**60**	**90**	**60**	**750**	**15**	**6**	**8**	**25**
NSS/NCC				**Qualifier**									
Summer Internship Project-II (Soft Skill Based) for two weeks duration: Evaluation in V Semester													

***Virtual Lab to be conducted along with the traditional lab**

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

B.Tech. V Semester (Information Technology)

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem Exam.	Quiz/ Assisgnment	End Sem.	Lab work & Sessional		L	T	P	
1.	100005*	HSMC-4	Ethics, Economics, Entrepreneurship & Management	70	20	10	-	-	100	3	-	-	3
2.	160501	BSC- 6	Discrete Structures	70	20	10	-	-	100	3	1	-	4
3.	160502	DC-9	Software Engineering	70	20	10	30	20	150	2	1	2	4
4.	160503	DC-10	Theory of Computation	70	20	10	30	20	150	2	1	2	4
5.	160504	DC-11	Microprocessor & Interfacing	70	20	10	30	20	150	2	1	2	4
6.	160505	DLC-4	Minor Project-I**	-	-	-	30	20	50	-	-	2	1
7.	160506	DLC-5	Summer Internship Project-II (Evaluation)	-	-	-	25	-	25	-	-	6	3
8.	160507	SEMINAR/ SELF STUDY	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)#	-	-	-	-	25	25	-	-	2	1
Total				350	100	50	145	105	750	12	4	16	24
9.	100006$	MC-3	Indian Constitution & Traditional Knowledge (Audit Course)	70	20	10	-	-	100	3		-	03
Department level activity/workshop/awareness programme to be conducted; certificate of compliance to be submitted by HoD to the Exam Controller through Dean Academics													
		Additional Course for Honours or minor Specialization	Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization										

* Group A/B programmes will offer this course in V/VI Semester respectively.

$ Group A/B programmes will offer this course in V/VI Semester respectively. (Marks will not be included in the aggregate; but it is compulsory to obtain pass marks in this course)

** The minor project-I may be evaluated by an internal committeefor awarding sessional marks.

Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation

GROUP A: (Electrical, Electronics, Computer Science & Engineering, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

B.Tech. VI Semester (Information Technology)

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot			L	T	P	
				End Sem.	Mid Sem Exam.	Quiz/ Assignment	End Sem.	Lab work & Sessional					
1.	160601	DC-12	Compiler Design	70	20	10	30	20	150	2	1	2	4
2.	160602	DC- 13	Computer Networks	70	20	10	-	-	100	4	-	-	4
3.	160603	DE-1	DE*	70	20	10	-	-	100	4	-	-	4
4.	160604	DE-2	DE*	70	20	10	-	-	100	4	-	-	4
5.	160605	OC-1	OC*	70	20	10	-	-	100	2	1	-	3
6.	100007	MC-4	Disaster Management	70	20	10	-	-	100	3	-	-	3
7.	160606	DLC-6	Minor Project-II	-	-	-	50	50	100	-	-	4	2
Total				420	120	60	80	70	750	19	2	6	24
Summer Internship-III (On Job Training) for Four weeks duration: Evaluation in VII Semester													
	Additional Course for Honours or minor Specialization		Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization										

* At least one of these courses must be run through SWAYAM/NPTEL/ MOOC

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

B.Tech. VII Semester (Information Technology)

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category Code	Subject Name & Title	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem. Exam	Quiz/ Assignment	End Sem.	Term Work / Lab Work & Sessional		L	T	P	
1.	160701	DE-3	DE	70	20	10	-	-	100	3	-	-	3
2.	160702	DE-4	DE*	70	20	10	-	-	100	2	-	-	2
3.	160703	OC-2	OC	70	20	10	-	-	100	2	1	-	3
4.	160704	OC-3	OC	70	20	10	-	-	100	3	-	-	3
5.	100008	MC-5	Intellectual Property Rights (IPR)	70	20	10	-	-	100	2	-	-	2
6.	160705	DLC-7	Departmental Lab	-	-	-	50	50	100	-	-	4	2
7.	160706	DLC-8	Summer Internship Project-III (04 weeks) (Evaluation)	-	-	-	50	50	100	-	-	4	2
8.	160707	DLC-9	Creative Problem Solving (Evaluation)	-	-	-	25	25	50	-	-	2	1
Total				350	100	50	125	125	750	12	1	10	18
		Additional Course for Honours or minor Specialization	Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization										

*This course must be run through SWAYAM/NPTEL/ MOOC

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

B.Tech. VIII Semester (Information Technology)

For batches admitted in Academic Session 2017-18 & 2018-19 Onwards (w.e.f. July, 2018)

S.No.	Subject Code	Category	Subject Name & Title	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End Sem.	Mid Sem. Exam	Quiz/ Assignment	End Sem.	Term Work / Lab Work & Sessional		L	T	P	
1.	160801	DE-5	DE*	70	20	10	-	-	100	3	-	-	3
2.	160802	OC-4	OC*	70	20	10	-	-	100	3	-	-	3
3.	160803	OC-5	OC*	70	20	10	-	-	100	3	-	-	3
4.	160804	DLC-10	Internship/Project	-	-	-	250	150	400	-	-	6	3
5.	160805	DLC-11	Innovative Technical Contribution#	-	-	-	-	50	50	-	-	2	1
Total				210	60	30	250	200	750	9	-	8	13
		Additional Course for Honours or minor Specialization	Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization										

*All of these courses will run through SWAYAM/NPTEL/ MOOC

#Evaluation will be based on participation/laurels brought by the students to the institution in national/state level technical events during the complete tenure of the UG program

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Syllabus of Subjects

B.Tech. III Semester

(Computer Science & Engineering)

Under Flexible Scheme Structure

Department of Computer Science & Engineering and Information Technology

DIGITAL ELECTRONICS
150301 (DC-1)

COURSE OBJECTIVES

- To perform the analysis and design of various digital electronic circuits.
- To learn various number systems, boolean algebra and logic gates.
- To understand the concept of counters, latches and flip-flops.

Unit-I

Introduction to Digital Electronics, Needs and Significance, Different Number System: Binary Numbers, Octal and Hexadecimal Numbers, Conversions, Complement's, Signed Binary Numbers, Binary Arithmetic's, Binary Codes: BCD, ASCII Codes.

Unit-II

Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Boolean Relations. Digital Logic Gates, De Morgan's Theorem, Karnaugh Maps and simplifications.

Unit-III

Combinational Circuits, Half Adder, Full Adder, Binary Adder-Subtractor, Binary Multiplier, Comparator, Decoders, Encoders, Multiplexers.

Unit-IV

Sequential Circuits, Latches, Flip-Flops: RS Latches, Level Clocking, D Latches, Edge-triggered D Flip-flop, Edge-triggered JK Flip-flop, JK Master-slave Flip-flop; Registers, Shift Registers, Counters, Ripple Counters, Synchronous Counters.

Unit-V

Introduction to Memory, Memory Decoding, Error Detection and Correction, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices, RTL and DTL Circuits, TTL, ECL, MOS, CMOS, Application Specific Integrated Circuits.

RECOMMENDED BOOKS

- Digital Design,Morris Mano M. and Michael D. Ciletti, IV Edition, Pearson Education.
- Digital Electronics: Principles, Devices and Applications,Anil K. Maini, Wiley.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. **Explain** the computer architecture for defining basic component and functional unit.

CO2. **Recall** different number system and solve the basic arithmetic operations.

CO3. **Develop** the understanding of combinational circuits.

CO4. **Analyze** the basic concept of sequential circuits.

CO5. **Compare** various memories.

CO6. **Solve** the Boolean functions using logic gates.

Department of Computer Science & Engineering and Information Technology

DATA STRUCTURES
150302 (DC-2)

COURSE OBJECTIVES

- To be familiar with the use of data structures as the foundational base for computer solutions to problems.
- To understand various techniques of searching and sorting.
- To understand basic concepts about stacks, queues, lists, trees and graphs.

Unit-I

Introduction to Data Structures: Algorithms & their characteristics, Asymptotic notations. Arrays and its representations, Index to address translation. **Link list:** Introduction, Implementation of linked list, Operations, Circular link list, Doubly linked list, Polynomial manipulation using linked list.

Unit-II

Stacks: concepts and implementation of stacks, Operations on Stack, Conversion of infix to postfix notation, Evaluation of postfix expression, recursion.

Queues: concepts and implementation, Operations on Queues, Dequeue, Priority queues, Circular queues and application.

Unit-III

Trees: Types, Terminology, Binary tree -Representations, Traversal, Conversion of General Tree to Binary Tree, Binary search tree, Threaded binary tree and Height balanced tree.

Unit-IV

Searching & Sorting: Linear search, Binary Search, Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Radix Sort and Heap sort, Comparison between Sorting Techniques, Hashing and Collision resolution techniques.

Unit-V

Graphs: Background, Graph theory terminologies, Representation of graphs- sequential & linked representation, path matrix, Graph Traversals- BFS, DFS, spanning trees, Applications of graph.

RECOMMENDED BOOKS

- Data Structures, Algorithms and Applications in C++, Sartaj Sahni, 2nd Edition.
- An Introduction to Data Structures with Applications, Jean-Paul Tremblay, Mcgraw hill.
- Data Structures & Algorithms, Aho, Hopcroft & Ullman, original edition, Pearson Publication.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Outline** the basics of Algorithms and their performance criteria's.

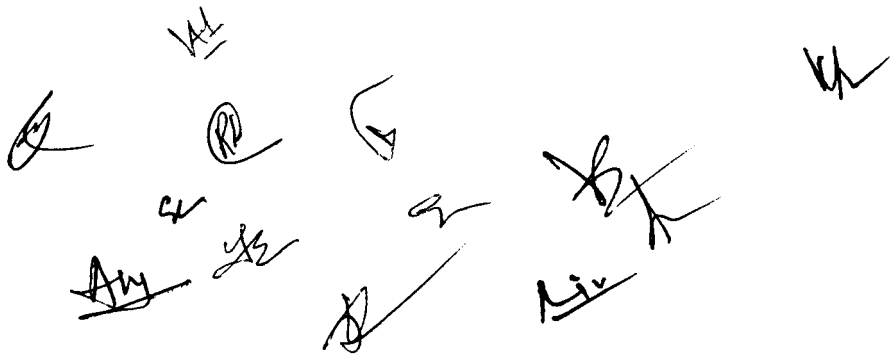
CO2. **Explain** the working of linear/Non Linear data structures.

CO3. **Identify** the appropriate data structure to solve specific problems.

CO4. **Analyze** the performance of various Data Structures & their applications.

CO5. **Evaluate** the time/space complexities of various data structures & their applications.

CO6. **Design** the optimal algorithmic solutions for various problems.



Department of Computer Science & Engineering and Information Technology

COMPUTER GRAPHICS
150303 (DC-3)

COURSE OBJECTIVES

- To provide an introduction to the theory and practice of computer graphics.
- To give a good exposure related to Computer Graphics algorithms and to design various graphics primitives.
- To enhance the proficiency in programming skills related to animation and graphics object design

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Unit-I

Introduction to Computer Graphics: Interactive Computer Graphics, Application of Computer Graphics, Random and Raster Scan Displays, Storage Tube Graphics Display, Calligraphic Refresh Graphics Display, Flat Panel Display, Refreshing, Flickering, Interlacing, Resolution, Bit Depth, Aspect Ratio etc.

Unit-II

Scan Conversion Technique: Image representation, Line drawing: DDA, Bresenham's Algorithm. **Circle Drawing:** General Method, Mid-Point, DDA, Bresenham's Circle Generation Algorithm, Ellipse Generation Algorithm, **Curves:** Parametric Function, Bezier Method, B-Spline Method.

Unit-III

2D & 3D Transformations: Translation, Rotation, Scaling, Reflection, Shearing, Inverse Transformation, Composite Transformation, World Coordinate System, Viewing Transformation, Representation of 3D object on Screen, Parallel and Perspective Projections.

Unit-IV

Clipping: Point clipping, Line Clipping, Simple Visibility Line Clipping Algorithm, Cohen Sutherland Line Clipping Algorithm etc, Polygon Clipping, Convex and Concave Polygon, Sutherland Hodgeman Polygon Clipping Algorithm etc, Area Filling, Hidden Surface Elimination: Z- Buffer algorithm and Painter's Algorithm.

Unit-V

Basic Illumination Models: Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, Color Models like RGB, YIQ, CMY, HSV etc., Introduction to Digital Image Processing (DIP), Fundamental Steps and Components of DIP.

RECOMMENDED BOOKS

- Computer Graphics, Donald Hearn and M.P. Becker, PHI Publication.
- Computer Graphics principle and Practice, FoleyVandam, Feiner, Hughes.
- Principles of Computers Graphics, Rogers, TMH.
- Computer Graphics, Sinha and Udai, TMH.
- Digital Image Processing, Gonzalez.

COURSE OUTCOMES

After completion of the course students will be able to:

CO1. **Explain** interactive Computer Graphics, various display devices and explore applications of computer graphics.

CO2. **Illustrate** various line generations, circle generation, curve generation and shape generation algorithms.

CO3. **Apply** various 2-Dimensional and 3-Dimensional transformations and projections on images.

CO4. **Classify** methods of image clipping and various algorithms for Line and Polygon clipping.

CO5. **Choose** appropriate filling algorithms, Hidden Surface Elimination algorithm and apply on various images.

CO6. **Discuss** various color models, shading methods, animation and Digital Image Processing.

Department of Computer Science & Engineering and Information Technology

OBJECT ORIENTED PROGRAMMING AND METHODOLOGY
150304 (DC-4)

COURSE OBJECTIVES

- To study about the concept of object oriented programming.
- To create C++ programs that leverage the object oriented features of the C++ Language.
- To apply object oriented or non-object oriented techniques to solve bigger computing problems.

Unit-I

Introduction to C++ and Object Oriented Concepts: Basics of C++, Tokens, I/O Statements, Structure of Program, Operators and Expressions, Flow of Control, Arrays, Structures, Functions and its type, Function Prototyping, Pointers, Pointer Variables, Pointers and Arrays, Array of Pointers, Pointers and Structures, Dynamic Memory Allocation.

Programming Techniques: Unstructured & Structured Programming, Object Oriented Paradigm, Features of Oops, Comparison with Procedural Oriented Programming & Object Oriented Programming, Abstract Data Types, Reference Variable, Scope Resolution Operator.

Unit-II

Classes & Objects: Specification of Class, Visibility Modes: Private, Public, Protected, Defining Member Functions, Creating of Objects, Characteristics of Object, Static Data Member, Static Member Function, Array of Objects, Object as Arguments, Inline Function, Default Arguments, Friend Function, Recursion.

Constructors and Destructors: Introduction, Types of Constructors-DefaultConstructor, User Defined Constructor, Parameterized Constructor, Copy Constructor, Constructor with Default Arguments, Rules of Constructor Definition and Usage, Destructors.

Unit-III

Polymorphism: Introduction, Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, Function Overloading, Operator Overloading: Binary

Operators, Arithmetic Assignment Operators, Unary Operators, Rules for Operator Overloading, Pitfalls of Operator Overloading, Data Conversion, Type Casting.

Unit-IV

Inheritance: Introduction to Code Reuse, Visibility Modes, Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath. Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Nesting of Classes, Overriding Member Function. Containership: Classes with in Classes, Function Overriding.

Unit-V

Pointer & File Concept: Pointers Overview, Pointers to Objects, This Pointer, Pointers to Derived Classes, Virtual Functions & Pure Virtual Function, Association, Type of Association, Aggregation, File Concepts, Study of Various Files and Streams, Opening and Closing of Files- Functions Get(), Getline(), Put(), Opening The Files Using Function Open(), File Manipulator Function.

RECOMMENDED BOOKS

- C++ How to Program, H M Deitel and P J Deitel, Prentice Hall.
- Programming with C++, D Ravichandran, T.M.H.
- Computing Concepts with C++ Essentials, Horstmann, John Wiley.
- The Complete Reference in C++, Herbert Schildt, TMH.
- Object-Oriented Programming in C++, E Balagurusam.
- Fundamentals of Programming C++, Richard L. Halterman.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** the concepts of classes & objects and their significance in real world.

CO2. **Explain** the benefits of object oriented design.

CO3. **Build** C++ classes using appropriate encapsulation and design principles.

CO4. **Analyze** the utilization of inheritance and polymorphism in the solution of problems.

CO5. **Choose** appropriate object orient programming concepts for solving real world problems.

CO6. **Develop** solutions to problems demonstrating usage of control structures, modularity, I/O and other standard language constructs.

List of Programs

B.Tech. III Semester

(Computer Science & Engineering)

Under Flexible Scheme Structure

Department of Computer Science & Engineering and Information Technology

DATA STRUCTURES
(150302)

LIST OF PROGRAMS

1. WAP that uses functions to perform the following:
   a) Create a singly linked list of integers.
   b) Delete a given integer from the linked list.
   c) Display the contents of the list after deletion.

2. WAP to perform the following using functions:
   a) Create a doubly linked list of integers.
   b) Delete a given integer from the doubly linked list.
   c) Display the contents of the list after deletion.

3. WAP that uses stack operations to convert a given infix expression into its postfix equivalent.

4. WAP to implement a double ended queue using array and doubly linked list respectively.

5. WAP to perform the following using functions:
   a) Create a binary search tree of characters.
   b) Traverse the above Binary search tree recursively in Postorder.

6. WAP to perform the following using functions:
   a) Create a binary search tree of integers.
   b) Traverse the Binary search tree non recursively in inorder.

7. WAP for implementing the following sorting methods to arrange a list of integers in ascending order:
   a) Insertion sort
   b) Merge sort

8. WAP for implementing the following sorting methods to arrange a list of integers in ascending order:
   a) Quick sort
   b) Selection sort

9. WAP to count the number of nodes in the binary search tree.

10. WAP to implement stack using linked list.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Select** the appropriate data structure based on their time/space complexity for the given problem.

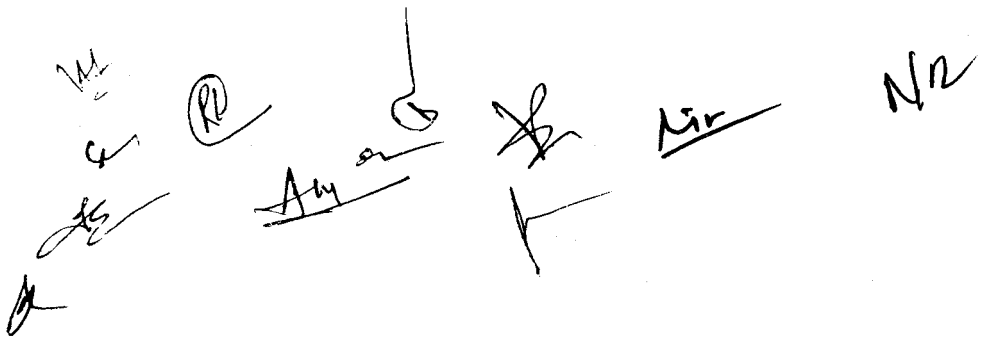
CO2. **Illustrate** various sorting and searching algorithms.

CO3. **Apply** the concepts of trees and graphs.

CO4. **Compare** different implementations of data structures and recognize their advantages and disadvantages.

CO5. **Evaluate** problems using stack and linked lists.

CO6. **Design** programs using linear and non-linear data structures.



Department of Computer Science & Engineering and Information Technology

COMPUTER GRAPHICS
(150303)

LIST OF PROGRAMS

1. WAP to implement line generation using DDA algorithm.
2. WAP to implement line using Bresenham's line generation algorithm.
3. WAP to generate circle using Mid Point algorithm.
4. WAP to perform translation, rotation scaling on 2-D transformation.
5. WAP to fill polygon using seed fill algorithm.
6. WAP to implement translation of a line and triangle.
7. WAP to implement rotation of a line and triangle.
8. WAP program to implement scaling transformation.
9. WAP to implement 3D rotation about an arbitrary axis.
10. WAP to implement cohen sutherland line clipping.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Choose** appropriate line, circle and other curves generation algorithms.

CO2. **Demonstrate** the concept of graphics to create an image using computer.

CO3. **Apply** graphics programming techniques to design, and create computer graphics scenes.

CO4. **Analyze** the importance of viewing and projections.

CO5. **Justify** various colour models, shading, animation and digital image processing in coding.

CO6. **Develop** programs for clipping of images.

Department of Computer Science & Engineering and Information Technology

OBJECT ORIENTED PROGRAMMING AND METHODOLOGY (150304)

LIST OF PROGRAMS

1. WAP to swap two integers without using third variable. The swapping must be done in a different method in a different class.
2. WAP that uses a class where the member functions are defined outside a class.
3. WAP to find the greater of two given numbers in two different classes using friend function.
4. Create an abstract class Shape which has a field PI=3.14 as final and it has an abstract method Volume. Make two subclasses Cone and Sphere from this class and they print their volume.
5. Create a class called LIST with two pure virtual function store() and retrieve().To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.
6. WAP to define the function template for calculating the square of given numbers with different data types.
7. Design a class to represent a bank account. Which include contains account number, name of the depositor, type of the account, balance amount in the account. Define Methods, to assign initial values, to Deposit an amount, to Withdraw amount after checking balance, to display name and balance.
8. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviors, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.
9. WAP to demonstrate the multilevel inheritance.
10. WAP to raise an exception if any attempt is made to refer to an element whose index is beyond the array size.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Select** proper arithmetic, logical, relational, and string manipulation expressions to process data.

CO2. **Demonstrate** the use of various OOPs concepts with the help of programs.

CO3. **Apply** validation techniques to build a reliable solution to a given problem.

CO4. **Analyze** and write programs to solve more complicated problems using the concepts of object oriented methodology.

CO5. **Choose** appropriate programming concepts as and when required in the futureapplication development.

CO6. **Construct** a complete class definition with in the class definition, write class andinstance methods including the constructor and overloaded methods.

Department of Computer Science & Engineering and Information Technology

HARDWARE LAB
150305 (DLC-1)

COURSE OBJECTIVES

- To understand various number systems, boolean algebra, logic gates.
- To acquire the knowledge of a computer system, motherboard and its processing unit.
- To be aware of different memories, I/O devices, windows installation and SMPS.

Unit -I

Number System, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Boolean Relations, Digital Logic Gates, De Morgan's Theorem, Karnaugh Maps and simplifications.

Unit-II

Combinational Circuits, Half Adder, Full Adder, Binary Adder-Subtractor, Binary Multiplier, Comparator, Decoders, Encoders, Multiplexers.

Unit -III

Sequential Circuits, Latches, Flip-Flops: Edge-triggered D Flip-flop, Edge-triggered JK Flip-flop, JK Master-slave Flip-flop, Registers. Integrated circuits.

Unit-IV

Introduction of Motherboard, Types of Motherboard, Integrated Motherboards, Non-Integrated Motherboards, Desktop Motherboards, Server Motherboards, Laptop Motherboards, Factors of Motherboard, Components of a Motherboard, Manufacturers of Motherboards, Bus Architecture.

Unit -V

Introduction to Memory, Types of Memory, Installation and Partition of Hard Disk, Working of Hard Disk. Basics of I/O Devices, Introduction to Ports, Identify the Different Ports, Ports Troubleshooting. Windows Installation. SMPS (Switch Mode Power Supply).

RECOMMENDED BOOKS

- Digital Design, Morris Mano M. and Michael D. Ciletti, IV Edition, Pearson Education.
- Digital Electronics: Principles, Devices and Applications, Anil K. Maini, Wiley.
- The Indispensable PC Hardware Book, Hans-Peter Messmer, Third Edition.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. **Illustrate** the concept of number system and Boolean algebra.

CO2. **Demonstrate** installation of windows and connections through ports at basic level.

CO3. **Build** various circuits and inspect their working.

CO4. **Examine** the ICs specifications and their functioning.

CO5. **Explain** the concept of Memory, Motherboard, Bus, and SMPS.

CO6. **Choose** appropriate logic gates to design combinational & sequential circuits.

Syllabus of Subjects

B.Tech. IV Semester

(Computer Science & Engineering)

Under Flexible Scheme Structure

Department of Computer Science & Engineering and Information Technology

DESIGN & ANALYSIS OF ALGORITHMS
150401 (DC-5)

COURSE OBJECTIVES

- To introduce the topic of algorithms as a precise mathematical concept.
- To study the techniques like recursion, divide and conquer, dynamic programming, greedy approach, backtracking and branch and bound.
- To practice their skills on many well-known algorithms and data structures designed to solve real-life problems.

Unit-I

Introduction to Computational Model: RAM, Turing machine, Circuit model, PRAM, Bulk synchronous parallel (BSP) Model, Algorithms and its Importance, Recurrences and Asymptotic Notations, Mathematical Analysis of Non-Recursive and Recursive Algorithm, Review of Sorting & Searching Algorithms, **Basic Tree and Graph Concepts:** Binary Search Trees, Height Balanced Trees, B-Trees and Traversal Techniques.

Unit-II

Divide and Conquer Method: Introduction and its Examples such as Finding the Maximum and Minimum, Binary Search, Merge Sort, Quick Sort and Strassen's Matrix Multiplication.

Unit-III

Greedy Method: Introduction, Characteristics, Examples of Greedy Methods such as Single-Source Shortest Paths, **Minimum Cost Spanning Trees** : Prims's and Kruskal's Algorithm, Knapsack Problem, Dijkstra's single source shortest path algorithm, Optimal Storage on Tapes.

Unit-IV

Dynamic Programming: Introduction, The Principle of Optimality, Examples of Dynamic Programming Methods such as – 0/1 Knapsack, Traveling salesman problem, Floyd's All Pairs Shortest Path, Longest Common Subsequence and Reliability Design.

Unit-V

Backtracking: Concept and its Examples like 4-Queen's Problem, Knapsack problem Hamiltonian Circuit Problem, Graph Coloring Problem etc. **Branch & Bound:** Introduction and its Examples like - Traveling Salesperson Problem etc. **NP-Completeness:** Introduction, Class P and NP, Polynomial Reduction, NP-Hard and NP-Complete Problems.

RECOMMENDED BOOKS

- Fundamentals of Computer Algorithms, Horowitz & Sahani, Universities press.
- Introduction to Algorithms, Coremen Thomas, Leiserson CE, Rivest RL, PHI.
- Design & Analysis of Computer Algorithms, Ullmann, Pearson.
- Algorithm Design, Michael T Goodrich, Robarto Tamassia, Wiley India.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** the basic features of an algorithm.

CO2. **Demonstrate** a familiarity with major algorithms and data structures.

CO3. **Apply** important algorithmic design paradigms and methods of analysis.

CO4. **Analyze** the asymptotic performance of algorithms.

CO5. **Compare** different design techniques to develop algorithms for computational problems.

CO6. **Design** algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch n bound approach.

Department of Computer Science & Engineering and Information Technology

DATABASE MANAGEMENT SYSTEM
150402 (DC-6)

COURSE OBJECTIVES

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical and network models.
- To understand and use data manipulation language to query, update and manage a database.

Unit-I

DBMS: Concepts & Architecture, Introduction of File organization Techniques, Database Approach v/s Traditional File Approach, Advantages of Database System, Schemas, Instances, Data Independence, Functions of DBA, Entities & Attributes, Entity types, Value Sets, Key Attributes, Relationships, E-R Diagram.

Data Models: Hierarchical Data Model, Network Data Model & Relational Data Model, Comparison between Models.

Unit-II

Relational Data Models: Domains, Tuples, Attributes, Relations, Characteristics of Relations, Keys, Attributes of Relation, Relational Database, Integrity Constraints.

Query Languages: Relational Algebra & Relational Calculus, Relational Algebra operations like Select, Project, Division, Intersection, Union, Division, Rename, Join etc.

Unit-III

SQL: Data Definition, Data Manipulation in SQL, Update Statements & Views in SQL Query & Subquery, Query by Example Data Storage Definition, Data Retrieval Queries, Set Operations, Aggregate functions, Nested sub queries,Data Manipulation Statements etc . Overview of Tuple Oriented & Domain Oriented Relational Calculus & Operations.

Unit-IV

Database Design: Introduction to Normalization, Various Normal Forms: 1NF, 2NF, 3NF, BCNF, Functional Dependency, Attribute closure, Decomposition, Dependency Preservation, Loss Less & Lossy Join, Problems with Null Valued & Dangling Tuple, Multivalued Dependencies.

Unit-V

Transaction Processing Concepts: Introduction, State Diagram, Properties of Transaction, Types of Transaction, Serializability: Conflict and View Serializability, Concurrency Control: Concepts, Techniques, Concurrent operation of Databases, Recovery: Introduction, Types of Recovery.

Overview of Distributed Databases: Protection, Security & Integrity Constraints. Relational Database Management Systems: Oracle & Microsoft Access Tools. Basic Concepts of Object Oriented Database System & Design.

RECOMMENDED BOOKS

- Database System Concepts,Abraham Silberschatz Henry F. Korth S. Sudarshan, McGraw-Hill 6th Edition.
- Database Management System, Raghu Ramakrishnan Johannes Gehrke, McGraw Hill 3rd Edition.
- Fundamentals of Database System, Elmasri&Navathe, Addison-Wesley Publishing, 5th Edition.
- An Introduction to Database Systems, Date C. J, Addison-Wesley Publishing, 8th Edition.

COURSE OUTCOMES

After successful completion of the course students will be able to:

CO1. **Tell** the terminology, features, classifications, and characteristics embodied in database systems.

CO2. **Explain** different issues involved in the design and implementation of database system.

CO3. **Apply** transaction processing concepts and recovery methods over real time data.

CO4. **Analyze** database schema for a given problem domain.

CO5. **Justify** principles for logical design of databases, including the E-R method and normalization approach.

CO6. **Formulate**, using relational algebra and SQL, solutions to a broad range of query problems.

Department of Computer Science & Engineering and Information Technology

OPERATING SYSTEM
150403 (DC-7)

COURSE OBJECTIVES

- To provide basic knowledge of computer operating system structures and functioning.
- To compare several different approaches to memory management, file management and process management.
- To understand various problems related to concurrent operations and their solutions.

Unit I

Basics of Operating System: Generations, Types, Structure, Services, System Calls, System Boot, System Programs, Protection and Security.

Unit II

Process Management: Process Concepts, Process States, Process Control Block, Scheduling-Criteria, Scheduling Algorithms and their Evaluation, Threads, Threading Issues.

Unit III

Process Synchronization: Background, Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors.

Deadlock: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock.

Unit IV

Memory Management: Main Memory, Swapping, Contiguous Memory Allocation, Paging, Structure of Page Table, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

Unit V

Storage Management: Mass-Storage Structure, Overview, Disk Structure, Disk Attachment, Disk Scheduling.

File System Interface: The Concept of a File, Access Methods, Directory Structure, File System Structure, Allocation Methods, Free-Space Management.

RECOMMENDED BOOKS

- Operating System Concepts, Silberschatz, Ninth Edition, Willey Publication.
- Operating Systems, internals and Design Principles, Stallings, Seventh Edition,Pearson Publication.
- Modern Operating Systems,Tanenbaum, Fourth Edition. Pearson Publication.

COURSE OUTCOMES

After the successful completion of this course, the student will be able to:

CO1. **Tell** the basic concept of operating systems.

CO2. **Explain** the working of operating system.

CO3. **Develop** the solution of various operating system problems/issues.

CO4. **Analyze** the various operating system problems/issues.

CO5. **Measure** the performance of various scheduling/allocation approaches.

CO6. **Test** the working of various scheduling/allocation approaches.

Department of Computer Science & Engineering and Information Technology

COMPUTER SYSTEM ORGANIZATION
150404 (DC-8)

COURSE OBJECTIVE

- To provide the fundamental knowledge of a computer system and its processing units.
- To provide the details of input & output operations, memory management and performance measurement of the computer system.
- To understand how computer represents and manipulate data.

Unit -I

Introduction: Von Newman Model, Various Subsystems, CPU, Memory, I/O, System Bus, CPU and Memory Registers, Program Counter, Accumulator, Register Transfer and Micro Operations: Register Transfer Language, Register Transfer, Tree-State Bus Buffers, Bus and Memory Transfers, Arithmetic Micro-Operation, Logic Micro-Operation, Shift Micro-Operation Register Transfer Micro Operations, Arithmetic Micro-Operations, Logic Micro-Operations and Shift Micro-Operations.

Unit- II

Computer Arithmetic: Addition and Subtraction with Signed-Magnitude, Multiplication Algorithm, Division Algorithm, Division Algorithms, Floating-Point Arithmetic Operations.

Central Processing Unit (CPU): General Purpose Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).Hardwired and Microprogrammed Control.

Unit -III

Microprocessors: Introduction of 8085 Microprocessor: Architecture, Instruction Set, Addressing Modes, Interrupts and Basic Assembly Language Programming.

Unit -IV

Input-Output Organization: Peripheral Devices, I/O Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA (DMA Controller, DMA Transfer),

Input-Output Processor (IOP), Data Transfer- Serial/Parallel, Simplex/ Half Duplex/ Full Duplex.

Unit-V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory- Organization and Mappings, Memory Management Hardware, Introduction to Pipelining & Multiprocessors.

RECOMMENDED BOOKS

- Computer System Architecture, Morris Mano, PHI.
- Microprocessor Architecture, Programming and Applications with the 8085, Gaonkar, Penram International Publishing (India) Pvt.Ltd.
- Computer Organization, Carl Hamacher, THM.
- Computer Architecture and Organization, J P Hayes, Mc-Graw Hills, New Delhi.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. **Recall** the basic building blocks of computer Architecture.

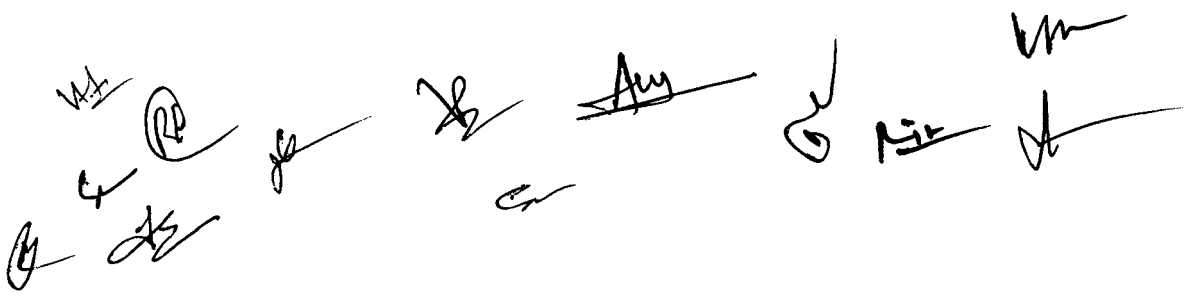
CO2. **Compare** different memories.

CO3. **Apply** the concept of memory mapping, multiprocessor and pipelining in solving real world problems.

CO4. **Analyze** various modes of Input-Output data transfer.

CO5. **Evaluate** the arithmetic related to the number system.

CO6. **Develop** the skill of writing low level programming.



Department of Computer Science & Engineering and Information Technology

CYBER SECURITY
100004 (MC-2)

COURSE OBJECTIVES

- To provide an understanding of cyber security fundamentals.
- To analyze various cyber attacks and their countermeasures.
- To provide basics of Internet and networking.
- To identify various cyber security threats and vulnerabilities.
- To apply forensic science to investigate a cyber crime.

Unit-I

Introduction- Overview of Cyber Security, Cyber Crime, Cyber Warfare, Cyber Terrorism, Cyber Espionage, Cyber Vandalism (Hacking), Cyber Stalking, Internet Frauds and Software Piracy.

Unit-II

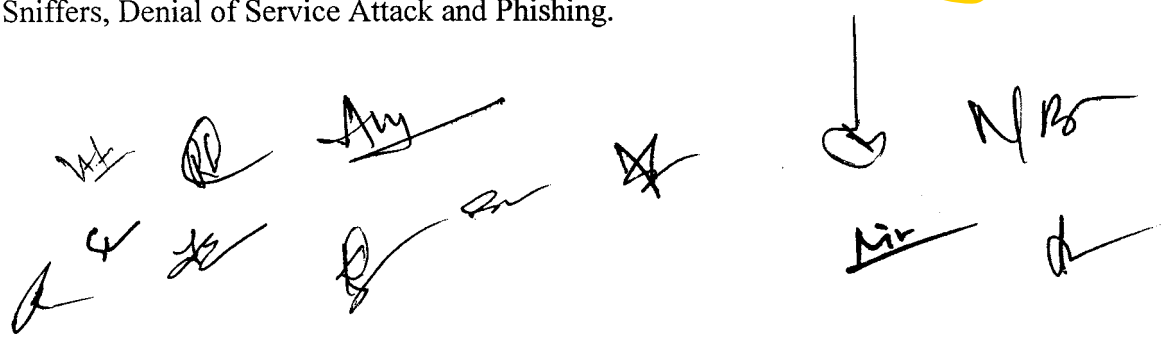
Basics of Internet & Networking- Wired and Wireless Networks, Internetworking Devices, Topologies, Web Browser, Web Server, OSI Model, IP Addressing, Firewall, E-Commerce, DNS, NAT, VPN, HTTP & HTTPS.

Unit-III

Cryptography and Network Security- Security Principles, Attacks, Cryptography, Steganography, Cryptanalysis, Symmetric key and Public key cryptography, Digital Signature, Intrusion Detection System, Secure Socket Layer(SSL) & Secure Electronic Transaction(SET).

Unit-IV

Cyber Security Threats and Vulnerabilities- Hacker, Types of Hacker- White, Gray and black, **Malicious Software's-** Virus, Worm, Trojan Horse, Backdoors and Spywares. Sniffers, Denial of Service Attack and Phishing.



Unit-V

Cyber Crime Investigation and Legal Issues: Intellectual property, privacy issues, IT Act 2000, Basics of Cyber Crime Investigation- Cyber Forensics, Electronic Evidences and its Types.

RECOMMENDED BOOKS

- Cryptography and Network Security, 4/E, William Stallings, 4th edition, Pearson publication.
- Computer Security: Principles and Practice, Stallings William, Pearson publication.
- Investigating Network Intrusions and Cybercrime, EC-Council Press.
- Network Forensics, Tracking Hackers through Cyberspace, Sherri Davidoff, Jonathan Ham, Prentice Hall.
- Cryptography and Network Security, 3e, Atul Kahate, McGraw Hill publication.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. Tell the basic terminologies of Cyber Security.

CO2. Explain the basic concept of networking and Internet.

CO3. Apply various methods used to protect data in the internet environment in real world situations.

CO4. Discover the concept of IP security and architecture.

CO5. Compare various types of cyber security threats/vulnerabilities.

CO6. Develop the understanding of cyber crime investigation and IT ACT 2000.

List of Programs

B.Tech. IV Semester

(Computer Science & Engineering)

Under Flexible Scheme Structure

Department of Computer Science & Engineering and Information Technology

DESIGN AND ANALYSIS OF ALGORITHM
(150401)

LIST OF PROGRAMS

1. WAP to implement the following using array as data structure and analyze its time complexity.
   a. Insertion sort b. Selection sort c. Bubble sort d. Quick sort e. Merge sort
   f. Bucket sort g. Shell sort h. Radix sort i. Heap sort
2. WAP to implement Linear and Binary Search and analyze its time complexity.
3. WAP to implement Matrix Chain Multiplication and analyze its time complexity.
4. WAP to implement Longest Common Subsequence Problem and analyze its time complexity.
5. WAP to implement Optimal Binary Search Tree Problem and analyze its time complexity.
6. WAP to implement Huffman Coding and analyze its time complexity.
7. WAP to implement Dijkstra's Algorithm and analyze its time complexity.
8. WAP to implement Bellman Ford Algorithm and analyze its time complexity.
9. WAP to implement DFS and BFS and analyze their time complexities.
10. WAP to Implement 0/1 knapsack using dynamic programming.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Relate** the principles of algorithm design in solving problems.
CO2. **Demonstrate** basic algorithms and different problem solving strategies.
CO3. **Build** creativeness and confidence to solve non-conventional problems.
CO4. **Analyze** running times of algorithms using asymptotic analysis.
CO5. **Compare** various algorithm design approaches for solving real world problems.
CO6. **Design** and implement optimization algorithms in specific applications.

Department of Computer Science & Engineering and Information Technology

DATA BASE MANAGEMENT SYSTEM
(150402)

LIST OF PROGRAMS

1. Implementation of DDL commands of SQL with suitable examples
   - Create table
   - Alter table
   - Drop Table

2. Implementation of DML commands of SQL with suitable examples
   - Insert
   - Update
   - Delete

3. Implementation of different types of function with suitable examples
   - Number function
   - Aggregate Function
   - Character Function
   - Conversion Function
   - Date Function

4. Implementation of different types of operators in SQL
   - Arithmetic Operators
   - Logical Operators
   - Comparison Operator
   - Special Operator
   - Set Operation

5. Implementation of different types of Joins
   - Inner Join
   - Outer Join
   - Natural Join etc.

6. Study and Implementation of
   - Group By & having clause
   - Order by clause
   - Indexing

7. Study & Implementation of
   - Sub queries
   - Views

8. Study & Implementation of different types of constraints.

9. Study & Implementation of Database Backup & Recovery commands. Study & Implementation of Rollback, Commit, Savepoint.

10. Creating Database /Table Space
    - Managing Users: Create User, Delete User
    - Managing roles:-Grant, Revoke.

11. Study & Implementation of PL/SQL.

12. Study & Implementation of SQL Triggers.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Choose** database schema for a given problem domain.

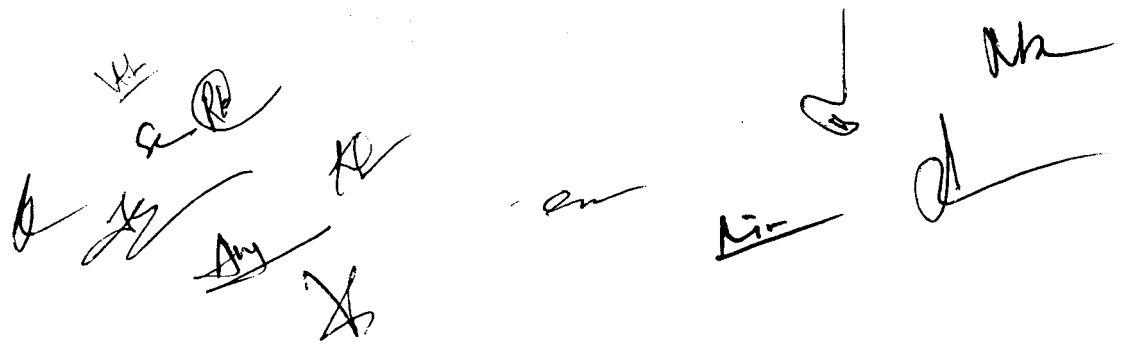
CO2. **Illustrate** relational data model with relational algebra operations.

CO3. **Build** normalized database, query a database using SQL DML/DDL commands.

CO4. **Analyze** integrity constraints on a database using a state-of-the-art RDBMS.

CO5. **Determine** data selection and operators used in queries and restrict data retrieval and control the display order.

CO6. **Create** database using aggregation, group functions and joining tables to summarize data.



Department of Computer Science & Engineering and Information Technology

PROGRAMMING LAB
(JAVA PROGRAMMING)
150405 (DLC-3)

COURSE OBJECTIVES

- To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- To acquire the ability to write a computer program to solve specified problems.
- To be able to use Java SDK environment to create, debug and run simple Java programs.

Unit-I

Introduction to Java programming: Overview and Characteristics of Java, The Java Virtual Machine, Installing Java, Java Program Development, Java Source File Structure, Compilation, Executions. Packages, Package access, Variables and data types, Conditional and looping constructs, Arrays.

Unit-II

Object-oriented programming with Java Classes and Objects: Fields and Methods, Constructors, Overloading methods, Nested classes, Overriding methods, Polymorphism, Making methods and classes final, Wrapper classes.

Unit-III

Extending Classes and Inheritance: Types of Inheritance in Java, Abstract classes and methods, Interfaces, use of 'super', Polymorphism in inheritance. Garbage collection in JAVA.

Exception handling: Try- Catch, Throw, Throws, Finally constructs, The Exception class.

Unit-IV

String Package and Multithreading: Operation on String, Mutable & Immutable String, Tokenizing a String, Creating Strings using String Buffer class.

Understanding Threads: Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities and Synchronizing Threads.

Unit-V

The I/O Package: Input Stream and Output Stream classes, Reader and Writer classes, Basics of AWT, Swing and Applets: Layout Managers, Event Handling, Classes for various controls, such as label, choice, list, checkbox, etc., Dialogs and frames using menus.

Basic concepts of networking: Working with URLs, Concepts of URLs and Sockets. Basics of database connectivity with JDBC.

RECOMMENDED BOOKS

- Programming with JAVA: A Primer, E. Balagurusamy, Tata McGraw Hill.
- JAVA: The Complete Reference, Herbert Schildt, McGraw Hill Education.
- JAVA-2: The Complete Reference, Patrick Naughton, Herbert Schidt.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** the available features in Java programming language.

CO2. **Illustrate** Java programming constructs in solving problems.

CO3. **Make use of** Java programming language for creating databases.

CO4. **Test for** bugs in a software application written in Java programming language.

CO5. **Determine** different ways for handling exception, memory management, file handling, I/O management and internet based application development.

CO6. **Build** a project for application development using Java programming language.

Syllabus of Subjects

B.Tech. III Semester

(Information Technology)

Under Flexible Scheme Structure

Department of Computer Science & Engineering and Information Technology

DIGITAL ELECTRONICS
160301 (DC-1)

COURSE OBJECTIVES

- To perform the analysis and design of various digital electronic circuits.
- To learn various number systems, boolean algebra and logic gates.
- To understand the concept of counters, latches and flip-flops.

Unit-I

Introduction to Digital Electronics, Needs and Significance, Different Number System: Binary Numbers, Octal and Hexadecimal Numbers, Conversions, Complement's, Signed Binary Numbers, Binary Arithmetic's, Binary Codes: BCD, ASCII Codes.

Unit-II

Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Boolean Relations, Digital Logic Gates, De Morgan's Theorem, Karnaugh Maps and simplifications.

Unit-III

Combinational Circuits, Half Adder, Full Adder, Binary Adder-Subtractor, Binary Multiplier, Comparator, Decoders, Encoders, Multiplexers.

Unit-IV

Sequential Circuits, Latches, Flip-Flops: RS Latches, Level Clocking, D Latches, Edge-triggered D Flip-flop, Edge-triggered JK Flip-flop, JK Master-slave Flip-flop; Registers, Shift Registers, Counters, Ripple Counters, Synchronous Counters.

Unit-V

Introduction to Memory, Memory Decoding, Error Detection and Correction, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices, RTL and DTL Circuits, TTL, ECL, MOS, CMOS, Application Specific Integrated Circuits.

RECOMMENDED BOOKS

- Digital Design,Morris Mano M. and Michael D. Ciletti, IV Edition, Pearson Education.
- Digital Electronics: Principles, Devices and Applications,Anil K. Maini, Wiley.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. **Explain** the computer architecture for defining basic component and functional unit.

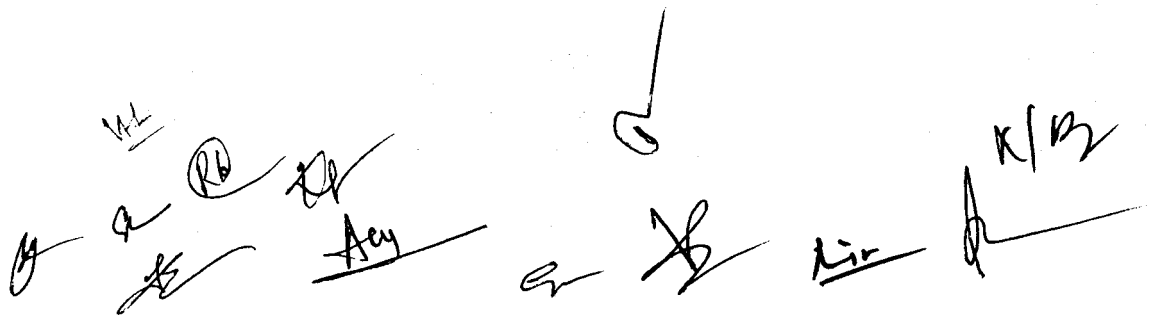
CO2. **Recall** different number system and solve the basic arithmetic operations.

CO3. **Develop** the understanding of combinational circuits.

CO4. **Analyze** the basic concept of sequential circuits.

CO5. **Compare** various memories.

CO6. **Solve** the Boolean functions using logic gates.



Department of Computer Science & Engineering and Information Technology

DATA STRUCTURES
160302 (DC-2)

COURSE OBJECTIVES

- To be familiar with the use of data structures as the foundational base for computer solutions to problems.
- To understand various techniques of searching and sorting.
- To understand basic concepts about stacks, queues, lists, trees and graphs.

Unit-I

Introduction to Data Structures: Algorithms & their characteristics, Asymptotic notations. Arrays and its representations, Index to address translation. **Link list:** Introduction, Implementation of linked list, Operations, Circular link list, Doubly linked list, Polynomial manipulation using linked list.

Unit-II

Stacks: concepts and implementation of stacks, Operations on Stack, Conversion of infix to postfix notation, Evaluation of postfix expression, recursion.

Queues: concepts and implementation, Operations on Queues, Dequeue, Priority queues, Circular queues and application.

Unit-III

Trees: Types, Terminology, Binary tree -Representations, Traversal, Conversion of General Tree to Binary Tree, Binary search tree, Threaded binary tree and Height balanced tree.

Unit-IV

Searching & Sorting: Linear search, Binary Search, Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Radix Sort and Heap sort, Comparison between Sorting Techniques, Hashing and Collision resolution techniques.

Unit-V

Graphs: Background, Graph theory terminologies, Representation of graphs- sequential & linked representation, path matrix, Graph Traversals- BFS, DFS, spanning trees, Applications of graph.

RECOMMENDED BOOKS

- Data Structures, Algorithms and Applications in C++, Sartaj Sahni, 2nd Edition.
- An Introduction to Data Structures with Applications, Jean-Paul Tremblay, Mcgraw hill.
- Data Structures & Algorithms, Aho, Hopcroft & Ullman, original edition, Pearson Publication.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Outline** the basics of Algorithms and their performance criteria's.

CO2. **Explain** the working of linear/Non Linear data structures.

CO3. **Identify** the appropriate data structure to solve specific problems.

CO4. **Analyze** the performance of various Data Structures & their applications.

CO5. **Evaluate** the time/space complexities of various data structures & their applications.

CO6. **Design** the optimal algorithmic solutions for various problems.

Department of Computer Science & Engineering and Information Technology

COMPUTER GRAPHICS
160303 (DC-3)

COURSE OBJECTIVES

- To provide an introduction to the theory and practice of computer graphics.
- To give a good exposure related to Computer Graphics algorithms and to design various graphics primitives.
- To enhance the proficiency in programming skills related to animation and graphics object design

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Unit-I

Introduction to Computer Graphics: Interactive Computer Graphics, Application of Computer Graphics, Random and Raster Scan Displays, Storage Tube Graphics Display, Calligraphic Refresh Graphics Display, Flat Panel Display, Refreshing, Flickering, Interlacing, Resolution, Bit Depth, Aspect Ratio etc.

Unit-II

Scan Conversion Technique: Image representation, Line drawing: DDA, Bresenham's Algorithm. Circle Drawing: General Method, Mid-Point, DDA, Bresenham's Circle Generation Algorithm, Ellipse Generation Algorithm, Curves: Parametric Function, Bezier Method, B-Spline Method.

Unit-III

2D & 3D Transformations: Translation, Rotation, Scaling, Reflection, Shearing, Inverse Transformation, Composite Transformation, World Coordinate System, Viewing Transformation, Representation of 3D object on Screen, Parallel and Perspective Projections. **Clipping:** Point clipping, Line Clipping, Simple Visibility Line Clipping Algorithm, Cohen Sutherland Line Clipping Algorithm etc, Polygon Clipping, Convex and Concave Polygon, Sutherland Hodgeman Polygon Clipping Algorithm etc, Area Filling, Hidden **Surface Elimination:** Z- Buffer algorithm and Painter's Algorithm.

Unit-IV

Basic Illumination Models: Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, Color Models like RGB, YIQ, CMY, HSV etc.

Unit-V

Multimedia System: An Introduction, Multimedia hardware, Multimedia System Architecture. Data & File Format standards. i.e RTF, TIFF, MIDI, JPEG, DIB, MPEG,Audio: digital audio, MIDI, processing sound, sampling, compression.

Video: Avi, 3GP,MOV, MPEG , compression standards, compression through spatial and temporal redundancy. Multimedia Authoring.

RECOMMENDED BOOKS

- Donald Hearn and M.P. Becker: Computer Graphics, PHI Publication
- FoleyVandam, Feiner, Hughes: Computer Graphics principle and Practice
- Rogers:Principles of Computers Graphics, TMH
- Sinha and Udai: Computer Graphics, TMH
- Digital Image Processing by Gonzalez.

COURSE OUTCOMES

After completion of the course students will be able to:

CO1. **Explain** interactive Computer Graphics, various display devices and explore applications of computer graphics.

CO2. **Illustrate** various line generations, circle generation, curve generation and shape generation algorithms.

CO3. **Apply** various 2-Dimensional and 3-Dimensional transformations and projections on images.

CO4. **Classify** methods of image clipping and various algorithms for Line and Polygon clipping.

CO5. **Choose** appropriate filling algorithms, Hidden Surface Elimination algorithm and apply on various images.

CO6. **Discuss** various color models, shading methods, animation and Digital Image Processing.

Department of Computer Science & Engineering and Information Technology

OBJECT ORIENTED PROGRAMMING AND METHODOLOGY
160304 (DC-4)

COURSE OBJECTIVES

- To study about the concept of object oriented programming.
- To create C++ programs that leverage the object oriented features of the C++ Language.
- To apply object oriented or non-object oriented techniques to solve bigger computing problems.

Unit-I

Introduction to C++ and Object Oriented Concepts: Basics of C++, Tokens, I/O Statements, Structure of Program, Operators and Expressions, Flow of Control, Arrays, Structures, Functions and its type, Function Prototyping, Pointers, Pointer Variables, Pointers and Arrays, Array of Pointers, Pointers and Structures, Dynamic Memory Allocation.

Programming Techniques: Unstructured & Structured Programming, Object Oriented Paradigm, Features of Oops, Comparison with Procedural Oriented Programming & Object Oriented Programming, Abstract Data Types, Reference Variable, Scope Resolution Operator.

Unit-II

Classes & Objects: Specification of Class, Visibility Modes: Private, Public, Protected, Defining Member Functions, Creating of Objects, Characteristics of Object, Static Data Member, Static Member Function, Array of Objects, Object as Arguments, Inline Function, Default Arguments, Friend Function, Recursion.

Constructors and Destructors: Introduction, Types of Constructors-DefaultConstructor, User Defined Constructor, Parameterized Constructor, Copy Constructor, Constructor with Default Arguments, Rules of Constructor Definition and Usage, Destructors.

Unit-III

Polymorphism: Introduction, Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, Function Overloading, Operator Overloading: Binary

Operators, Arithmetic Assignment Operators, Unary Operators, Rules for Operator Overloading, Pitfalls of Operator Overloading, Data Conversion, Type Casting.

Unit-IV

Inheritance: Introduction to Code Reuse, Visibility Modes, Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath. Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Nesting of Classes, Overriding Member Function. Containership: Classes with in Classes, Function Overriding.

Unit-V

Pointer & File Concept: Pointers Overview, Pointers to Objects, This Pointer, Pointers to Derived Classes, Virtual Functions & Pure Virtual Function, Association, Type of Association, Aggregation, File Concepts, Study of Various Files and Streams, Opening and Closing of Files- Functions Get(), Getline(), Put(), Opening The Files Using Function Open(), File Manipulator Function.

RECOMMENDED BOOKS

- C++ How to Program, H M Deitel and P J Deitel, Prentice Hall.
- Programming with C++, D Ravichandran, T.M.H.
- Computing Concepts with C++ Essentials, Horstmann, John Wiley.
- The Complete Reference in C++, Herbert Schildt, TMH.
- Object-Oriented Programming in C++, E Balagurusam.
- Fundamentals of Programming C++, Richard L. Halterman.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** the concepts of classes & objects and their significance in real world.

CO2. **Explain** the benefits of object oriented design.

CO3. **Build** C++ classes using appropriate encapsulation and design principles.

CO4. **Analyze** the utilization of inheritance and polymorphism in the solution of problems.

CO5. **Choose** appropriate object orient programming concepts for solving real world problems.

CO6. **Develop** solutions to problems demonstrating usage of control structures, modularity, I/O and other standard language constructs.

List of Programs

B.Tech. III Semester

(Information Technology)

Under Flexible Scheme Structure

Department of Computer Science & Engineering and Information Technology

DATA STRUCTURES
(160302)

LIST OF PROGRAMS

1. WAP that uses functions to perform the following:
   a) Create a singly linked list of integers.
   b) Delete a given integer from the linked list.
   c) Display the contents of the list after deletion.

2. WAP to perform the following using functions:
   a) Create a doubly linked list of integers.
   b) Delete a given integer from the doubly linked list.
   c) Display the contents of the list after deletion.

3. WAP that uses stack operations to convert a given infix expression into its postfix equivalent.

4. WAP to implement a double ended queue using array and doubly linked list respectively.

5. WAP to perform the following using functions:
   a) Create a binary search tree of characters.
   b) Traverse the above Binary search tree recursively in Postorder.

6. WAP to perform the following using functions:
   a) Create a binary search tree of integers.
   b) Traverse the Binary search tree non recursively in inorder.

7. WAP for implementing the following sorting methods to arrange a list of integers in ascending order:
   a) Insertion sort
   b) Merge sort

8. WAP for implementing the following sorting methods to arrange a list of integers in ascending order:
   a) Quick sort
   b) Selection sort

9. WAP to count the number of nodes in the binary search tree.

10. WAP to implement stack using linked list.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Select** the appropriate data structure based on their time/space complexity for the given problem.

CO2. **Illustrate** various sorting and searching algorithms.

CO3. **Apply** the concepts of trees and graphs.

CO4. **Compare** different implementations of data structures and recognize their advantages and disadvantages.

CO5. **Evaluate** problems using stack and linked lists.

CO6. **Design** programs using linear and non-linear data structures.

Department of Computer Science & Engineering and Information Technology

COMPUTER GRAPHICS & MULTIMEDIA
(160303)

LIST OF PROGRAMS

1. WAP to implement line generation using DDA algorithm.
2. WAP to implement line using Bresenham's line generation algorithm.
3. WAP to generate circle using Mid Point algorithm.
4. WAP to perform translation, rotation scaling on 2-D transformation.
5. WAP to fill polygon using seed fill algorithm.
6. WAP to implement translation of a line and triangle.
7. WAP to implement rotation of a line and triangle.
8. WAP program to implement scaling transformation.
9. WAP to implement 3D rotation about an arbitrary axis.
10. WAP to implement cohen sutherland line clipping.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Choose** appropriate line, circle and other curves generation algorithms.

CO2. **Demonstrate** the concept of graphics to create an image using computer.

CO3. **Apply** graphics programming techniques to design, and create computer graphics scenes.

CO4. **Analyze** the importance of viewing and projections.

CO5. **Justify** various colour models, shading, animation and digital image processing in coding.

CO6. **Develop** programs for clipping of images.

Department of Computer Science & Engineering and Information Technology

OBJECT ORIENTED PROGRAMMING AND METHODOLOGY (160304)

LIST OF PROGRAMS

1. WAP to swap two integers without using third variable. The swapping must be done in a different method in a different class.
2. WAP that uses a class where the member functions are defined outside a class.
3. WAP to find the greater of two given numbers in two different classes using friend function.
4. Create an abstract class Shape which has a field PI=3.14 as final and it has an abstract method Volume. Make two subclasses Cone and Sphere from this class and they print their volume.
5. Create a class called LIST with two pure virtual function store() and retrieve().To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.
6. WAP to define the function template for calculating the square of given numbers with different data types.
7. Design a class to represent a bank account. Which include contains account number, name of the depositor, type of the account, balance amount in the account. Define Methods, to assign initial values, to Deposit an amount, to Withdraw amount after checking balance, to display name and balance.
8. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviors, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.
9. WAP to demonstrate the multilevel inheritance.
10. WAP to raise an exception if any attempt is made to refer to an element whose index is beyond the array size.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Select** proper arithmetic, logical, relational, and string manipulation expressions to process data.

CO2. **Demonstrate** the use of various OOPs concepts with the help of programs.

CO3. **Apply** validation techniques to build a reliable solution to a given problem.

CO4. **Analyze** and write programs to solve more complicated problems using the concepts of object oriented methodology.

CO5. **Choose** appropriate programming concepts as and when required in the future application development.

CO6. **Construct** a complete class definition with in the class definition, write class and instance methods including the constructor and overloaded methods.

Department of Computer Science & Engineering and Information Technology

HARDWARE LAB
160305 (DLC-1)

COURSE OBJECTIVES

- To understand various number systems, boolean algebra, logic gates.
- To acquire the knowledge of a computer system, motherboard and its processing unit.
- To be aware of different memories, I/O devices, windows installation and SMPS.

Unit -I

Number System, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Boolean Relations, Digital Logic Gates, De Morgan's Theorem, Karnaugh Maps and simplifications.

Unit-II

Combinational Circuits, Half Adder, Full Adder, Binary Adder-Subtractor, Binary Multiplier, Comparator, Decoders, Encoders, Multiplexers.

Unit -III

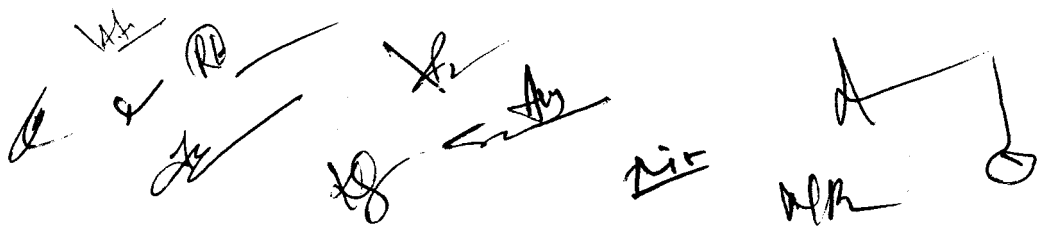
Sequential Circuits, Latches, Flip-Flops: Edge-triggered D Flip-flop, Edge-triggered JK Flip-flop, JK Master-slave Flip-flop, Registers. Integrated circuits.

Unit-IV

Introduction of Motherboard, Types of Motherboard, Integrated Motherboards, Non-Integrated Motherboards, Desktop Motherboards, Server Motherboards, Laptop Motherboards, Factors of Motherboard, Components of a Motherboard, Manufacturers of Motherboards, Bus Architecture.

Unit -V

Introduction to Memory, Types of Memory, Installation and Partition of Hard Disk, Working of Hard Disk. Basics of I/O Devices, Introduction to Ports, Identify the Different Ports, Ports Troubleshooting. Windows Installation. SMPS (Switch Mode Power Supply).



RECOMMENDED BOOKS

- Digital Design, Morris Mano M. and Michael D. Ciletti, IV Edition, Pearson Education.
- Digital Electronics: Principles, Devices and Applications, Anil K. Maini, Wiley.
- The Indispensable PC Hardware Book, Hans-Peter Messmer, Third Edition.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. **Illustrate** the concept of number system and Boolean algebra.

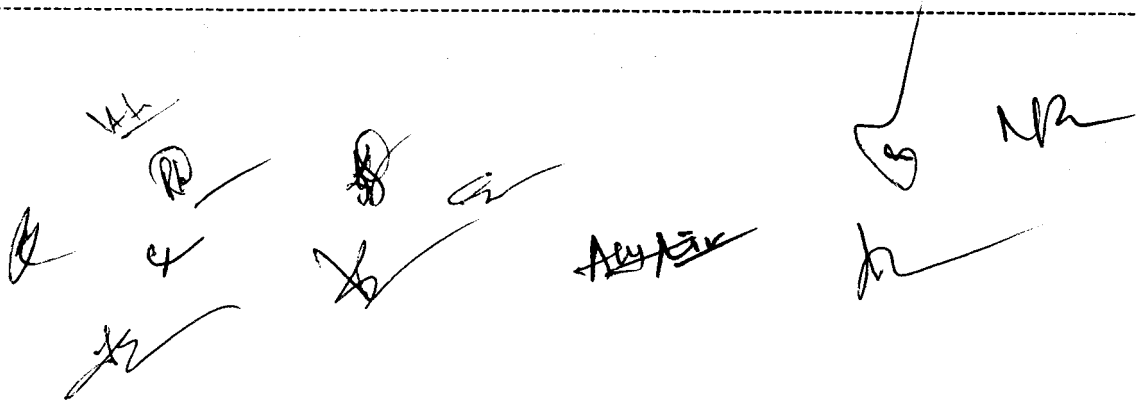
CO2. **Demonstrate** installation of windows and connections through ports at basic level.

CO3. **Build** various circuits and inspect their working.

CO4. **Examine** the ICs specifications and their functioning.

CO5. **Explain** the concept of Memory, Motherboard, Bus, and SMPS.

CO6. **Choose** appropriate logic gates to design combinational & sequential circuits.



Syllabus of Subjects

B.Tech. IV Semester

(Information Technology)

Under Flexible Scheme Structure

Department of Computer Science & Engineering and Information Technology

DESIGN & ANALYSIS OF ALGORITHMS
160401 (DC-5)

COURSE OBJECTIVES

- To introduce the topic of algorithms as a precise mathematical concept.
- To study the techniques like recursion, divide and conquer, dynamic programming, greedy approach, backtracking and branch and bound.
- To practice their skills on many well-known algorithms and data structures designed to solve real-life problems.

Unit-I

Introduction to Computational Model: RAM, Turing machine, Circuit model, PRAM, Bulk synchronous parallel (BSP) Model, Algorithms and its Importance, Recurrences and Asymptotic Notations, Mathematical Analysis of Non-Recursive and Recursive Algorithm, Review of Sorting & Searching Algorithms, **Basic Tree and Graph Concepts:** Binary Search Trees, Height Balanced Trees, B-Trees and Traversal Techniques.

Unit-II

Divide and Conquer Method: Introduction and its Examples such as Finding the Maximum and Minimum, Binary Search, Merge Sort, Quick Sort and Strassen's Matrix Multiplication.

Unit-III

Greedy Method: Introduction, Characteristics, Examples of Greedy Methods such as Single-Source Shortest Paths, **Minimum Cost Spanning Trees :** Prims's and Kruskal's Algorithm, Knapsack Problem, Dijkstra's single source shortest path algorithm, Optimal Storage on Tapes.

Unit-IV

Dynamic Programming: Introduction, The Principle of Optimality, Examples of Dynamic Programming Methods such as – 0/1 Knapsack, Traveling salesman problem, Floyd's All Pairs Shortest Path, Longest Common Subsequence and Reliability Design.

Unit-V

Backtracking: Concept and its Examples like 4-Queen's Problem, Knapsack problem Hamiltonian Circuit Problem, Graph Coloring Problem etc. **Branch & Bound:** Introduction and its Examples like - Traveling Salesperson Problem etc. **NP-Completeness:** Introduction, Class P and NP, Polynomial Reduction, NP-Hard and NP-Complete Problems.

RECOMMENDED BOOKS

- Fundamentals of Computer Algorithms, Horowitz & Sahani, Universities press.
- Introduction to Algorithms, Coremen Thomas, Leiserson CE, Rivest RL, PHI.
- Design & Analysis of Computer Algorithms, Ullmann, Pearson.
- Algorithm Design, Michael T Goodrich, Robarto Tamassia, Wiley India.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** the basic features of an algorithm.
CO2. **Demonstrate** a familiarity with major algorithms and data structures.
CO3. **Apply** important algorithmic design paradigms and methods of analysis.
CO4. **Analyze** the asymptotic performance of algorithms.
CO5. **Compare** different design techniques to develop algorithms for computational problems.
CO6. **Design** algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch n bound approach.

Department of Computer Science & Engineering and Information Technology

DATABASE MANAGEMENT SYSTEM
160402 (DC-6)

COURSE OBJECTIVES

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical and network models.
- To understand and use data manipulation language to query, update and manage a database.

Unit-I

DBMS: Concepts & Architecture, Introduction of File organization Techniques, Database Approach v/s Traditional File Approach, Advantages of Database System, Schemas, Instances, Data Independence, Functions of DBA, Entities & Attributes, Entity types, Value Sets, Key Attributes, Relationships, E-R Diagram.

Data Models: Hierarchical Data Model, Network Data Model & Relational Data Model, Comparison between Models.

Unit-II

Relational Data Models: Domains, Tuples, Attributes, Relations, Characteristics of Relations, Keys, Attributes of Relation, Relational Database, Integrity Constraints.

Query Languages: Relational Algebra & Relational Calculus, Relational Algebra operations like Select, Project, Division, Intersection, Union, Division, Rename, Join etc.

Unit-III

SQL: Data Definition, Data Manipulation in SQL, Update Statements & Views in SQL Query & Subquery, Query by Example Data Storage Definition, Data Retrieval Queries, Set Operations, Aggregate functions, Nested sub queries,Data Manipulation Statements etc . Overview of Tuple Oriented & Domain Oriented Relational Calculus & Operations.

Unit-IV

Database Design: Introduction to Normalization, Various Normal Forms: 1NF, 2NF, 3NF, BCNF, Functional Dependency, Attribute closure, Decomposition, Dependency Preservation, Loss Less & Lossy Join, Problems with Null Valued & Dangling Tuple, Multivalued Dependencies.

Unit-V

Transaction Processing Concepts: Introduction, State Diagram, Properties of Transaction, Types of Transaction, Serializability: Conflict and View Serializability, Concurrency Control: Concepts, Techniques, Concurrent operation of Databases, Recovery: Introduction, Types of Recovery.

Overview of Distributed Databases: Protection, Security & Integrity Constraints. Relational Database Management Systems: Oracle & Microsoft Access Tools. Basic Concepts of Object Oriented Database System & Design.

RECOMMENDED BOOKS

- Database System Concepts,Abraham Silberschatz Henry F. Korth S. Sudarshan, McGraw-Hill 6th Edition.
- Database Management System, Raghu Ramakrishnan Johannes Gehrke, McGraw Hill 3rd Edition.
- Fundamentals of Database System, Elmasri&Navathe, Addison-Wesley Publishing, 5th Edition.
- An Introduction to Database Systems, Date C. J, Addison-Wesley Publishing, 8th Edition.

COURSE OUTCOMES

After successful completion of the course students will be able to:

CO1. **Tell** the terminology, features, classifications, and characteristics embodied in database systems.

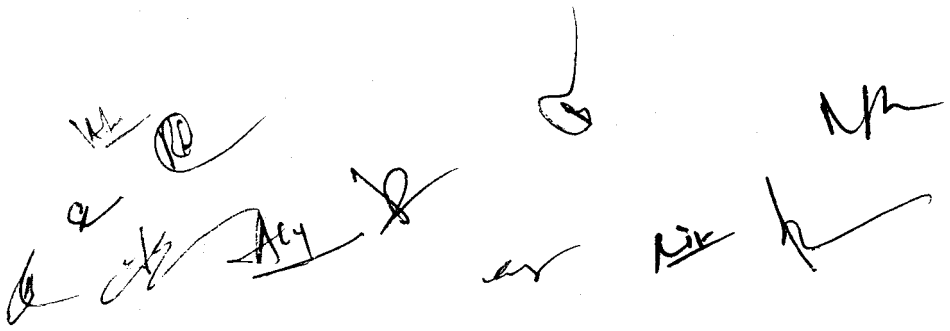
CO2. **Explain** different issues involved in the design and implementation of database system.

CO3. **Apply** transaction processing concepts and recovery methods over real time data.

CO4. **Analyze** database schema for a given problem domain.

CO5. **Justify** principles for logical design of databases, including the E-R method and normalization approach.

CO6. **Formulate**, using relational algebra and SQL, solutions to a broad range of query problems.



Department of Computer Science & Engineering and Information Technology

OPERATING SYSTEM
160403 (DC-7)

COURSE OBJECTIVES

- To provide basic knowledge of computer operating system structures and functioning.
- To compare several different approaches to memory management, file management and process management.
- To understand various problems related to concurrent operations and their solutions.

Unit I

Basics of Operating System: Generations, Types, Structure, Services, System Calls, System Boot, System Programs, Protection and Security.

Unit II

Process Management: Process Concepts, Process States, Process Control Block, Scheduling-Criteria, Scheduling Algorithms and their Evaluation, Threads, Threading Issues.

Unit III

Process Synchronization: Background, Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors.

Deadlock: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery form Deadlock.

Unit IV

Memory Management: Main Memory, Swapping, Contiguous Memory Allocation, Paging, Structure of Page Table, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

Unit V

Storage Management: Mass-Storage Structure, Overview, Disk Structure, Disk Attachment, Disk Scheduling.

File System Interface: The Concept of a File, Access Methods, Directory Structure, File System Structure, Allocation Methods, Free-Space Management.

RECOMMENDED BOOKS

- Operating System Concepts, Silberschatz, Ninth Edition, Willey Publication.
- Operating Systems, internals and Design Principles, Stallings, Seventh Edition,Pearson Publication.
- Modern Operating Systems,Tanenbaum, Fourth Edition. Pearson Publication.

COURSE OUTCOMES

After the successful completion of this course, the student will be able to:

CO1. **Tell** the basic concept of operating systems.

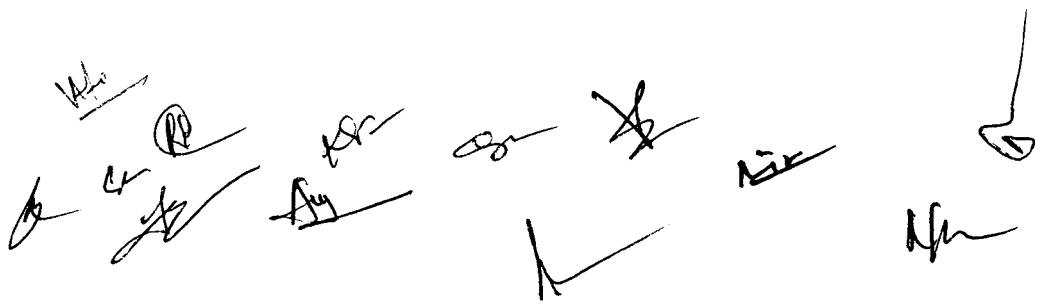
CO2. **Explain** the working of operating system.

CO3. **Develop** the solution of various operating system problems/issues.

CO4. **Analyze** the various operating system problems/issues.

CO5. **Measure** the performance of various scheduling/allocation approaches.

CO6. **Test** the working of various scheduling/allocation approaches.



Department of Computer Science & Engineering and Information Technology

COMPUTER SYSTEM ORGANIZATION
160404 (DC-8)

COURSE OBJECTIVE

- To provide the fundamental knowledge of a computer system and its processing units.
- To provide the details of input & output operations, memory management and performance measurement of the computer system.
- To understand how computer represents and manipulate data.

Unit -I

Introduction: Von Newman Model, Various Subsystems, CPU, Memory, I/O, System Bus, CPU and Memory Registers, Program Counter, Accumulator, Register Transfer and Micro Operations: Register Transfer Language, Register Transfer, Tree-State Bus Buffers, Bus and Memory Transfers, Arithmetic Micro-Operation, Logic Micro-Operation, Shift Micro-Operation Register Transfer Micro Operations, Arithmetic Micro-Operations, Logic Micro-Operations and Shift Micro-Operations.

Unit- II

Computer Arithmetic: Addition and Subtraction with Signed-Magnitude, Multiplication Algorithm, Division Algorithm, Division Algorithms, Floating-Point Arithmetic Operations.

Central Processing Unit (CPU): General Purpose Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).Hardwired and Microprogrammed Control.

Unit -III

Microprocessors: Introduction of 8085 Microprocessor: Architecture, Instruction Set, Addressing Modes, Interrupts and Basic Assembly Language Programming.

Unit -IV

Input-Output Organization: Peripheral Devices, I/O Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA (DMA Controller, DMA Transfer),

Input-Output Processor (IOP), Data Transfer- Serial/Parallel, Simplex/ Half Duplex/ Full Duplex.

Unit-V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory- Organization and Mappings, Memory Management Hardware, Introduction to Pipelining & Multiprocessors.

RECOMMENDED BOOKS

- Computer System Architecture, Morris Mano, PHI.
- Microprocessor Architecture, Programming and Applications with the 8085, Gaonkar, Penram International Publishing (India) Pvt.Ltd.
- Computer Organization, Carl Hamacher, THM.
- Computer Architecture and Organization, J P Hayes, Mc-Graw Hills, New Delhi.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. **Recall** the basic building blocks of computer Architecture.

CO2. **Compare** different memories.

CO3. **Apply** the concept of memory mapping, multiprocessor and pipelining in solving real world problems.

CO4. **Analyze** various modes of Input-Output data transfer.

CO5. **Evaluate** the arithmetic related to the number system.

CO6. **Develop** the skill of writing low level programming.

Department of Computer Science & Engineering and Information Technology

CYBER SECURITY
100004 (MC-2)

COURSE OBJECTIVES

- To provide an understanding of cyber security fundamentals.
- To analyze various cyber attacks and their countermeasures.
- To provide basics of Internet and networking.
- To identify various cyber security threats and vulnerabilities.
- To apply forensic science to investigate a cyber crime.

Unit-I

Introduction- Overview of Cyber Security, Cyber Crime, Cyber Warfare, Cyber Terrorism, Cyber Espionage, Cyber Vandalism (Hacking), Cyber Stalking, Internet Frauds and Software Piracy.

Unit-II

Basics of Internet & Networking- Wired and Wireless Networks, Internetworking Devices, Topologies, Web Browser, Web Server, OSI Model, IP Addressing, Firewall, E-Commerce, DNS, NAT, VPN, HTTP & HTTPS.

Unit-III

Cryptography and Network Security- Security Principles, Attacks, Cryptography, Steganography, Cryptanalysis, Symmetric key and Public key cryptography, Digital Signature, Intrusion Detection System, Secure Socket Layer(SSL) & Secure Electronic Transaction(SET).

Unit-IV

Cyber Security Threats and Vulnerabilities- Hacker, Types of Hacker- White, Gray and black, **Malicious Software's-** Virus, Worm, Trojan Horse, Backdoors and Spywares. Sniffers, Denial of Service Attack and Phishing.

Unit-V

Cyber Crime Investigation and Legal Issues: Intellectual property, privacy issues, IT Act 2000, Basics of Cyber Crime Investigation- Cyber Forensics, Electronic Evidences and its Types.

RECOMMENDED BOOKS

- Cryptography and Network Security, 4/E, William Stallings, 4th edition, Pearson publication.
- Computer Security: Principles and Practice, Stallings William, Pearson publication.
- Investigating Network Intrusions and Cybercrime, EC-Council Press.
- Network Forensics, Tracking Hackers through Cyberspace, Sherri Davidoff, Jonathan Ham, Prentice Hall.
- Cryptography and Network Security, 3e, Atul Kahate, McGraw Hill publication.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. Tell the basic terminologies of Cyber Security.

CO2. Explain the basic concept of networking and Internet.

CO3. Apply various methods used to protect data in the internet environment in real world situations.

CO4. Discover the concept of IP security and architecture.

CO5. Compare various types of cyber security threats/vulnerabilities.

CO6. Develop the understanding of cyber crime investigation and IT ACT 2000.

List of Programs

B.Tech. IV Semester

(Information Technology)

Under Flexible Scheme Structure

Department of Computer Science & Engineering and Information Technology

DESIGN AND ANALYSIS OF ALGORITHM
(160401)

LIST OF PROGRAMS

1. WAP to implement the following using array as data structure and analyze its time complexity.
   a. Insertion sort b. Selection sort c. Bubble sort d. Quick sort e. Merge sort
   f. Bucket sort g. Shell sort h. Radix sort i. Heap sort
2. WAP to implement Linear and Binary Search and analyze its time complexity.
3. WAP to implement Matrix Chain Multiplication and analyze its time complexity.
4. WAP to implement Longest Common Subsequence Problem and analyze its time complexity.
5. WAP to implement Optimal Binary Search Tree Problem and analyze its time complexity.
6. WAP to implement Huffman Coding and analyze its time complexity.
7. WAP to implement Dijkstra's Algorithm and analyze its time complexity.
8. WAP to implement Bellman Ford Algorithm and analyze its time complexity.
9. WAP to implement DFS and BFS and analyze their time complexities.
10. WAP to Implement 0/1 knapsack using dynamic programming.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Relate** the principles of algorithm design in solving problems.

CO2. **Demonstrate** basic algorithms and different problem solving strategies.

CO3. **Build** creativeness and confidence to solve non-conventional problems.

CO4. **Analyze** running times of algorithms using asymptotic analysis.

CO5. **Compare** various algorithm design approaches for solving real world problems.

CO6. **Design** and implement optimization algorithms in specific applications.

Department of Computer Science & Engineering and Information Technology

DATA BASE MANAGEMENT SYSTEM
(160402)

LIST OF PROGRAMS

1. Implementation of DDL commands of SQL with suitable examples
   - Create table
   - Alter table
   - Drop Table

2. Implementation of DML commands of SQL with suitable examples
   - Insert
   - Update
   - Delete

3. Implementation of different types of function with suitable examples
   - Number function
   - Aggregate Function
   - Character Function
   - Conversion Function
   - Date Function

4. Implementation of different types of operators in SQL
   - Arithmetic Operators
   - Logical Operators
   - Comparison Operator
   - Special Operator
   - Set Operation

5. Implementation of different types of Joins
   - Inner Join
   - Outer Join
   - Natural Join etc.

6. Study and Implementation of
   - Group By & having clause
   - Order by clause
   - Indexing

7. Study & Implementation of
   - Sub queries
   - Views

8. Study & Implementation of different types of constraints.

9. Study & Implementation of Database Backup & Recovery commands. Study & Implementation of Rollback, Commit, Savepoint.

10. Creating Database /Table Space
    - Managing Users: Create User, Delete User
    - Managing roles:-Grant, Revoke.

11. Study & Implementation of PL/SQL.

12. Study & Implementation of SQL Triggers.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Choose** database schema for a given problem domain.

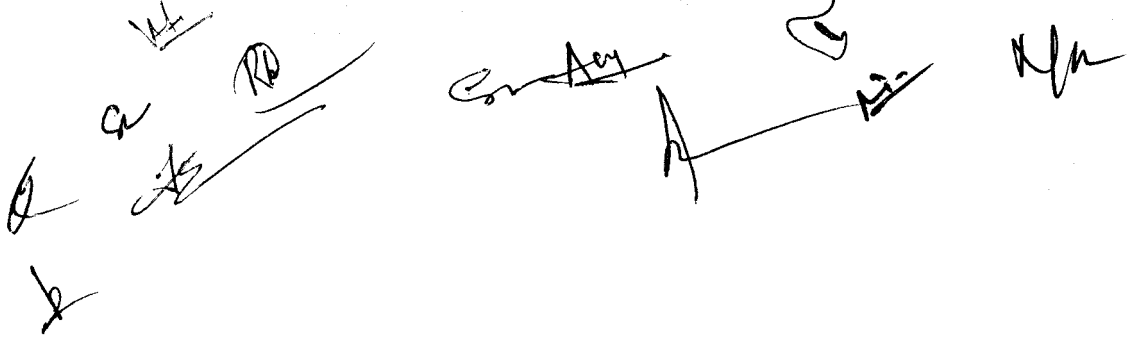
CO2. **Illustrate** relational data model with relational algebra operations.

CO3. **Build** normalized database, query a database using SQL DML/DDL commands.

CO4. **Analyze** integrity constraints on a database using a state-of-the-art RDBMS.

CO5. **Determine** data selection and operators used in queries and restrict data retrieval and control the display order.

CO6. **Create** database using aggregation, group functions and joining tables to summarize data.



Department of Computer Science & Engineering and Information Technology

PROGRAMMING LAB
(JAVA PROGRAMMING)
160405 (DLC-3)

COURSE OBJECTIVES

- To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- To acquire the ability to write a computer program to solve specified problems.
- To be able to use Java SDK environment to create, debug and run simple Java programs.

Unit-I

Introduction to Java programming: Overview and Characteristics of Java, The Java Virtual Machine, Installing Java, Java Program Development, Java Source File Structure, Compilation, Executions. Packages, Package access, Variables and data types, Conditional and looping constructs, Arrays.

Unit-II

Object-oriented programming with Java Classes and Objects: Fields and Methods, Constructors, Overloading methods, Nested classes, Overriding methods, Polymorphism, Making methods and classes final, Wrapper classes.

Unit-III

Extending Classes and Inheritance: Types of Inheritance in Java, Abstract classes and methods, Interfaces, use of 'super', Polymorphism in inheritance. Garbage collection in JAVA.

Exception handling: Try- Catch, Throw, Throws, Finally constructs, The Exception class.

Unit-IV

String Package and Multithreading: Operation on String, Mutable & Immutable String, Tokenizing a String, Creating Strings using String Buffer class.

Understanding Threads: Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities and Synchronizing Threads.

Unit-V

The I/O Package: Input Stream and Output Stream classes, Reader and Writer classes, Basics of AWT, Swing and Applets: Layout Managers, Event Handling, Classes for various controls, such as label, choice, list, checkbox, etc., Dialogs and frames using menus.

Basic concepts of networking: Working with URLs, Concepts of URLs and Sockets. Basics of database connectivity with JDBC.

RECOMMENDED BOOKS

- Programming with JAVA: A Primer, E. Balagurusamy, Tata McGraw Hill.
- JAVA: The Complete Reference, Herbert Schildt, McGraw Hill Education.
- JAVA-2: The Complete Reference, Patrick Naughton, Herbert Schidt.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** the available features in Java programming language.

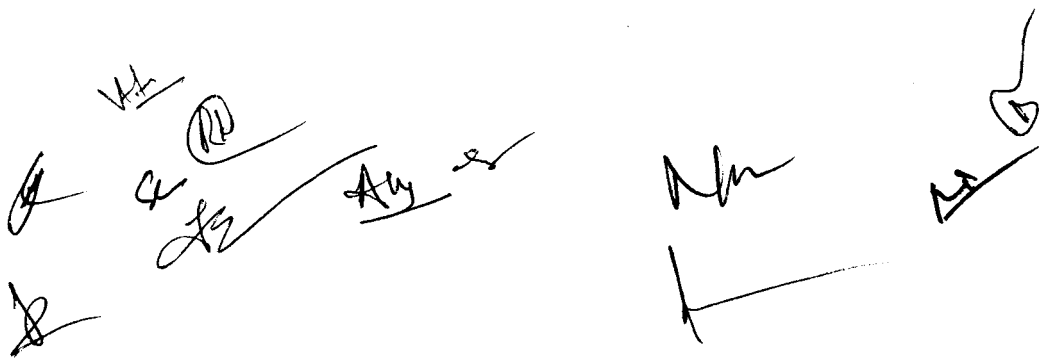
CO2. **Illustrate** Java programming constructs in solving problems.

CO3. **Make use of** Java programming language for creating databases.

CO4. **Test for** bugs in a software application written in Java programming language.

CO5. **Determine** different ways for handling exception, memory management, file handling, I/O management and internet based application development.

CO6. **Build** a project for application development using Java programming language.



Schemes of B.E. VII & VIII Semester

Computer Science & Engineering and Information Technology

Under Grading System

(For Students Admitted in 2015 & 2016 under CBCS Scheme)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A UGC-Autonomous Institute affiliated to RGPV, Bhopal)

GROUP A: ***For batches admitted in July 2015, July 2016***

Scheme of Examination
B.E. VII Semester (Computer Science & Engineering)
Subject wise distribution of marks and corresponding credits

S.N.	Subject Code	Subject Name & Title	Maximum Marks Allotted					Total Marks	Credits Allotted Subject wise			Total Credits
			Theory Slot			Practical Slot						
			End Sem.	Mid Sem. Exam	Quiz, Assignment	End Sem	Term Work / Lab Work & Sessional		L	T	P	
1	BCSL701	Artificial Intelligence & Expert Systems	70	20	10	30	20	150	3	1	2	5
2	BCSL702	Distributed Systems **(Elective-III)**	70	20	10	30	20	150	3	1	2	5
3	BCSL703	Digital Forensics **(Elective-IV)**	70	20	10	-	-	100	3	1	0	4
4	BCSL704	Adhoc Network	70	20	10	-	-	100	3	1	0	4
5	BCSL705	E-Commerce	70	20	10	-	-	100	3	1	0	4
6	BCSP706	Training / Internship / Self-Study	-	-	-	-	50	50	0	0	~~6~~ 2	~~3~~ 1
7	BCSD707	Major Project -I	-	-	-	~~50~~ 60	~~50~~ 40	100	0	0	4	2
8	BCSS708	Seminar /Group discussion	-	-	-	-	50	50	0	0	2	1
		Total	**350**	**100**	**50**	~~110~~ 120	~~190~~ 180	**800**	**15**	**5**	~~16~~ 12	~~28~~ 26

Elective-III:
1. (BCSL702) Distributed Systems
2. (BCSL709) **Grid Computing**
3. (BCSL710) Natural Language Processing

Elective-IV:
1. (BCSL703) Digital Forensics
2. (BCSL711) Software Testing and Quality Assurance
3. (BCSL712) Agile Methodology

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A UGC-Autonomous Institute affiliated to RGPV, Bhopal)

GROUP A: ***For batches admitted in July 2015, July 2016***

Scheme of Examination
B.E. VIII Semester (Computer Science & Engineering)
Subject wise distribution of marks and corresponding credits

S.N.	Subject Code	Subject Name & Title	Maximum Marks Allotted					Total Marks	Credits Allotted Subject wise			Total Credits
			Theory Slot			Practical Slot						
			End Sem.	Mid Sem. Exam	Quiz, Assignment	End Sem	Term Work / Lab Work & Sessional		L	T	P	
1	BCSL801	Image Processing	70	20	10	30	20	150	3	1	2	5
2	BCSL802	Data Warehouse & Data Mining	70	20	10	30	20	150	3	1	2	5
3	BCSL803	Neural Networks &Fuzzy Systems	70	20	10	-	-	100	3	1	0	4
	BCSL804	Internet of Things and Applications **(Elective-V)**	70	20	10	-	-	100	3	1	0	4
5	BCSD805	Major Project -II	-	-	-	150	150	300	0	0	6	3
		Total	**280**	**80**	**40**	**210**	**190**	**800**	**12**	**4**	**10**	**21**

Elective-V:

1. (BCSL804) Internet of Things and Applications
2. (BCSL806) **Biometrics**
3. (BCSL807) High Performance Computing

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A UGC-Autonomous Institute affiliated to RGPV, Bhopal)

GROUP A: ***For batches admitted in July 2015, July 2016***

Scheme of Examination
B.E. VII Semester (Information Technology)
Subject wise distribution of marks and corresponding credits

S.N.	Subject Code	Subject Name & Title	Maximum Marks Allotted					Total Marks	Credits Allotted Subject wise			Total Credits
			Theory Slot			Practical Slot						
			End Sem.	Mid Sem. Exam	Quiz, Assignment	End Sem	Term Work / Lab Work & Sessional		L	T	P	
1	BITL701	Artificial Intelligence & Expert Systems	70	20	10	30	20	150	3	1	2	5
2	BITL702	Distributed Systems **(Elective-III)**	70	20	10	30	20	150	3	1	2	5
3	BITL703	IT Infrastructure Management **(Elective-IV)**	70	20	10	-	-	100	3	1	0	4
4	BITL704	Adhoc Network	70	20	10	-	-	100	3	1	0	4
5	BITL705	E-Commerce	70	20	10	-	-	100	3	1	0	4
6	BITP706	Training / Internship / Self-Study	-	-	-	-	50	50	0	0	~~5~~ 2	~~3~~ 1
7	BITD707	Major Project -I,	-	-	-	~~50~~ 60	~~50~~ 40	100	0	0	4	2
8	BITS708	Seminar /Group discussion	-	-	-	-	50	50	0	0	2	1
		Total	**350**	**100**	**50**	~~110~~ 120	~~190~~ 180	**800**	**15**	**5**	~~16~~ 12	~~28~~ 26

Elective-III:
1. (BITL702) Distributed Systems
2. (BITL709) **Grid Computing**
3. (BITL710) Natural Language Processing

Elective-IV:
1. (BITL703) IT Infrastructure Management
2. (BITL711) Software Testing and Quality Assurance
3. (BITL712) Agile Methodology

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A UGC-Autonomous Institute affiliated to RGPV, Bhopal)

GROUP A: ***For batches admitted in July 2015, July 2016***

Scheme of Examination
B.E. VIII Semester (Information Technology)
Subject wise distribution of marks and corresponding credits

S.N.	Subject Code	Subject Name & Title	Maximum Marks Allotted					Total Marks	Credits Allotted Subject wise			Total Credits
			Theory Slot			Practical Slot						
			End Sem.	Mid Sem. Exam	Quiz, Assignment	End Sem	Term Work / Lab Work & Sessional		L	T	P	
1	BITL801	Image Processing	70	20	10	30	20	150	3	1	2	5
2	BITL802	Data Warehouse & Data Mining	70	20	10	30	20	150	3	1	2	5
3	BITL803	Neural Networks &Fuzzy Systems	70	20	10	-	-	100	3	1	0	4
	BITL804	Internet of Things and Applications **(Elective-V)**	70	20	10	-	-	100	3	1	0	4
5	BITD805	Major Project -II	-	-	-	150	150	300	0	0	6	3
		Total	**280**	**80**	**40**	**210**	**190**	**800**	**12**	**4**	**10**	**21**

Elective-V:

1. (BITL804) Internet of Things and Applications
2. (BITL806) **Biometrics**
3. (BITL807) High Performance Computing

Syllabus of B.E. VII & VIII Semester

Computer Science & Engineering

Under Grading System

(For Students Admitted in 2015 & 2016 under CBCS Scheme)

Department of Computer Science & Engineering and Information Technology

ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS
BCSL -701

COURSE OBJECTIVES

- To provide an introduction to the Artificial Intelligence and its methods.
- To enhance the capability of analysis for Machine learning and fuzzy logic.
- To apply the mathematical concepts in designing and executing the knowledge representation and problem solving.

Unit-I

Definition, Scope, Task and Objectives of Artificial Intelligence, AI Problems, Applications of AI. The Importance of AI, AI and related fields. Problems, Problem Spaces and Production System. Components of Production System, Characteristics of Production Systems, Types of Production System. Control Strategies, Application of Production Systems, water-jug, 8 – Puzzle and other advance Problems.

Unit-II

Searching : The Blind and Informed Searches, Breadth First Search, Depth First Search and their implementation using Open and Closed list, Heuristic estimation and evaluation, Hill climbing and their Problems, Best First Search, Searching And-Or Graphs, A * search, AO * search.

Unit-III

Knowledge Representation: General Concept, Introduction, Definition and importance Of Knowledge, Approaches to knowledge Representation, Issues in Knowledge Representation, Procedural and Declarative Knowledge, Forward Versus Backward Reasoning, Knowledge Representation Techniques: Logics, Prepositional Logic, Predicate Logic.

Unit-IV

Semantic Nets, Partition Semantic Nets, Frames, Conceptual Dependencies, Scripts, Bay's Theorem, Fuzzy Logic, Game Playing: Min – Max Search Procedure.

Unit-V

Planning, Understanding, Natural Language Processing, Speech Recognition, Computer Vision, Expert System and Expert System Cell.

RECOMMENDED BOOKS

- Artificial Intelligence, Rich & Knight McGraw Hill.
- Introduction to Artificial Intelligence and Expert Systems –Dan. W, Patterson, PHI.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. **Tell** the basics of concept of artificial intelligence.

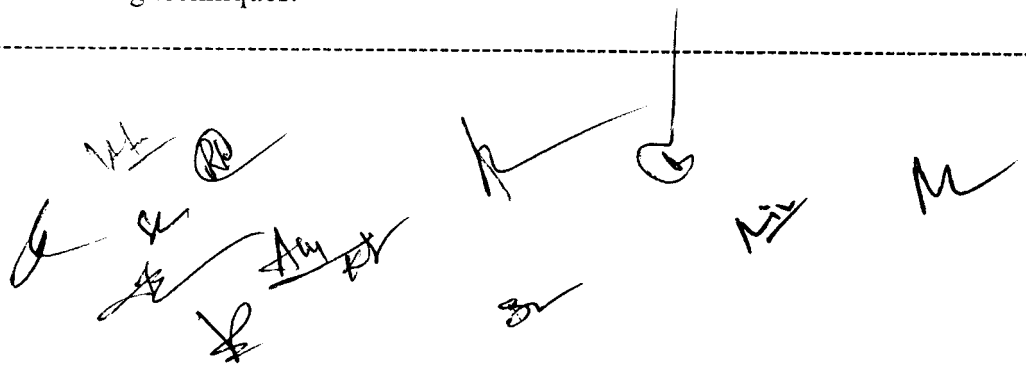
CO2. **Illustrate** various algorithms for efficient formed & informed search.

CO3. **Identify** the appropriate search methods to solve specific problems.

CO4. **Analyze** the performance of knowledge representation methods used in Artificial intelligence.

CO5. **Explain** machine learning methods in robotics &other applications.

CO6. **Design** game playing techniques by applying programming methods of puzzle solving techniques.



Department of Computer Science & Engineering and Information Technology

DISTRIBUTED SYSTEMS
BCSL-702 (Elective – III)

COURSE OBJECTIVES

- To provide students contemporary knowledge of distributed systems.
- To equip students with skills to analyze and design distributed applications.
- To gain experience in the design and testing of a large software system, and to be able to communicate that design to others.

Unit - I

Introduction to distributed systems: Architecture for Distributed System, Goals of Distributed system, Hardware and Software concepts, Distributed Computing Model, Advantages & Disadvantage distributed system, Issues in designing Distributed System.

Unit -II

Distributed Share Memory: Basic Concept of Distributed Share Memory (DSM), DSM Architecture & its Types, Design & Implementations issues In DSM System, Structure of Share Memory Space, Consistency Model, and Thrashing.

Unit - III

Distributed File System: Desirable features of good Distributed File System, File Model, File Service Architecture, File Accessing Model, File Sharing Semantics, File Catching Scheme, File Application & Fault tolerance. Naming - Features, System Oriented Names, Object Locating Mechanism, Human Oriented Name.

Unit - IV

Inter Process Communication and Synchronization: API for Internet Protocol, Data Representation & Marshaling, Group Communication, Client Server Communication, RPC- Implementing RPC Mechanism, Stub Generation, RPC Messages. Synchronization: - Clock Synchronization, Mutual Exclusion, Election Algorithms - Bully & Ring Algorithms.

Unit - V

Distributed Scheduling and Deadlock Distributed Scheduling- Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues. Deadlock- Issues in deadlock detection & Resolutions, Deadlock Handling Strategy, Distributed Deadlock Algorithms. Case Study of Distributed System: Amoeba, Mach, Chorus.

RECOMMENDED BOOKS

- Distributed Operating System Concept & Design, Sinha, PHI .
- Distributed System Concepts and Design, Coulouris & Dollimore, Pearson Pub.
- Distributed Operating System, Andrew S. Tanenbaum, Pearson.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** the basic elements and concepts related to distributed system technologies

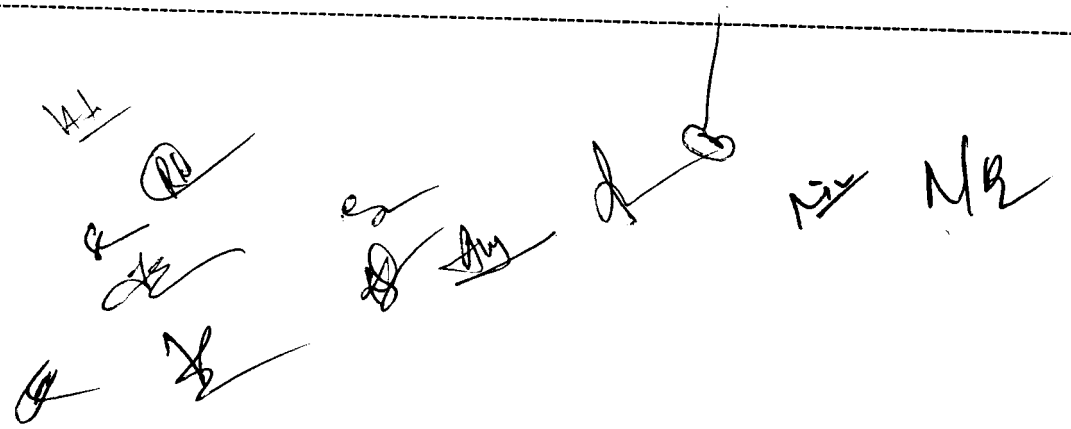
CO2. **Demonstrate** knowledge of the core architectural aspects of distributed systems.

CO3. **Identify** how the resources in a distributed system are managed by Algorithm.

CO4. **Examine** the concept of distributed file system and distributed shared memory.

CO5. **Compare** various distributed system algorithms for solving real world problems.

CO6. **Discuss** large-scale distributed applications.



Department of Computer Science & Engineering and Information Technology

DIGITAL FORENSICS
BCSL - 703 (Elective – IV)

COURSE OBJECTIVES

- To provide an understanding Computer forensics fundamentals.
- To identify methods for data recovery.
- To apply the methods for preservation of digital evidence.

Unit - I

Introduction: Digital Crime, Forensics Science, Digital Forensics, Electronic evidence, Types of evidences. Digital forensic process- Seizure, Acquisition, Analysis and Reporting.

Unit - II

Window System Artifacts: Registry Analysis, Hibernation files, Print spooling, Recycle bin content analysis, File carving, FAT, NTFS, Event log analysis, Disk imaging.

Unit - III

Network forensics: Network Data collection, Exploring logs, Evidence gathering in shared and switches Ethernet, DNS Poisoning, ARP Table, Evidence gathering using-wireshark and SNORT.

Unit - IV

Internet and Email forensics: Browser Investigation- History files, Cache and Cookies, Email, Email crime- Spamming, mail bombing and mail storm, Email Header analysis, tracing email. Tools and Techniques for locating IP address-Nslookup, Traceroute, WHOIS, Investigating Web attacks- XSS, SQL Injection, Port Scanning, DOS attack and Phishing.

Unit - V

Computer crime and Legal issues: Intellectual property, privacy issues, Criminal Justice system for forensic, audit/investigative situations and digital crime scene,

investigative procedure/standards for extraction, preservation, and deposition of legal evidence in a court of law.

RECOMMENDED BOOKS

- Investigating Network Intrusions and Cybercrime, EC-Council Press.
- Network Forensics, Tracking Hackers through Cyberspace, Sherri Davidoff Jonathan Ham, Prentice Hall.
- Practical Windows Forensics: Ayman Shaaban, Konstantin Sapronov, Packt Publishing Ltd.
- The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics, John Sammons, Syngress.
- Computer Forensics, Marie-Helen Maras, Jones & Bartlett Publishers.
- Digital Forensics, André Arnes, John Wiley & Sons.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Name** various digital crimes and their countermeasure.

CO2. **Explain** the system/network forensics process.

CO3. **Identify** various sources of data.

CO4. **Analyze** methods of evidence collection, preservation and recovery.

CO5. **Determine** the various types of cyber-crimes /attacks.

CO6. **Choose** appropriate tools/softwares for evidence gathering and analysis.

Department of Computer Science & Engineering and Information Technology

ADHOC NETWORK
BCSL - 704

COURSE OBJECTIVES

- To recognize needs of different set of MAC, routing and transport protocols for wireless computer networks.
- To analyze performance of MANET Routing Protocols under different mobility patterns.
- To iden: different methods for energy saving in a mobile device.

Unit -I

Introduction: Wireless Networks, Cellular Mobile Network, Wireless LAN, Ad Hoc Networks, Sensor Network, Differences between Cellular and Ad Hoc, Issues in Ad Hoc Wireless Networks, Applications of Ad Hoc Wireless Networks.

Unit -II

MAC Layer: Introduction, Issues and Need for Medium Access Control. Problems in Ad Hoc Channel Access such as Hidden Terminal Problem and Exposed Node Problem. Classification of MAC Protocols – Contention Based MAC Protocols such as ALOHA and CSMA. Contention-Based MAC Protocols with Reservation Mechanisms such as MACA and MACA-BI.

Unit -III

Routing Protocols: Introduction, Classification of Routing Protocols- Proactive routing protocols such as WRP and DSDV, Reactive routing protocol such as AODV, DSR , LAR, Hybrid Routing protocols such as ZRP.

Unit -IV

Transport Protocols and Energy Management Systems: Introduction, Design Issues and Challenges, Power Management, Smart Batteries and Battery Characteristics.

Unit -V

Security: Security in wireless Ad hoc wireless Networks, Network security requirements, Issues & challenges in security provisioning, Security attacks.

RECOMMENDED BOOKS

- Ad Hoc Wireless Networks: Architectures and Protocols, C. Siva Ram Murthy, B. S. Manoj, Pearson Education India.
- Ad Hoc Mobile Wireless Networks: Protocols and Systems, C.-K. Toh Pearson Publication.
- Wireless Networks Principles, Protocols, and Applications: Subir Kumar Sarkar, T G Basavaraju, C Puttamadappa, Auerbach Publications, Taylor & Francis Group
- Security and Quality of Service in Ad Hoc Wireless Networks, Amitabh Mishra, John Wiley & Sons, Cambridge University Press

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COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** the basics of wireless networks.

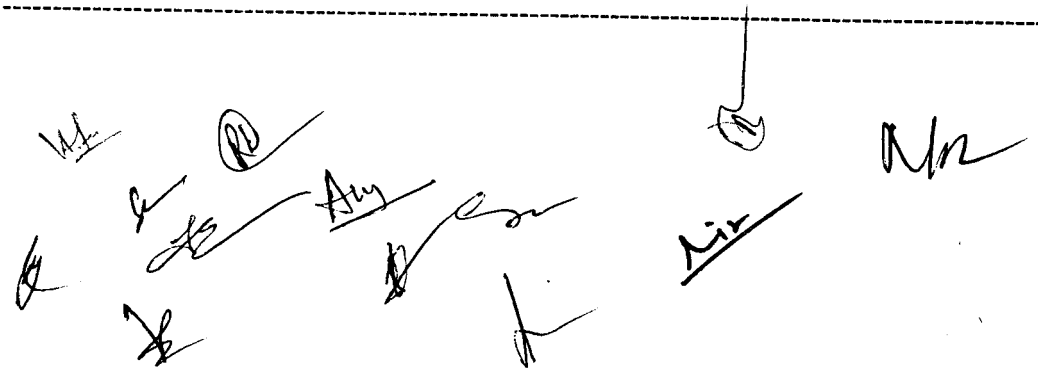
CO2. **Explain** the working of various Ad-hoc network protocols.

CO3. **Identify** various issues/problems associated with Ad-hoc networks and their solutions.

CO4. **Analyze** the performance of various Ad-hoc network protocols.

CO5. **Conclude** the security challenges and issue of Ad-hoc wireless network.

CO6. **Develop** the solutions of various problems/Issues associated with ad-hoc networks.



Department of Computer Science & Engineering and Information Technology

E - COMMERCE
BCSL -705

COURSE OBJECTIVES

- To identify the major categories and trends of e-commerce applications.
- To discuss the various marketing strategies for an online business.
- To define various electronic payment types and associated security risks and the ways to protect against them.

Unit -I

Introduction of Building Blocks of Electronic Commerce, Features, Traditional Commerce v/s E-Commerce, E-Commerce Advantages And Disadvantages, E-Commerce : Business Models, E-Services: Category of E-Services, Web-Enabled Services, Information-Selling on the web.

Unit -II

Internet and Networking Technologies, Static and Dynamic Web Pages, Tiers, Plug-Ins Frames, Exposure to Markup Languages HTML, DHTML VRML, SGML, XML, CGI, Applets & Serve-Lets, JSP& Java Beans, ASP Cookies, Creating and Reading Cookies, Comparative Case Study of Microsoft and Java Technologies, Web Application Architectures, Browsers, Search Engines.

Unit -III

Internet Payment System: Characteristics of Payment System, 4C Payment Methods, SET Protocol for Credit Card Payment, E-Cash, E -Check, Micro Payment System, Overview of Smart Card, E- Governance: E- Governance Architecture, Public Private Partnership, EDI, EDI Documents, Steps in an EDI System, Advantages of an EDI System readiness.

Unit -IV

Security Systems, Measures to ensure Security, Security Protocols in internet Secure Socket Layer (SSL), Secure Hypertext Transfer Protocol (HTTP), Secure Electronic Transaction, Cyber Crime Law, IT Act.

Unit -V

Advanced Technologies of E-Commerce, Introduction to Mobile Agents, WAP: the enabling technology, WAP Model, WAP Architecture, Benefits of WAP to E-Commerce, Web Security, Encryption Schemes, Secure Web, Digital Signatures, Firewall.

RECOMMENDED BOOKS

- E-commerce, Gary P. Schneider, Cengage Learning India.
- Essentials of E-Commerce Technology, V. Rajaraman, PHI Learning Private Limited.
- E-commerce study, technology and applications, David Whiteley, TMH.
- E-Commerce An Indian Perspective, P.T. Joseph, PHI Learning Private Limited.
- Web Technologies: TCP/IP to Internet Application Architectures, Achyut S. Godbole and Atul Kahate, TMH.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. **Find** the impact of Information and Communication technologies, especially of the Internet in business operations.

CO2. **Explain** the foundations and importance of E-commerce.

CO3. **Develop** web pages using tools and services of the internet in the development of a virtual e-commerce site.

CO4. **Perceive** legal issues and privacy in E-Commerce, electronic payment systems and other global E-commerce issues.

CO5. **Analyze** policy and regulatory issues in E-commerce.

CO6. **Elaborate** Wireless Application Protocol for internet access and advanced telephony services from the mobile phones.

Department of Computer Science & Engineering and Information Technology

GRID COMPUTING
BCSL - 709 (Elective – III)

COURSE OBJECTIVES

- To expose the characteristics of grid computing.
- To explore the design principles of grid computing.
- To illustrate security mechanisms in grid computing applications.

Unit - I

Concepts and Architecture: Introduction, Parallel and Distributed Computing, Cluster Computing, Grid Computing, Anatomy and Physiology of Grid, Review of Web Services, OGSA, WSRF.

Unit - II

Grid Monitoring: Grid Monitoring Architecture (GMA), An Overview of Grid Monitoring Systems, Grid ICE – JAMM, MDS, Network Weather Service, R, GMA, Other Monitoring Systems, Ganglia and GridMon.

Unit - III

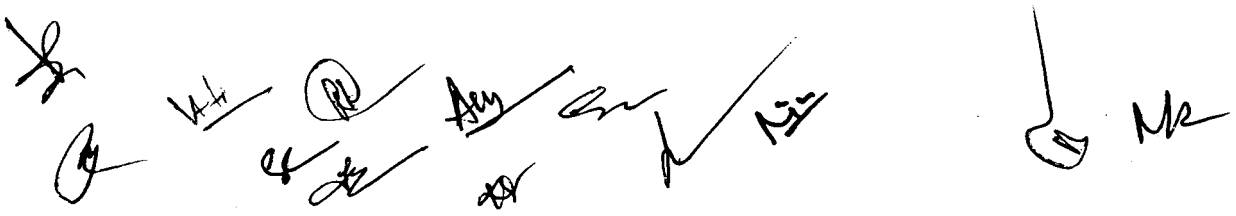
Grid Security and Resource Management: Grid Security, A Brief Security Primer, PKI, X.509 Certificates, Grid Security, Grid Scheduling and Resource Management, Scheduling Paradigms, Working principles of Scheduling, A Review of Condor, SGE, PBS and LSF, Grid Scheduling with QoS.

Unit - IV

Data Management and Grid Portals: Data Management, Categories and Origins of Structured Data, Data Management Challenges, Architectural Approaches, Collective, Data Management Services, Federation Services, Grid Portals, First-Generation Grid Portals, Second-Generation Grid Portals.

Unit - V

Grid Middleware: List of globally available Middleware, Case Studies, Recent version of Globus Toolkit and gLite, Architecture, Components and Features.



RECOMMENDED BOOKS

- Grid Computing, Joshy Joseph, Craig Fellenstein, Pearson Education, 2004.
- Grid Computing for Developers, Vladimir Silva, Dreamtech Press, 2006.
- Grid Computing making the global infrastructure a Reality, Fran Berman, Geoffrey C. Fox, Anthony J.G Hey, Wiley.
- Grid Computing -A Practical Guide to Technology and Applications, Ahmar Abbas, Firewall Media, 2006.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Relate** grid computing with previous technologies.

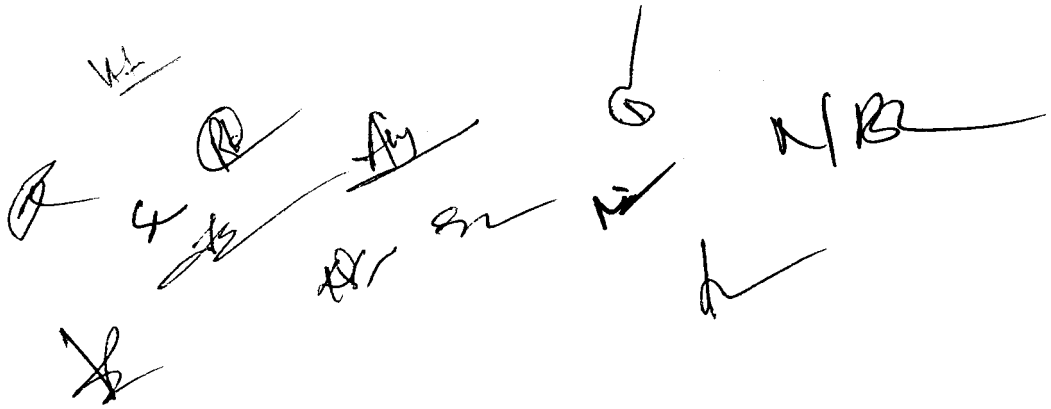
CO2. **Illustrate** security mechanisms in grid computing applications.

CO3. **Identify** the characteristics of grid computing.

CO4. **Classify** various functions of grid computing middleware.

CO5. **Explain** the design principles of grid computing.

CO6. **Discuss** different grid computing applications.



Department of Computer Science & Engineering and Information Technology

NATURAL LANGUAGE PROCESSING
BCSL - 710 (Elective – III)

COURSE OBJECTIVES

- To give a exposure related to machine learning and motivate toward its application.
- To enhance the capability of natural language processing.
- To apply the probabilistic approach for solving the problems.

Unit - I

Introduction: Introduction to Natural Language Processing and issue in Natural language Processing, NLP stages, Basic Text Processing, Regular Expression, Word tokenization, Word Normalization, Stemming, sentence segmentation.

Unit - II

Probabilistic Language Model: Conditional Probability, Bayes' theorem, Markov assumptions, N-grams, Estimating N-gram probability, MLE Dealing with zeros, generalization, Back-offs and interpolations.

Unit - III

Word Classes and Part-of-Speech Tagging: Text classification, Naïve Based Learning Parameter Estimation, Laplace (Add one) smoothing Text classification evaluation, Tagging problem , Part-Of-Speech Tagging, Generative models, Trigram Hidden Markov Model for parameter estimation, Dealing with low frequency words, Viterbi Algorithm.

Unit - IV

Parsing: Natural Language Parsing, A simple CFG for English Language, Ambiguity, Probabilistic CFGs, Parsing with PCFGs, CKY parsing algorithm. Example, Issue with PCFGs, Lexicalized PCFGs.

Unit - V

Applications: Word Prediction, Information Extraction, Sentiment analysis, Question Answering and summarization, Machine Translation, Text Categorization, Optical character Recognition.

RECOMMENDED BOOKS

- Speech and Language Processing, Second Edition, Prentice Hall, Jurafsky, Dan and Martin, James, 2008.
- Foundations of Statistical Natural Language Processing , Manning, Christopher and Heinrich, Schutze, MIT Press. 1999.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Relate** the natural language processing techniques in applied domain.

CO2. **Compare** machine learning methods and robotics.

CO3. **Apply** the NLP constructs in solving real world problems.

CO4. **Analyze** knowledge representation methods.

CO5. **Explain** computation modelling of natural language processing.

CO6. **Improve** the new approaches over existing one using probabilistic formulation.

Department of Computer Science & Engineering and Information Technology

SOFTWARE TESTING AND QUALITY ASSURANCE (STQA)
BCSL - 711 (Elective – IV)

COURSE OBJECTIVE

- To apply software testing knowledge and engineering methods.
- To design and conduct a software test process for a software project.
- To identify the needs of software test automation, and define and develop a test tool to support test automation.

Unit - I

Quality: Perspectives and Expectations, Correctness and Defects: Definitions, Properties, and Measurements, Software quality factors, **Quality Assurance:** Defect Prevention, Defect Reduction, Defect Containment.

Unit - II

Concepts, Issues, and Techniques of Software Testing: Functional vs. Structural Testing, Test Planning and Preparation, Test Execution, Result Checking, and Measurement, Test Automation, **Coverage and Usage Testing Based on Checklists and Partitions:** Checklist-Based Testing and Its Limitations, Testing for Partition Coverage.

Unit - III

Input Domain Partitioning and Testing- Basic concepts, definitions, and terminology, Simple Domain Analysis and the Extreme Point Combination Strategy, Testing Strategies Based on Boundary Analysis, Other Boundary Test Strategies and Applications, **Control Flow, Data Dependency, and Interaction Testing:** Basic Concept and techniques.

Unit - IV

Defect Prevention and Process improvement: Basic Concepts and Generic Approaches, Focusing on Software Processes, **Software Inspection:** Basic Concepts and Generic Process, Fagan inspection, Other Inspections and Related Activities. **Formal Verification:** Basic Concepts, Axiomatic Approach.

Unit - V

Feedback Loop and Activities for Quantifiable Quality Improvement: QA Monitoring and Measurement, **Quality Models and Measurements:** Models for Quality Assessment, **Risk Identification for Quantifiable Quality Improvement:** New Techniques for Risk Identification.

RECOMMENDED BOOKS

- Software Quality Engineering-Testing, Quality Assurance and Quantifiable Improvement, Jeff Tian, A John Wiley & Sons, Inc., Publication.
- Software Testing and Quality Assurance: Theory and Practice, Kshirasagar Naik, Priyadarshi Tripathy, A John Wiley & Sons, Inc., Publication.
- Software Quality Assurance From theory to implementation, Daniel Galin, Pearson Publication.
- Software Testing: Principles, Techniques and Tools, M G Limaye, TMH Publication.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** basic concept of Software Testing and Quality.

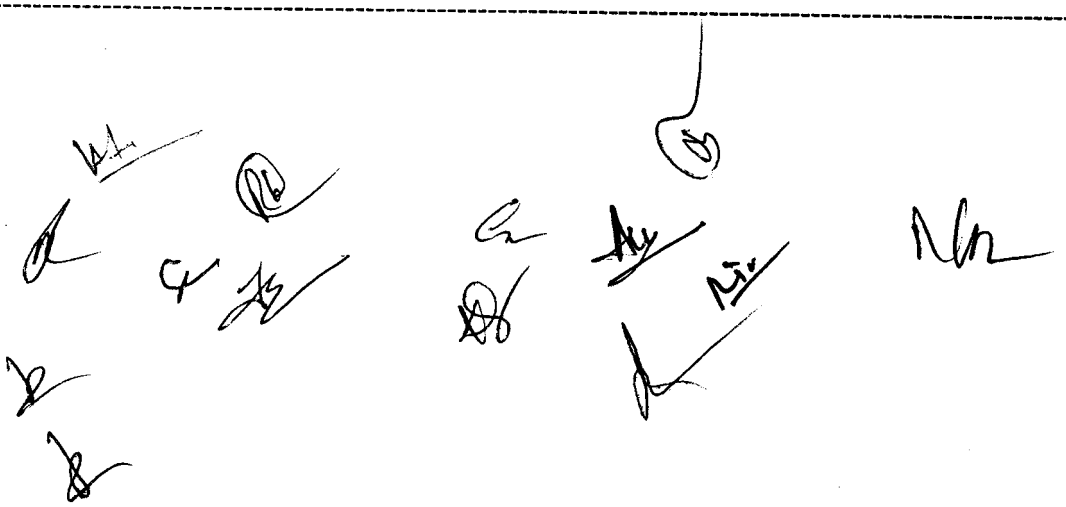
CO2. **Demonstrate** software test automation problems and solutions.

CO3. **Apply** software testing tools and Techniques for improvement of software project.

CO4. **Analyze** various quality parameters for a good software project.

CO5. **Evaluate** a project using test cases and other software testing parameters.

CO6. **Design** software testing documents and quality plan for communicating with engineers in various forms.



Department of Computer Science & Engineering and Information Technology

AGILE METHODOLOGY
BCSL -712 (Elective – IV)

COURSE OBJECTIVES

- To understand the background and driving forces for taking an agile approach to software development.
- To understand the business value of adopting agile approaches.
- To understand the agile development practices.

Unit - I

Fundamentals of Agile: The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing, Agile Tools.

Unit - II

Agile Scrum Framework: Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint planning and retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team, Scrum case study, Tools for Agile project management.

Unit - III

Agile Testing: The Agile lifecycle and its impact on testing, Test-Driven Development (TDD), xUnit framework and tools for TDD, Testing user stories - acceptance tests and scenarios, Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile tester.

Unit - IV

Agile Software Design and Development: Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles, Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control.

Unit - V

Industry Trends: Market scenario and adoption of Agile, Agile ALM, Roles in an Agile project, Agile applicability, Agile in Distributed teams, Business benefits, Challenges in Agile, Risks and Mitigation, Agile projects on Cloud, Balancing Agility with Discipline, Agile rapid development technologies

RECOMMENDED BOOKS

- Agile Software Development with Scrum, Ken Schawber, Mike Beedle, Pearson.
- Agile Testing: A Practical Guide for Testers and Agile Teams, Lisa Crispin, Janet Gregory, Addison Wesley.
- Agile Software Development, Principles, Patterns and Practices, Robert C. Martin, Prentice Hall.
- Agile Software Development: The Cooperative Game, Alistair Cockburn, Addison Wesley.
- User Stories Applied: For Agile Software, Mike Cohn, Addison Wesley.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Explain** Scrum Release Planning, and Scrum Sprint Planning.

CO2. **Classify** a Sprint with Sprint Reviews and Sprint Retrospectives.

CO3. **Apply** user stories into tasks and ideal day estimates.

CO4. **Examine** the Scrum with multiple, or distributed, project teams.

CO5. **Determine** agile methods scale to large and distributed projects.

CO6. **Design** test driven and agile principal based software.

Department of Computer Science & Engineering and Information Technology

IMAGE PROCESSING
BCSL - 801

COURSE OBJECTIVES

- To understand the fundamentals of Image acquisition, image processing in spatial and frequency domain.
- To understand image transforms used in digital image processing.
- To know about the image restoration techniques and methods used in image processing.

Unit - I

Introduction and Fundamentals: Introduction to Image Processing Systems, Digital Image Fundamentals: Components of Digital Image Processing system, Image model, Imaging geometry, Sampling and quantization of images, Classification of digital images, Zooming and shrinking, Relationship between pixels.

Unit - II

Image Enhancement in spatial domain: Introduction, Basic gray level function, piecewise linear transformation, Contrast stretching, Histogram specification, Histogram Equalization, Local enhancement using arithmetic and logical operation-Image subtraction, Image averaging Image smoothing: Smoothing Spatial Filters, Smoothing Linear Filters, Image sharpening.

Unit - III

Image Enhancement in Frequency domain: Introduction to Fourier Transform, Filters: low pass and High pass, Gaussian filters, Homomorphic filtering. **Image Restoration:** Model of Image Degradation/Restoration process, Noise models, Noise reduction in spatial domain and frequency domain, Inverse filtering, mean filters, Least Mean Square(Wiener) filtering, FIR Wiener Filter.

Unit - IV

Morphological Image Processing: Logic operation involving binary images, Dilation and Erosion, Opening and Closing, Morphological Algorithms: Boundary extraction,

Region filling, Extraction of connected components, Convex Hull, Thinning, and Thickening.

Unit - V

Image registration: Introduction, Geometric transformation, Plane to plane transformation, mapping. **Image Segmentation:** Introduction, Region extraction, pixel based approach, Multi level thresholding, Local thresholding, Region based approach, Region growing, Splitting and merging, Edge and Line detection, Corner detection, Detection of discontinuities, Edge linking and boundary detection.

RECOMMENDED BOOKS

- Digital Image Processing, Rafael C Gonzalez, Richard E Woods, Pearson Education.
- Fundamentals of Digital Image Processing, K. Jain, Pearson Education.
- Digital Image Processing, S. Esakkirajan, S. Jayaraman,T. Veerakumar, Tata McGraw-Hill Education.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Explain** different modalities and current techniques in image acquisition.

CO2. **Classify** spatial and frequency domain techniques used in image processing.

CO3. **Apply** image processing techniques to enhance visual images.

CO4. **Analyze** the constraints in image processing when dealing with real problems.

CO5. **Evaluate** various Enhancement, restoration and retrieval techniques of image processing.

CO6. **Design** a system using the mathematical models and principles of digital image processing for real world problems.

Department of Computer Science & Engineering and Information Technology

DATA WAREHOUSE & DATA MINING
BCSL - 802

COURSE OBJECTIVES

- To understand the value of data mining in solving real-world problems.
- To gain understanding of algorithms commonly used in data mining tools.
- To develop ability for applying data mining tools to real-world problems.

Unit - I

Introduction: Motivation, important, Data type for data mining: relational databases, Data ware-houses. Transactional databases, advanced Database system and its Applications, Data Mining Functionalities Concept/Class description, Association Analysis classification & prediction, cluster Analysis, Outliner Analysis classification of data Mining Systems, Major issues in data mining.

Unit - II

Data Warehouse and OLTP Technology for Data Mining: Differences between operational Database Systems, & Data warehouse, A multidimensional Data Model, Data warehouse Architecture, Data warehouse Implementation Data cube technology.

Unit - III

Data Pre-processing: Data cleaning, Data Integration and Transformation, Data reduction Discretization and Concept Hierarchy Generation. Data Mining Primitives Languages and system Architectures, Concept description, Characterization and comparison Analytical characterization.

Unit - IV

Mining Association Rules in Large Databases: Association rule Mining : Market Basket Analysis, Basic Concepts, Mining single Dimensional Boolean Association rules from Transactional databases : The Apriori algorithm, Generating Association rules from frequent items, Improving the efficiency of Apriori, other algorithms & their comparison, Mining multilevel Association Rules, Multidimensional Association rules, constraint Based Association rule Mining.

Unit - V

Classification & Predication and Cluster Analysis: Issues regarding classification & predication, Different classification methods, Predication, cluster Analysis, Major clustering methods. Application & Trends in data mining: Data Mining Applications, Currently available tools, case study, current status.

RECOMMENDED BOOKS

- Data Mining: Concepts and Techniques, Han and Kamber, Morgan Kaufmann Publications.
- Data Mining Techniques, A. K. Pujari, Universities Press Pvt. Ltd.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** various methods for storing & retrieving data from different data sources /repository.

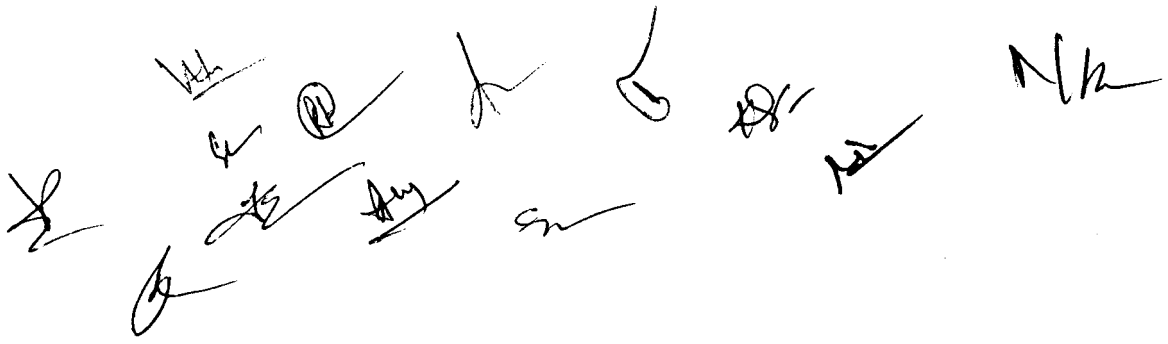
CO2. **Classify** various data bases and data models of data warehouse.

CO3. **Apply** pre-processing techniques for construction of data warehouse

CO4. **Analyze** data mining algorithms for knowledge discovery & prediction.

CO5. **Choose** appropriate data mining method for finding of association rules from transactional databases.

CO6. **Develop** various classification algorithms for data using data mining.



Department of Computer Science & Engineering and Information Technology

NEURAL NETWORKS & FUZZY SYSTEMS
BCSL - 803

COURSE OBJECTIVES

- To provide the student with the basic understanding of neural networks and fuzzy logic fundamentals.
- To understand the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.
- To understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic control and other machine intelligence applications of fuzzy logic.

Unit - I

Introduction and Fundamental concept of ANN: Basic models of Artificial Neural Networks, Terminologies of ANNs McCulloch-Pitts Neurons, Linear Separability, Hebb Network.

Unit - II

Supervised Learning Networks: Introduction, Perceptron Networks, Associative Memory Network, Back Propagation Networks, Delta learning rule, Radial Basis Function Networks, Hopefield networks.

Unit - III

Unsupervised Learning: Fixed weight Competitive Nets, Kohonen Self-Organizing Map, Learning vector quantization, Counter propagation Networks, Adaptive Resonance Theory Network.

Unit - IV

Fuzzy Set Theory: Fuzzy Sets, Fuzzy Membership Functions, Operations on Fuzzy Sets, Fuzzy Relations, Fuzz Extension Principles. **Fuzzy Logic:** Basics, Fuzzy truth in terms of Fuzzy sets, Fuzzy rules, Fuzzy Reasoning.

Unit - V

Defuzzification: Lembda-Cuts for Fuzzy sets (Alpha-Cuts), Lembda-Cuts for Fuzzy Relations.**Fuzzy Inference System:** Introduction, Mamdani Fuzzy Models, Other Variants: Sugeno Fuzzy Models, Tekamoto Fuzzy Models.

RECOMMENDED BOOKS

- Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications-S. Rajasekaran & G.A. Vijayalakshmi Pai, PHI.
- Principles of Soft Computing, S. N. Sivanandam and S. N. Deepa , Wiley
- Introduction to Soft Computing Neuro-Fuzzy and Genetic Algorithms, Samir Roy and Udit Chakraborty, Pearson.
- Neural Networks and Learning Machines-Simon Haykin (PHI).
- Fuzzy Logic and Engineering Application, Tomthy Ross, TMH.

COURSE OUTCOMES

After successful completion of the course students will be able to:

CO1. **Explain** the concept of Artificial Neural Network and Fuzzy Logic.

CO2. **Illustrate** various problems to be solved through Fuzzy Systems.

CO3. **Make use of** single and multi-layer feed-forward neural networks.

CO4. **Analyze** various Neural Networks in order to solve problems effectively and efficiently.

CO5. **Determine** the roll of Neural Networks & Fuzzy Systems in problem solving.

CO6. **Develop** and train different supervised and unsupervised networks.

Department of Computer Science & Engineering and Information Technology

INTERNET OF THINGS AND APPLICATIONS
BCSL – 804 (Elective – V)

COURSE OBJECTIVES

- To identify the various elements of an IoT System.
- To understand Cloud Computing & its relevance in IoT.
- To make students aware of security concerns and challenges while implementing IoT Solutions.

Unit - 1

Internet of Things: Introduction, Internet of things Definition Evolution, IoT Architectures, Resource Management, IoT Data Management & Analytics, Communication Protocols, Internet of Things Applications, Security, Identity Management and Authentication, Privacy, Standardization and Regulatory Limitations.

Unit -2

Open Source Semantics Web Infrastructures for Managing IoT resources in the cloud: Open IoT Architecture for IoT/Cloud Convergence, Scheduling Process and IoT Services Lifecycle, Scheduling and Resource Management, Validating Applications and use cases, Device/Cloud Collaboration Framework, Application of Device/Cloud Collaboration, Fog Computing: Principles, Architectures and Applications.

. Unit -3

Programming Frameworks for Internet of Things: Introduction, Embedded Device Programming Languages, Message Passing in Devices, Coordination Languages, Polygot Programming, Survey of IoT Programming Frameworks, Virtualization on Embedded Boards as Enabling Technology for the cloud of Things, Micro Virtual Machines (MicroVMs) for cloud- Assisted Cyber- Physical System (CPS), Cloud Computing in IoT.

Unit -4

IoT Data and Knowledge Management: The foundations of Stream Processing in IoT, Continuous Logic Processing System, Framework for Distributed Data Analysis for IoT,

Anomaly detection, Efficient Incremental local modeling, Big Data Analytics - Data Visualization - IoT Platforms.

Unit -5

Security and Privacy in the Internet of Things: Concepts, IoT Security Overview, Security Frameworks for IoT, Privacy in IoT Networks, IoT Robustness and Reliability, Governing Internet of Things: Issues, Approaches and New Paradigms, IoT Applications.

RECOMMENDED BOOKS

- Internet of Things- Principles and Paradigms (M.K), Rajkumar Buyya, Amir Vahid Dastjerdi.
- Marco Schwartz, "Internet of Things with the Arduino Yun", Packt Publishing, 2014.
- Internet of Things (A Hands-on-Approach), Vijay Madisetti and Arshdeep Bahga, 1st Edition, VPT, 2014.
- Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, Francis daCosta, 1st Edition, Apress Publications, 2013.
- Internet of Things and Data Analytics, Wiley Publications.

COURSE OUTCOMES

After completing the course the student must able to do:

CO1. **Explain** Internet of things, Evolution of IoT, Applications of IoT.

CO2. **Classify** IoT Architectures, IoT services lifecycles & Application of Device/Cloud Collaboration.

CO3. **Apply** the concept of Internet of Things in the real world scenario.

CO4. **Analyze** Security and Privacy in the IoT.

CO5. **Choose appropriate** Framework for Distributed Data Analysis for IoT & Anomaly detection.

CO6. **Develop** small low cost embedded system.

Department of Computer Science & Engineering and Information Technology

BIOMETRICS
BCSL – 806 (Elective – V)

COURSE OBJECTIVES

- To understand of essential terminologies of biometric systems.
- To apply biometric matching for identification, authentication and authorization.
- To know about emerging future trends in the biometrics industry.

Unit - I

Introduction: Biometric fundamentals, Biometric technologies, Biometrics Vs traditional techniques, Characteristics of a good biometric system, Benefits of biometrics, Key biometric processes: verification, identification and biometric matching - Performance measures in biometric systems, FAR, FRR, FTE rate, EER and ATV rate, Applications of Biometric Systems, Security and Privacy Issues.

Unit - II

Physiological Biometrics : Leading technologies : Finger-scan, Facial-scan, Iris-scan, Voice-scan, components, working principles, competing technologies, strengths and weaknesses, Other physiological biometrics : Hand-scan, Retina-scan, components, working principles, competing technologies, strengths and weaknesses, Automated fingerprint identification systems.

Unit - III

Behavioral Biometrics: Leading technologies: Signature-scan, Keystroke scan, components, working principles, strengths and weaknesses. Privacy and Standards in Biometrics: Assessing the Privacy Risks of Biometrics, Designing Privacy, Sympathetic Biometric Systems, Need for standards, different biometric standards.

Unit - IV

Fingerprint Biometrics: Fingerprint Patterns, Fingerprint Features, Fingerprint Image, width between two ridges, Fingerprint Image Processing, Minutiae Determination, Fingerprint Matching: Fingerprint Classification, Matching policies.

Unit - V

Iris Biometrics: Iris System Architecture, Definitions and Notations, Iris Recognition: Iris location, Doubly Dimensionless Projection, Iris code, Comparison, Coordinate System: Head Tilting Problem, Basic Eye Model, Searching Algorithm, and Texture Energy Feature.

RECOMMENDED BOOKS

- Biometrics - Identity Verification in a Networked World, Samir Nanavati, Michael Thieme, Raj Nanavati, Wiley-Dreamtech India Pvt Ltd.
- Handbook of Biometrics, Anil K Jain, Patrick Flynn, Arun A Ross, Springer.
- Introduction to Biometrics, Anil K Jain, Arun A Ross, Springer.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Explain** various biometric technologies along with their basic features and other parameters.

CO2. **Demonstrate** the state-of-the-art in biometric technologies and explore the currently available biometric systems.

CO3. **Identify** the issues related to fingerprint and iris technology and plan a mechanism to solve them.

CO4. **Analyze** the fundamental concepts of behavioral biometrics and their applications in biometric systems.

CO5. **Compare** various physiological and behavioral biometrics approaches.

CO6. **Design** large scale biometric identification systems for real world security systems.

Department of Computer Science & Engineering and Information Technology

HIGH PERFORMANCE COMPUTING
BCSL – 807 (Elective – V)

COURSE OBJECTIVES

- To understand the fundamentals of high performance computing.
- To develop and execute parallel programs on high performance computing resources using parallel programming paradigms such as the message passing interface (MPI).
- To provide systematic and comprehensive treatment of the hardware and the software high performance techniques involved in current day computing.

Unit - I

Parallel Processing Concepts: Levels of parallelism (instruction, transaction, task, thread, memory, function), Models (SIMD, MIMD, SIMT, SPMD, Dataflow Models, Demand-driven Computation etc), Architectures: N-wide superscalar architectures, multi-core, multi-threaded.

Unit - II

Parallel Programming with CUDA: Processor Architecture, Interconnect, Communication, Memory Organization, and Programming Models in high performance computing architectures: (Examples: IBM CELL BE, Nvidia Tesla GPU, Intel Larrabee Micro-architecture and Intel Nehalem micro-architecture), Memory hierarchy and transaction specific memory design, Thread Organization.

Unit - III

Fundamental Design Issues in Parallel Computing: Synchronization, Scheduling, Job Allocation, Job Partitioning, Dependency Analysis, Mapping Parallel Algorithms onto Parallel Architectures, Performance Analysis of Parallel Algorithms; Fundamental Limitations Facing Parallel Computing: Bandwidth Limitations, Latency Limitations, Latency Hiding/Tolerating Techniques and their limitations.

Unit - IV

Power-Aware Computing and Communication: Power-aware Processing Techniques, Power-aware Memory Design, Power-aware Interconnect Design, Software Power Management.

Unit - V

Advanced Topics: Petascale Computing, Optics in Parallel Computing, Quantum Computers, Recent developments in Nanotechnology and its impact on HPC.

RECOMMENDED BOOKS

- Highly Parallel Computing, George S. Almasi and Alan Gottlieb.
- Advanced Computer Architecture: Parallelism, Scalability, Programmability, Kai Hwang, McGraw Hill 1993
- Parallel Computer Architecture: A hardware/Software Approach, David Culler Jaswinder Pal Singh, Morgan Kaufmann, 1999.
- Petascale Computing: Algorithms and Applications, David A. Bader (Ed.), Chapman & Hall/CRC Computational Science Series, 2007.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Explain** the key components of HPC architectures and how they are put together to form complete system.

CO2. **Demonstrate** a basic knowledge of numerical computing using an appropriate programming language.

CO3. **Develop** software, which exploits the memory hierarchy of a CPU to obtain a code which is close to optimal performance.

CO4. **Examine** the architectural hardware and software issues for high performance computing systems.

CO5. **Determine** all aspects in the processes of programming, compilation, starting program, running program by OS, executing (parallel) instructions by CPU to writing output to disk.

CO6. **Design** algorithms that yield good performance on high-performance architectures, and to be able to estimate and evaluate their performance.

Syllabus of B.E. VII & VIII Semester

Information Technology

Under Grading System

(For Students Admitted in 2015 & 2016 under CBCS Scheme)

Department of Computer Science & Engineering and Information Technology

ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS
BITL -701

COURSE OBJECTIVES

- To provide an introduction to the Artificial Intelligence and its methods.
- To enhance the capability of analysis for Machine learning and fuzzy logic.
- To apply the mathematical concepts in designing and executing the knowledge representation and problem solving.

Unit-I

Definition, Scope, Task and Objectives of Artificial Intelligence, AI Problems, Applications of AI. The Importance of AI, AI and related fields. Problems, Problem Spaces and Production System. Components of Production System, Characteristics of Production Systems, Types of Production System. Control Strategies, Application of Production Systems, water-jug, 8 – Puzzle and other advance Problems.

Unit-II

Searching : The Blind and Informed Searches, Breadth First Search, Depth First Search and their implementation using Open and Closed list, Heuristic estimation and evaluation, Hill climbing and their Problems, Best First Search, Searching And-Or Graphs, A * search, AO * search.

Unit-III

Knowledge Representation: General Concept, Introduction, Definition and importance Of Knowledge, Approaches to knowledge Representation, Issues in Knowledge Representation, Procedural and Declarative Knowledge, Forward Versus Backward Reasoning, Knowledge Representation Techniques: Logics, Prepositional Logic, Predicate Logic.

Unit-IV

Semantic Nets, Partition Semantic Nets, Frames, Conceptual Dependencies, Scripts, Bay's Theorem, Fuzzy Logic, Game Playing: Min – Max Search Procedure.

Unit-V

Planning, Understanding, Natural Language Processing, Speech Recognition, Computer Vision, Expert System and Expert System Cell.

RECOMMENDED BOOKS

- Artificial Intelligence, Rich & Knight McGraw Hill.
- Introduction to Artificial Intelligence and Expert Systems –Dan. W. Patterson, PHI.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. **Tell** the basics of concept of artificial intelligence.

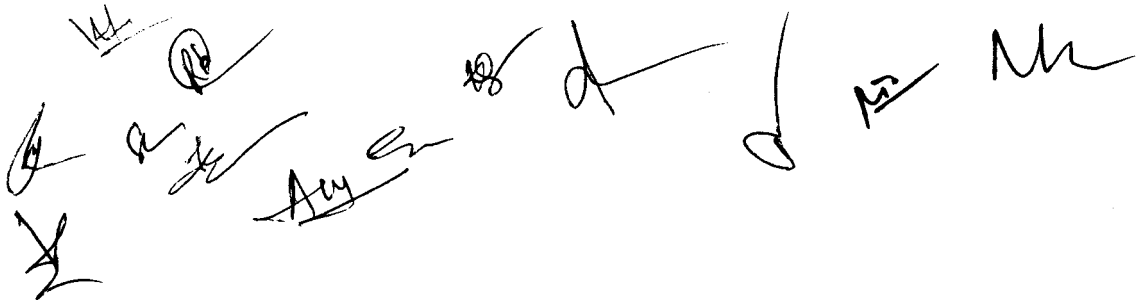
CO2. **Illustrate** various algorithms for efficient formed & informed search.

CO3. **Identify** the appropriate search methods to solve specific problems.

CO4. **Analyze** the performance of knowledge representation methods used in Artificial intelligence.

CO5. **Explain** machine learning methods in robotics & other applications.

CO6. **Design** game playing techniques by applying programming methods of puzzle solving techniques.



Department of Computer Science & Engineering and Information Technology

DISTRIBUTED SYSTEMS
BITL -702 (Elective – III)

COURSE OBJECTIVES

- To provide students contemporary knowledge of distributed systems.
- To equip students with skills to analyze and design distributed applications.
- To gain experience in the design and testing of a large software system, and to be able to communicate that design to others.

Unit - I

Introduction to distributed systems: Architecture for Distributed System, Goals of Distributed system, Hardware and Software concepts, Distributed Computing Model, Advantages & Disadvantage distributed system, Issues in designing Distributed System.

Unit -II

Distributed Share Memory: Basic Concept of Distributed Share Memory (DSM), DSM Architecture & its Types, Design & Implementations issues In DSM System, Structure of Share Memory Space, Consistency Model, and Thrashing.

Unit - III

Distributed File System: Desirable features of good Distributed File System, File Model, File Service Architecture, File Accessing Model, File Sharing Semantics, File Catching Scheme, File Application & Fault tolerance. Naming - Features, System Oriented Names, Object Locating Mechanism, Human Oriented Name.

Unit - IV

Inter Process Communication and Synchronization: API for Internet Protocol, Data Representation & Marshaling, Group Communication, Client Server Communication, RPC- Implementing RPC Mechanism, Stub Generation, RPC Messages. Synchronization: - Clock Synchronization, Mutual Exclusion, Election Algorithms - Bully & Ring Algorithms.

Unit - V

Distributed Scheduling and Deadlock Distributed Scheduling- Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues. Deadlock- Issues in deadlock detection & Resolutions, Deadlock Handling Strategy, Distributed Deadlock Algorithms. Case Study of Distributed System: Amoeba, Mach, Chorus.

RECOMMENDED BOOKS

- Distributed Operating System Concept & Design, Sinha, PHI .
- Distributed System Concepts and Design, Coulouris & Dollimore, Pearson Pub.
- Distributed Operating System, Andrew S. Tanenbaum, Pearson.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** the basic elements and concepts related to distributed system technologies

CO2. **Demonstrate** knowledge of the core architectural aspects of distributed systems.

CO3. **Identify** how the resources in a distributed system are managed by Algorithm.

CO4. **Examine** the concept of distributed file system and distributed shared memory.

CO5. **Compare** various distributed system algorithms for solving real world problems.

CO6. **Discuss** large-scale distributed applications.

Department of Computer Science & Engineering and Information Technology

INFORMATION TECHNOLOGY INFRASTRUCTURE AND ITS MANAGEMENT
BITL – 703 (Elective – IV)

COURSE OBJECTIVES

- To explain current trends in IT infrastructure and their impacts on IT infrastructure management.
- To demonstrate an awareness of current IT governance frameworks and their relevance to the development of IT infrastructure management plans and proposals.
- To analyse current IT infrastructure management plans and practice, and assess their degree of alignment with organizational business and strategic goals.

Unit - I

Infrastructure Management Overview: Definitions, Infrastructure management activities, Evolutions of Systems since 1960s (Mainframes-to-Midrange-to-PCs-to-Client-server computing-to-New age systems) and their management, growth of internet, current business demands and IT systems issues, complexity of today's computing environment, Total cost of complexity issues, Value of Systems management for business.

Unit - II

Preparing for Infrastructure Management: Factors to consider in designing IT organizations and IT infrastructure, Determining customer's Requirements, Identifying System Components to manage, Exist Processes, Data, applications, Tools and their integration, Patterns for IT systems management, Introduction to the design process for information systems, Models, Information Technology Infrastructure Library (ITIL).

Unit - III

Service Delivery Processes: Service-level management, financial management and costing, IT services continuity management, Capacity management, Availability management.

Unit - IV

Service Support Processes: Configuration Management, Service desk. Incident management, Problem management, Change management, Release management.

Unit - V

Storage and Security Management: Introduction Security, Identity management, Single sign-on, Access Management, Basics of network security, LDAP fundamentals, Intrusion detection, firewall, security information management, Introduction to Storage, Backup & Restore, Archive & Retrieve, Space Management, SAN & NAS, Disaster Recovery, Hierarchical space management, Database & Application protection, Bare machine recovery, Data retention.

RECOMMENDED BOOKS

- Jan Van Bon, "Foundations of IT Service Management: based on ITIL" Van Haren Publishing, 2nd edition 2005.
- Harris Kem, Stuart Gaiup, Guy Nemiro, "IT Organization: Building a Worldclass Infrastructure", Prentice Hall, 2000.
- Rich Schiesser, "IT Systems Management: Designing, Implementing, and Managing World-Class Infrastructures", Prentice Hall PTR, 2001.
- Phalguni Gupta, "IT Infrastructure and its Management", Tata McGraw Hill Education Private Limited.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1 **Recall** the concepts and histories of computer platforms and operating systems, network, data storage and applications.

CO2 **Extend** the knowledge scope from Technique to Management.

CO3 **Develop** business continuity with IT services on storage management.

CO4 **Analyze** the relation between different components of IT infrastructure management.

CO5 **Determine** service delivery processes and service support processes for IT infrastructure management.

CO6 **Estimate** storage and security management issues and its counter measures in IT service management.

Department of Computer Science & Engineering and Information Technology

ADHOC NETWORK
BITL - 704

COURSE OBJECTIVES

- To recognize needs of different set of MAC, routing and transport protocols for wireless computer networks.
- To analyze performance of MANET Routing Protocols under different mobility patterns.
- To identify different methods for energy saving in a mobile device.

Unit -I

Introduction: Wireless Networks, Cellular Mobile Network, Wireless LAN, Ad Hoc Networks, Sensor Network, Differences between Cellular and Ad Hoc, Issues in Ad Hoc Wireless Networks, Applications of Ad Hoc Wireless Networks.

Unit -II

MAC Layer: Introduction, Issues and Need for Medium Access Control. Problems in Ad Hoc Channel Access such as Hidden Terminal Problem and Exposed Node Problem. Classification of MAC Protocols – Contention Based MAC Protocols such as ALOHA and CSMA, Contention-Based MAC Protocols with Reservation Mechanisms such as MACA and MACA-BI.

Unit -III

Routing Protocols: Introduction, Classification of Routing Protocols- Proactive routing protocols such as WRP and DSDV, Reactive routing protocol such as AODV, DSR , LAR, Hybrid Routing protocols such as ZRP.

Unit -IV

Transport Protocols and Energy Management Systems: Introduction, Design Issues and Challenges, Power Management, Smart Batteries and Battery Characteristics.

Unit -V

Security: Security in wireless Ad hoc wireless Networks, Network security requirements, Issues & challenges in security provisioning, Security attacks.

RECOMMENDED BOOKS

- Ad Hoc Wireless Networks: Architectures and Protocols, C. Siva Ram Murthy, B. S. Manoj, Pearson Education India.
- Ad Hoc Mobile Wireless Networks: Protocols and Systems, C.-K. Toh Pearson Publication.
- Wireless Networks Principles, Protocols, and Applications: Subir Kumar Sarkar, T G Basavaraju, C Puttamadappa, Auerbach Publications, Taylor & Francis Group
- Security and Quality of Service in Ad Hoc Wireless Networks, Amitabh Mishra, John Wiley & Sons, Cambridge University Press

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COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** the basics of wireless networks.

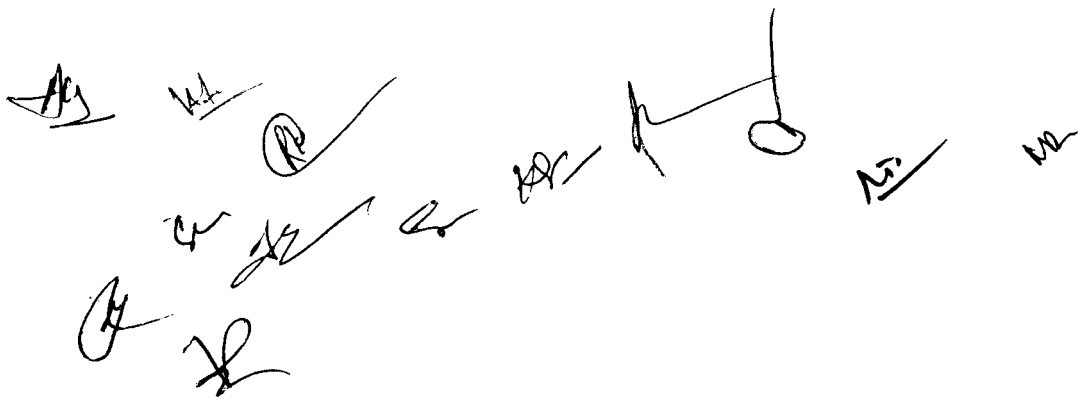
CO2. **Explain** the working of various Ad-hoc network protocols.

CO3. **Identify** various issues/problems associated with Ad-hoc networks and their solutions.

CO4. **Analyze** the performance of various Ad-hoc network protocols.

CO5. **Conclude** the security challenges and issue of Ad-hoc wireless network.

CO6. **Develop** the solutions of various problems/Issues associated with ad-hoc networks.



Department of Computer Science & Engineering and Information Technology

E - COMMERCE
BITL -705

COURSE OBJECTIVES

- To identify the major categories and trends of e-commerce applications.
- To discuss the various marketing strategies for an online business.
- To define various electronic payment types and associated security risks and the ways to protect against them.

Unit -I

Introduction of Building Blocks of Electronic Commerce, Features, Traditional Commerce v/s E-Commerce, E-Commerce Advantages And Disadvantages, E-Commerce : Business Models, E-Services: Category of E-Services, Web-Enabled Services, Information-Selling on the web.

Unit -II

Internet and Networking Technologies, Static and Dynamic Web Pages, Tiers, Plug-Ins Frames, Exposure to Markup Languages HTML, DHTML VRML, SGML, XML, CGI, Applets & Serve-Lets, JSP& Java Beans, ASP Cookies, Creating and Reading Cookies, Comparative Case Study of Microsoft and Java Technologies, Web Application Architectures, Browsers, Search Engines.

Unit -III

Internet Payment System: Characteristics of Payment System, 4C Payment Methods, SET Protocol for Credit Card Payment, E-Cash, E -Check, Micro Payment System, Overview of Smart Card, E- Governance: E- Governance Architecture, Public Private Partnership, EDI, EDI Documents, Steps in an EDI System, Advantages of an EDI System readiness.

Unit -IV

Security Systems, Measures to ensure Security, Security Protocols in internet Secure Socket Layer (SSL), Secure Hypertext Transfer Protocol (HTTP), Secure Electronic Transaction, Cyber Crime Law, IT Act.

Unit -V

Advanced Technologies of E-Commerce, Introduction to Mobile Agents, WAP: the enabling technology, WAP Model, WAP Architecture, Benefits of WAP to E-Commerce, Web Security, Encryption Schemes, Secure Web, Digital Signatures, Firewall.

RECOMMENDED BOOKS

- E-commerce, Gary P. Schneider, Cengage Learning India.
- Essentials of E-Commerce Technology, V. Rajaraman, PHI Learning Private Limited.
- E-commerce study, technology and applications, David Whiteley, TMH.
- E-Commerce An Indian Perspective, P.T. Joseph, PHI Learning Private Limited.
- Web Technologies: TCP/IP to Internet Application Architectures, Achyut S. Godbole and Atul Kahate, TMH.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. **Find** the impact of Information and Communication technologies, especially of the Internet in business operations.

CO2. **Explain** the foundations and importance of E-commerce.

CO3. **Develop** web pages using tools and services of the internet in the development of a virtual e-commerce site.

CO4. **Perceive** legal issues and privacy in E-Commerce, electronic payment systems and other global E-commerce issues.

CO5. **Analyze** policy and regulatory issues in E-commerce.

CO6. **Elaborate** Wireless Application Protocol for internet access and advanced telephony services from the mobile phones.

Department of Computer Science & Engineering and Information Technology

GRID COMPUTING
BITL - 709 (Elective – III)

COURSE OBJECTIVES

- To expose the characteristics of grid computing.
- To explore the design principles of grid computing.
- To illustrate security mechanisms in grid computing applications.

Unit - I

Concepts and Architecture: Introduction, Parallel and Distributed Computing, Cluster Computing, Grid Computing, Anatomy and Physiology of Grid, Review of Web Services, OGSA, WSRF.

Unit - II

Grid Monitoring: Grid Monitoring Architecture (GMA), An Overview of Grid Monitoring Systems, Grid ICE – JAMM, MDS, Network Weather Service, R, GMA, Other Monitoring Systems, Ganglia and GridMon.

Unit - III

Grid Security and Resource Management: Grid Security, A Brief Security Primer, PKI, X.509 Certificates, Grid Security, Grid Scheduling and Resource Management, Scheduling Paradigms, Working principles of Scheduling, A Review of Condor, SGE, PBS and LSF, Grid Scheduling with QoS.

Unit - IV

Data Management and Grid Portals: Data Management, Categories and Origins of Structured Data, Data Management Challenges, Architectural Approaches, Collective, Data Management Services, Federation Services, Grid Portals, First-Generation Grid Portals, Second-Generation Grid Portals.

Unit - V

Grid Middleware: List of globally available Middleware, Case Studies, Recent version of Globus Toolkit and gLite, Architecture, Components and Features.

RECOMMENDED BOOKS

- Grid Computing, Joshy Joseph, Craig Fellenstein, Pearson Education, 2004.
- Grid Computing for Developers, Vladimir Silva, Dreamtech Press, 2006.
- Grid Computing making the global infrastructure a Reality, Fran Berman, Geoffrey C. Fox, Anthony J.G Hey, Wiley.
- Grid Computing -A Practical Guide to Technology and Applications, Ahmar Abbas, Firewall Media, 2006.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Relate** grid computing with previous technologies.

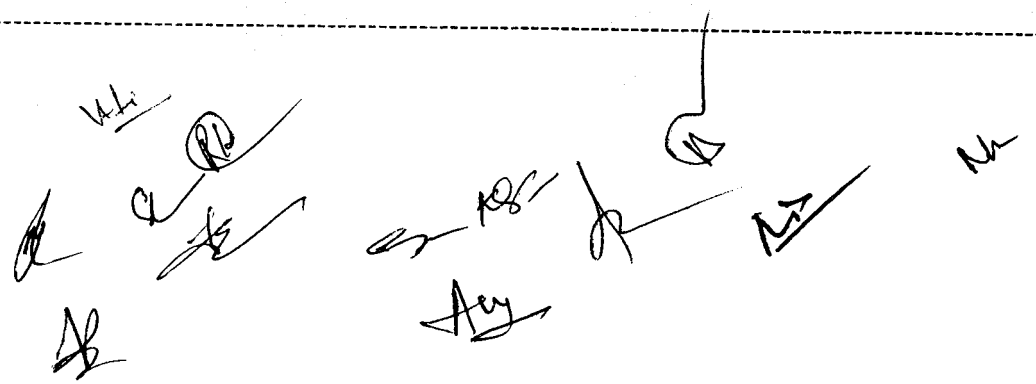
CO2. **Illustrate** security mechanisms in grid computing applications.

CO3. **Identify** the characteristics of grid computing.

CO4. **Classify** various functions of grid computing middleware.

CO5. **Explain** the design principles of grid computing.

CO6. **Discuss** different grid computing applications.



Department of Computer Science & Engineering and Information Technology

NATURAL LANGUAGE PROCESSING
BITL - 710 (Elective – III)

COURSE OBJECTIVES

- To give a exposure related to machine learning and motivate toward its application.
- To enhance the capability of natural language processing.
- To apply the probabilistic approach for solving the problems.

Unit - I

Introduction: Introduction to Natural Language Processing and issue in Natural language Processing, NLP stages, Basic Text Processing, Regular Expression, Word tokenization, Word Normalization, Stemming, sentence segmentation.

Unit - II

Probabilistic Language Model: Conditional Probability, Bayes' theorem, Markov assumptions, N-grams, Estimating N-gram probability, MLE Dealing with zeros, generalization, Back-offs and interpolations.

Unit - III

Word Classes and Part-of-Speech Tagging: Text classification, Naïve Based Learning Parameter Estimation, Laplace (Add one) smoothing Text classification evaluation, Tagging problem , Part-Of-Speech Tagging, Generative models, Trigram Hidden Markov Model for parameter estimation, Dealing with low frequency words, Viterbi Algorithm.

Unit - IV

Parsing: Natural Language Parsing, A simple CFG for English Language, Ambiguity, Probabilistic CFGs, Parsing with PCFGs, CKY parsing algorithm. Example, Issue with PCFGs, Lexicalized PCFGs.

Unit - V

Applications: Word Prediction, Information Extraction, Sentiment analysis, Question Answering and summarization, Machine Translation, Text Categorization, Optical character Recognition.

RECOMMENDED BOOKS

- Speech and Language Processing, Second Edition, Prentice Hall, Jurafsky, Dan and Martin, James, 2008.
- Foundations of Statistical Natural Language Processing , Manning, Christopher and Heinrich, Schutze, MIT Press, 1999.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Relate** the natural language processing techniques in applied domain.

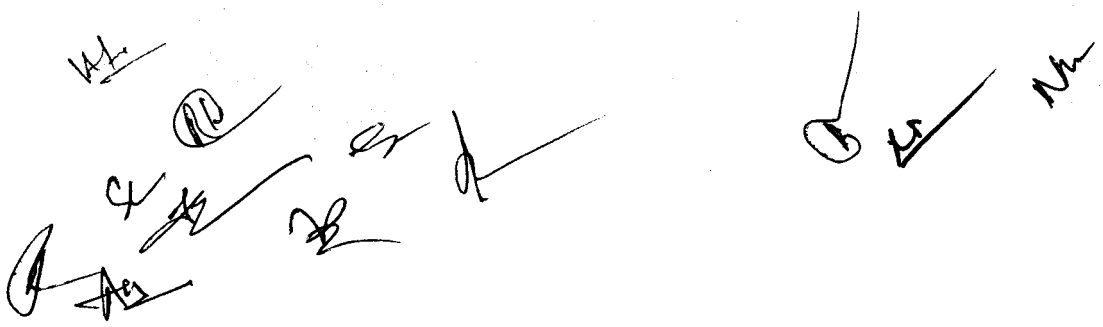
CO2. **Compare** machine learning methods and robotics.

CO3. **Apply** the NLP constructs in solving real world problems.

CO4. **Analyze** knowledge representation methods.

CO5. **Explain** computation modelling of natural language processing.

CO6. **Improve** the new approaches over existing one using probabilistic formulation.



Department of Computer Science & Engineering and Information Technology

SOFTWARE TESTING AND QUALITY ASSURANCE (STQA)
BITL - 711 (Elective – IV)

COURSE OBJECTIVE

- To apply software testing knowledge and engineering methods.
- To design and conduct a software test process for a software project.
- To identify the needs of software test automation, and define and develop a test tool to support test automation.

Unit - I

Quality: Perspectives and Expectations, Correctness and Defects: Definitions, Properties, and Measurements, Software quality factors, **Quality Assurance:** Defect Prevention, Defect Reduction, Defect Containment.

Unit - II

Concepts, Issues, and Techniques of Software Testing: Functional vs. Structural Testing, Test Planning and Preparation, Test Execution, Result Checking, and Measurement, Test Automation, **Coverage and Usage Testing Based on Checklists and Partitions:** Checklist-Based Testing and Its Limitations, Testing for Partition Coverage.

Unit - III

Input Domain Partitioning and Testing- Basic concepts, definitions, and terminology, Simple Domain Analysis and the Extreme Point Combination Strategy, Testing Strategies Based on Boundary Analysis, Other Boundary Test Strategies and Applications, **Control Flow, Data Dependency, and Interaction Testing:** Basic Concept and techniques.

Unit - IV

Defect Prevention and Process improvement: Basic Concepts and Generic Approaches, Focusing on Software Processes, **Software Inspection:** Basic Concepts and Generic Process, Fagan inspection, Other Inspections and Related Activities. **Formal Verification:** Basic Concepts, Axiomatic Approach.

Unit - V

Feedback Loop and Activities for Quantifiable Quality Improvement: QA Monitoring and Measurement, **Quality Models and Measurements:** Models for Quality Assessment, **Risk Identification for Quantifiable Quality Improvement:** New Techniques for Risk Identification.

RECOMMENDED BOOKS

- Software Quality Engineering-Testing, Quality Assurance and Quantifiable Improvement, Jeff Tian, A John Wiley & Sons, Inc., Publication.
- Software Testing and Quality Assurance: Theory and Practice, Kshirasagar Naik, Priyadarshi Tripathy, A John Wiley & Sons, Inc., Publication.
- Software Quality Assurance From theory to implementation, Daniel Galin, Pearson Publication.
- Software Testing: Principles, Techniques and Tools, M G Limaye, TMH Publication.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** basic concept of Software Testing and Quality.

CO2. **Demonstrate** software test automation problems and solutions.

CO3. **Apply** software testing tools and Techniques for improvement of software project.

CO4. **Analyze** various quality parameters for a good software project.

CO5. **Evaluate** a project using test cases and other software testing parameters.

CO6. **Design** software testing documents and quality plan for communicating with engineers in various forms.

Department of Computer Science & Engineering and Information Technology

AGILE METHODOLOGY
BITL - 712 (Elective – IV)

COURSE OBJECTIVES

- To understand the background and driving forces for taking an agile approach to software development.
- To understand the business value of adopting agile approaches.
- To understand the agile development practices.

Unit - I

Fundamentals of Agile: The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing, Agile Tools.

Unit - II

Agile Scrum Framework: Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint planning and retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team, Scrum case study, Tools for Agile project management.

Unit - III

Agile Testing: The Agile lifecycle and its impact on testing, Test-Driven Development (TDD), xUnit framework and tools for TDD, Testing user stories - acceptance tests and scenarios, Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile tester.

Unit - IV

Agile Software Design and Development: Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles, Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control.

Unit - V

Industry Trends: Market scenario and adoption of Agile, Agile ALM, Roles in an Agile project, Agile applicability, Agile in Distributed teams, Business benefits, Challenges in Agile, Risks and Mitigation, Agile projects on Cloud, Balancing Agility with Discipline, Agile rapid development technologies

RECOMMENDED BOOKS

- Agile Software Development with Scrum, Ken Schawber, Mike Beedle, Pearson.
- Agile Testing: A Practical Guide for Testers and Agile Teams, Lisa Crispin, Janet Gregory, Addison Wesley.
- Agile Software Development, Principles, Patterns and Practices, Robert C. Martin, Prentice Hall.
- Agile Software Development: The Cooperative Game, Alistair Cockburn, Addison Wesley.
- User Stories Applied: For Agile Software, Mike Cohn, Addison Wesley.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Explain** Scrum Release Planning, and Scrum Sprint Planning.
CO2. **Classify** a Sprint with Sprint Reviews and Sprint Retrospectives.
CO3. **Apply** user stories into tasks and ideal day estimates.
CO4. **Examine** the Scrum with multiple, or distributed, project teams.
CO5. **Determine** agile methods scale to large and distributed projects.
CO6. **Design** test driven and agile principal based software.

Department of Computer Science & Engineering and Information Technology

IMAGE PROCESSING
BITL - 801

COURSE OBJECTIVES

- To understand the fundamentals of Image acquisition, image processing in spatial and frequency domain.
- To understand image transforms used in digital image processing.
- To know about the image restoration techniques and methods used in image processing.

Unit - I

Introduction and Fundamentals: Introduction to Image Processing Systems, Digital Image Fundamentals: Components of Digital Image Processing system, Image model, Imaging geometry, Sampling and quantization of images, Classification of digital images, Zooming and shrinking, Relationship between pixels.

Unit - II

Image Enhancement in spatial domain: Introduction, Basic gray level function, piecewise linear transformation, Contrast stretching, Histogram specification, Histogram Equalization, Local enhancement using arithmetic and logical operation-Image subtraction, Image averaging Image smoothing: Smoothing Spatial Filters, Smoothing Linear Filters, Image sharpening.

Unit - III

Image Enhancement in Frequency domain: Introduction to Fourier Transform, Filters: low pass and High pass, Gaussian filters, Homomorphic filtering. **Image Restoration:** Model of Image Degradation/Restoration process, Noise models, Noise reduction in spatial domain and frequency domain, Inverse filtering, mean filters, Least Mean Square(Wiener) filtering, FIR Wiener Filter.

Unit - IV

Morphological Image Processing: Logic operation involving binary images, Dilation and Erosion, Opening and Closing, Morphological Algorithms: Boundary extraction,

Region filling, Extraction of connected components, Convex Hull, Thinning, and Thickening.

Unit - V

Image registration: Introduction, Geometric transformation, Plane to plane transformation, mapping. **Image Segmentation:** Introduction, Region extraction, pixel based approach, Multi level thresholding, Local thresholding, Region based approach, Region growing, Splitting and merging, Edge and Line detection, Corner detection, Detection of discontinuities, Edge linking and boundary detection.

RECOMMENDED BOOKS

- Digital Image Processing, Rafael C Gonzalez, Richard E Woods, Pearson Education.
- Fundamentals of Digital Image Processing, K. Jain, Pearson Education.
- Digital Image Processing, S. Esakkirajan, S. Jayaraman,T. Veerakumar, Tata McGraw-Hill Education.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Explain** different modalities and current techniques in image acquisition.

CO2. **Classify** spatial and frequency domain techniques used in image processing.

CO3. **Apply** image processing techniques to enhance visual images.

CO4. **Analyze** the constraints in image processing when dealing with real problems.

CO5. **Evaluate** various Enhancement, restoration and retrieval techniques of image processing.

CO6. **Design** a system using the mathematical models and principles of digital image processing for real world problems.

Department of Computer Science & Engineering and Information Technology

DATA WAREHOUSE & DATA MINING
BITL - 802

COURSE OBJECTIVES

- To understand the value of data mining in solving real-world problems.
- To gain understanding of algorithms commonly used in data mining tools.
- To develop ability for applying data mining tools to real-world problems.

Unit - I

Introduction: Motivation, important, Data type for data mining: relational databases, Data ware-houses. Transactional databases, advanced Database system and its Applications, Data Mining Functionalities Concept/Class description, Association Analysis classification & prediction, cluster Analysis, Outliner Analysis classification of data Mining Systems, Major issues in data mining.

Unit - II

Data Warehouse and OLTP Technology for Data Mining: Differences between operational Database Systems, & Data warehouse, A multidimensional Data Model, Data warehouse Architecture, Data warehouse Implementation Data cube technology.

Unit - III

Data Pre-processing: Data cleaning, Data Integration and Transformation, Data reduction Discretization and Concept Hierarchy Generation. Data Mining Primitives Languages and system Architectures, Concept description, Characterization and comparison Analytical characterization.

Unit - IV

Mining Association Rules in Large Databases: Association rule Mining : Market Basket Analysis, Basic Concepts, Mining single Dimensional Boolean Association rules from Transactional databases : The Apriori algorithm, Generating Association rules from frequent items, Improving the efficiency of Apriori, other algorithms & their comparison, Mining multilevel Association Rules, Multidimensional Association rules, constraint Based Association rule Mining.

Unit - V

Classification & Predication and Cluster Analysis: Issues regarding classification & predication, Different classification methods, Predication, cluster Analysis, Major clustering methods. Application & Trends in data mining: Data Mining Applications, Currently available tools, case study, current status.

RECOMMENDED BOOKS

- Data Mining: Concepts and Techniques, Han and Kamber, Morgan Kaufmann Publications.
- Data Mining Techniques, A. K. Pujari, Universities Press Pvt. Ltd.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Tell** various methods for storing & retrieving data from different data sources /repository.

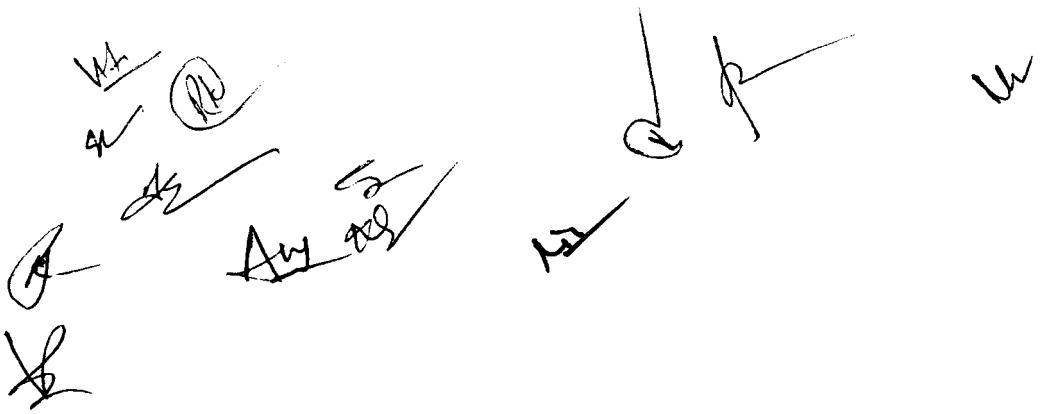
CO2. **Classify** various data bases and data models of data warehouse.

CO3. **Apply** pre-processing techniques for construction of data warehouse

CO4. **Analyze** data mining algorithms for knowledge discovery & prediction.

CO5. **Choose** appropriate data mining method for finding of association rules from transactional databases.

CO6. **Develop** various classification algorithms for data using data mining.



Department of Computer Science & Engineering and Information Technology

NEURAL NETWORKS & FUZZY SYSTEMS
BITL - 803

COURSE OBJECTIVES

- To provide the student with the basic understanding of neural networks and fuzzy logic fundamentals.
- To understand the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.
- To understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic control and other machine intelligence applications of fuzzy logic.

Unit - I

Introduction and Fundamental concept of ANN: Basic models of Artificial Neural Networks, Terminologies of ANNs McCulloch-Pitts Neurons, Linear Separability, Hebb Network.

Unit - II

Supervised Learning Networks: Introduction, Perceptron Networks, Associative Memory Network, Back Propagation Networks, Delta learning rule, Radial Basis Function Networks, Hopefield networks.

Unit - III

Unsupervised Learning: Fixed weight Competitive Nets, Kohonen Self-Organizing Map, Learning vector quantization, Counter propagation Networks, Adaptive Resonance Theory Network.

Unit - IV

Fuzzy Set Theory: Fuzzy Sets, Fuzzy Membership Functions, Operations on Fuzzy Sets, Fuzzy Relations, Fuzz Extension Principles. **Fuzzy Logic:** Basics, Fuzzy truth in terms of Fuzzy sets, Fuzzy rules, Fuzzy Reasoning.

Unit - V

Defuzzification: Lembda-Cuts for Fuzzy sets (Alpha-Cuts), Lembda-Cuts for Fuzzy Relations.**Fuzzy Inference System:** Introduction, Mamdani Fuzzy Models, Other Variants: Sugeno Fuzzy Models, Tekamoto Fuzzy Models.

RECOMMENDED BOOKS

- Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications-S. Rajasekaran & G.A. Vijayalakshmi Pai, PHI.
- Principles of Soft Computing, S. N. Sivanandam and S. N. Deepa , Wiley
- Introduction to Soft Computing Neuro-Fuzzy and Genetic Algorithms, Samir Roy and Udit Chakraborty, Pearson.
- Neural Networks and Learning Machines-Simon Haykin (PHI).
- Fuzzy Logic and Engineering Application, Tomthy Ross, TMH.

COURSE OUTCOMES

After successful completion of the course students will be able to:

CO1. **Explain** the concept of Artificial Neural Network and Fuzzy Logic.

CO2. **Illustrate** various problems to be solved through Fuzzy Systems.

CO3. **Make use of** single and multi-layer feed-forward neural networks.

CO4. **Analyze** various Neural Networks in order to solve problems effectively and efficiently.

CO5. **Determine** the roll of Neural Networks & Fuzzy Systems in problem solving.

CO6. **Develop** and train different supervised and unsupervised networks.

Department of Computer Science & Engineering and Information Technology

INTERNET OF THINGS AND APPLICATIONS
BITL – 804 (Elective – V)

COURSE OBJECTIVES

- To identify the various elements of an IoT System.
- To understand Cloud Computing & its relevance in IoT.
- To make students aware of security concerns and challenges while implementing IoT Solutions.

Unit - 1

Internet of Things: Introduction, Internet of things Definition Evolution, IoT Architectures, Resource Management, IoT Data Management & Analytics, Communication Protocols, Internet of Things Applications, Security, Identity Management and Authentication, Privacy, Standardization and Regulatory Limitations.

Unit -2

Open Source Semantics Web Infrastructures for Managing IoT resources in the cloud: Open IoT Architecture for IoT/Cloud Convergence, Scheduling Process and IoT Services Lifecycle, Scheduling and Resource Management, Validating Applications and use cases, Device/Cloud Collaboration Framework, Application of Device/Cloud Collaboration, Fog Computing: Principles, Architectures and Applications.

. Unit -3

Programming Frameworks for Internet of Things: Introduction, Embedded Device Programming Languages, Message Passing in Devices, Coordination Languages, Polygot Programming, Survey of IoT Programming Frameworks, Virtualization on Embedded Boards as Enabling Technology for the cloud of Things, Micro Virtual Machines (MicroVMs) for cloud- Assisted Cyber- Physical System (CPS), Cloud Computing in IoT.

Unit -4

IoT Data and Knowledge Management: The foundations of Stream Processing in IoT, Continuous Logic Processing System, Framework for Distributed Data Analysis for IoT,

Anomaly detection, Efficient Incremental local modeling, Big Data Analytics - Data Visualization - IoT Platforms.

Unit -5

Security and Privacy in the Internet of Things: Concepts, IoT Security Overview, Security Frameworks for IoT, Privacy in IoT Networks, IoT Robustness and Reliability, Governing Internet of Things: Issues, Approaches and New Paradigms, IoT Applications.

RECOMMENDED BOOKS

- Internet of Things- Principles and Paradigms (M.K), Rajkumar Buyya, Amir Vahid Dastjerdi.
- Marco Schwartz, "Internet of Things with the Arduino Yun", Packt Publishing, 2014.
- Internet of Things (A Hands-on-Approach), Vijay Madisetti and Arshdeep Bahga, 1st Edition, VPT, 2014.
- Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, Francis daCosta, 1st Edition, Apress Publications, 2013.
- Internet of Things and Data Analytics, Wiley Publications.

COURSE OUTCOMES

After completing the course the student must able to do:

CO1. **Explain** Internet of things, Evolution of IoT, Applications of IoT.

CO2. **Classify** IoT Architectures, IoT services lifecycles & Application of Device/Cloud Collaboration.

CO3. **Apply** the concept of Internet of Things in the real world scenario.

CO4. **Analyze** Security and Privacy in the IoT.

CO5. **Choose appropriate** Framework for Distributed Data Analysis for IoT & Anomaly detection.

CO6. **Develop** small low cost embedded system.

Department of Computer Science & Engineering and Information Technology

BIOMETRICS
BITL – 806 (Elective – V)

COURSE OBJECTIVES

- To understand of essential terminologies of biometric systems.
- To apply biometric matching for identification, authentication and authorization.
- To know about emerging future trends in the biometrics industry.

Unit - I

Introduction: Biometric fundamentals, Biometric technologies, Biometrics Vs traditional techniques, Characteristics of a good biometric system, Benefits of biometrics, Key biometric processes: verification, identification and biometric matching - Performance measures in biometric systems, FAR, FRR, FTE rate, EER and ATV rate, Applications of Biometric Systems, Security and Privacy Issues.

Unit - II

Physiological Biometrics : Leading technologies : Finger-scan, Facial-scan, Iris-scan, Voice-scan, components, working principles, competing technologies, strengths and weaknesses, Other physiological biometrics : Hand-scan, Retina-scan, components, working principles, competing technologies, strengths and weaknesses, Automated fingerprint identification systems.

Unit - III

Behavioral Biometrics: Leading technologies: Signature-scan, Keystroke scan, components, working principles, strengths and weaknesses. Privacy and Standards in Biometrics: Assessing the Privacy Risks of Biometrics, Designing Privacy, Sympathetic Biometric Systems, Need for standards, different biometric standards.

Unit - IV

Fingerprint Biometrics: Fingerprint Patterns, Fingerprint Features, Fingerprint Image, width between two ridges, Fingerprint Image Processing, Minutiae Determination, Fingerprint Matching: Fingerprint Classification, Matching policies.

Unit - V

Iris Biometrics: Iris System Architecture, Definitions and Notations, Iris Recognition: Iris location, Doubly Dimensionless Projection, Iris code, Comparison, Coordinate System: Head Tilting Problem, Basic Eye Model, Searching Algorithm, and Texture Energy Feature.

RECOMMENDED BOOKS

- Biometrics - Identity Verification in a Networked World, Samir Nanavati, Michael Thieme, Raj Nanavati, Wiley-Dreamtech India Pvt Ltd.
- Handbook of Biometrics, Anil K Jain, Patrick Flynn, Arun A Ross, Springer.
- Introduction to Biometrics, Anil K Jain, Arun A Ross, Springer.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Explain** various biometric technologies along with their basic features and other parameters.

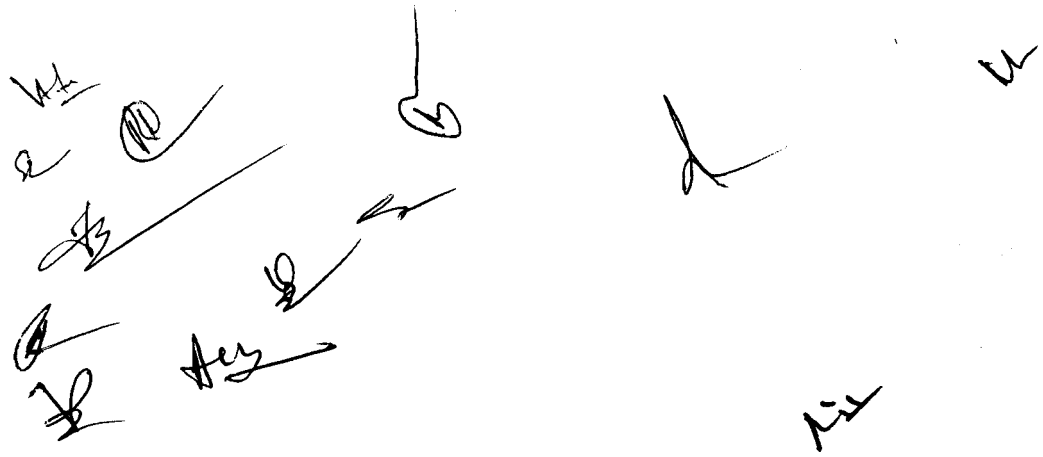
CO2. **Demonstrate** the state-of-the-art in biometric technologies and explore the currently available biometric systems.

CO3. **Identify** the issues related to fingerprint and iris technology and plan a mechanism to solve them.

CO4. **Analyze** the fundamental concepts of behavioral biometrics and their applications in biometric systems.

CO5. **Compare** various physiological and behavioral biometrics approaches.

CO6. **Design** large scale biometric identification systems for real world security systems.



Department of Computer Science & Engineering and Information Technology

HIGH PERFORMANCE COMPUTING
BITL – 807 (Elective – V)

COURSE OBJECTIVES

- To understand the fundamentals of high performance computing.
- To develop and execute parallel programs on high performance computing resources using parallel programming paradigms such as the message passing interface (MPI).
- To provide systematic and comprehensive treatment of the hardware and the software high performance techniques involved in current day computing.

Unit - I

Parallel Processing Concepts: Levels of parallelism (instruction, transaction, task, thread, memory, function), Models (SIMD, MIMD, SIMT, SPMD, Dataflow Models, Demand-driven Computation etc), Architectures: N-wide superscalar architectures, multi-core, multi-threaded.

Unit - II

Parallel Programming with CUDA: Processor Architecture, Interconnect, Communication, Memory Organization, and Programming Models in high performance computing architectures: (Examples: IBM CELL BE, Nvidia Tesla GPU, Intel Larrabee Micro-architecture and Intel Nehalem micro-architecture), Memory hierarchy and transaction specific memory design, Thread Organization.

Unit - III

Fundamental Design Issues in Parallel Computing: Synchronization, Scheduling, Job Allocation, Job Partitioning, Dependency Analysis, Mapping Parallel Algorithms onto Parallel Architectures, Performance Analysis of Parallel Algorithms; Fundamental Limitations Facing Parallel Computing: Bandwidth Limitations, Latency Limitations, Latency Hiding/Tolerating Techniques and their limitations.

Unit - IV

Power-Aware Computing and Communication: Power-aware Processing Techniques, Power-aware Memory Design, Power-aware Interconnect Design, Software Power Management.

Unit - V

Advanced Topics: Petascale Computing, Optics in Parallel Computing, Quantum Computers, Recent developments in Nanotechnology and its impact on HPC.

RECOMMENDED BOOKS

- Highly Parallel Computing, George S. Almasi and Alan Gottlieb.
- Advanced Computer Architecture: Parallelism, Scalability, Programmability, Kai Hwang, McGraw Hill 1993
- Parallel Computer Architecture: A hardware/Software Approach, David Culler Jaswinder Pal Singh, Morgan Kaufmann, 1999.
- Petascale Computing: Algorithms and Applications, David A. Bader (Ed.), Chapman & Hall/CRC Computational Science Series, 2007.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Explain** the key components of HPC architectures and how they are put together to form complete system.

CO2. **Demonstrate** a basic knowledge of numerical computing using an appropriate programming language.

CO3. **Develop** software, which exploits the memory hierarchy of a CPU to obtain a code which is close to optimal performance.

CO4. **Examine** the architectural hardware and software issues for high performance computing systems.

CO5. **Determine** all aspects in the processes of programming, compilation, starting program, running program by OS, executing (parallel) instructions by CPU to writing output to disk.

CO6. **Design** algorithms that yield good performance on high-performance architectures, and to be able to estimate and evaluate their performance.

Schemes of M.Tech. III & IV Semester

Computer Science & Engineering /Information Technology/ Cyber Security

(Recommendation of New Codes)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V., Bhopal MP)

Computer Science and Engineering Department

Recommended New Codes W.E.F JULY 2018

Master of Technology - Third Semester

Computer Science & Engineering

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code Old	Subject Code New	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem. /Practical Viva	Practical Record/ Assignment/ Quiz/ Presentation		L	T	P	
1.	**MCSL 931**	**620301**	Elective -I	70	20	10	-	-	100	3	1	-	4
2.	**MCSL 932**	**620302**	Elective -II	70	20	10	-	-	100	3	1	-	4
3.	**MCSS 933**	**620303**	Seminar	-	-	-	-	100	100	-	-	4	4
4.	**MCSD 934**	**620304**	Dissertation Part-I (Literature Review/ Problem Foundation/ Synopsis)	-	-	-	120	80	200	-	-	8	8
			Total	**140**	**40**	**20**	**120**	**180**	**500**	**6**	**2**	**12**	**20**

Only subject codes have been recommended for change, However there is no change in the syllabus.

During labs, students have to perform practical/assignments/ minor projects related to theory subjects/theoretical concepts of respective semester using recent technologies / languages / tools etc.

L: Lecture- T: Tutorial- P: Practical

Elective-I (MCSL 931/ 620301)
Image Processing and Retrieval Techniques

Elective-II ((MCSL 932/ 620302)
Network Security

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V., Bhopal MP)

Computer Science and Engineering Department

Recommended New Codes W.E.F JULY 2018

Master of Technology - Fourth Semester

Computer Science & Engineering

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code Old	Subject Code New	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem./ Practical Viva	Practical Record/ Assignment/ Quiz/ Presentation		L	T	P	
1.	MCSD 941	620401	Dissertation Part-II	-	-	-	300	200	500	-	-	20	20
			Total	-	-	-	**300**	**200**	**500**	-	-	**20**	**20**

Only subject codes have been recommended for change, However there is no change in other provisions.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V., Bhopal MP)

Information Technology Department

Recommended New Codes W.E.F JULY 2018

Master of Technology - Third Semester
Information Technology

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code Old	Subject Code New	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem. /Practical Viva	Practical Record/ Assignment/ Quiz/ Presentation		L	T	P	
1.	MITL 931	630301	Elective -I	70	20	10	-	-	100	3	1	-	4
2.	MITL 932	630302	Elective -II	70	20	10	-	-	100	3	1	-	4
3.	MITS 933	630303	Seminar	-	-	-	-	100	100	-	-	4	4
4.	MITD 934	630304	Dissertation Part-I (Literature Review/ Problem Foundation/ Synopsis)	-	-	-	120	80	200	-	-	8	8
			Total	**140**	**40**	**20**	**120**	**180**	**500**	**6**	**2**	**12**	**20**

Only subject codes have been recommended for change, However there is no change in the syllabus.
During labs, students have to perform practical/assignments/ minor projects related to theory subjects/theoretical concepts of respective semester using recent technologies / languages / tools etc.

L: Lecture- T: Tutorial- P: Practical

Elective-I (MITL 931/ 630301)
Image Processing and Retrieval Techniques

Elective-II ((MITL 932/ 630302)
Information Security & Systems

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V., Bhopal MP)

Information Technology Department

Recommended New Codes W.E.F JULY 2018

Master of Technology - Fourth Semester
Information Technology

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code Old	Subject Code New	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem./ Practical Viva	Practical Record/ Assignment/ Quiz/ Presentation		L	T	P	
1.	MITD941	630401	Dissertation Part-II	-	-	-	300	200	500	-	-	20	20
			Total	-	-	-	**300**	**200**	**500**	-	-	**20**	**20**

Only subject codes have been recommended for change, However there is no change in other provisions.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Computer Science and Engineering Department

Recommended New Codes W.E.F JULY 2018

Master of Technology - Third Semester

Cyber Security

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code Old	Subject Code New	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem. /Practical Viva	Practical Record/ Assignment/ Quiz/ Presentation		L	T	P	
1.	MCYL 931	640301	Elective -I	70	20	10	-	-	100	3	1	-	4
2.	MCYL 932	640302	Elective -II	70	20	10	-	-	100	3	1	-	4
3.	MCYS 933	640303	Seminar	-	-	-	-	100	100	-	-	4	4
4.	MCYD 934	640304	Dissertation Part-I (Literature Review/ Problem Foundation/ Synopsis)	-	-	-	120	80	200	-	-	8	8
			Total	**140**	**40**	**20**	**120**	**180**	**500**	**6**	**2**	**12**	**20**

Only subject codes have been recommended for change, However there is no change in the syllabus.
During labs, students have to perform practical/assignments/ minor projects related to theory subjects/theoretical concepts of respective semester using recent technologies / languages / tools etc.

L: Lecture- T: Tutorial- P: Practical

Elective-I (MCYL 931/ 640301)
Biometric Systems and Biometric Image Processing

Elective-II ((MCYL 932/ 640302)
Cyber Crime Investigations and Digital Forensics

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Computer Science and Engineering Department

Recommended New Codes W.E.F JULY 2018

Master of Technology - Fourth Semester

Cyber Security

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code Old	Subject Code New	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem./ Practical Viva	Practical Record/ Assignment/ Quiz/ Presentation		L	T	P	
1.	**MCYD 941**	**640401**	Dissertation Part-II	-	-	-	300	200	500	-	-	20	20
			Total	-	-	-	**300**	**200**	**500**	-	-	**20**	**20**

Only subject codes have been recommended for change, However there is no change in other provisions.

Syllabus

of

Basic Computer Engineering (100203)

B.Tech. 1st Year

Department of Computer Science & Engineering and Information Technology

BASIC COMPUTER ENGINEERING
100203

COURSE OBJECTIVES

- To develop comprehensive knowledge about the fundamental principles and concepts of basic computer engineering.
- To develop competencies for the design, coding and debugging of computer programs.
- To understand fundamentals of operating system concept.
- To acquire the basic knowledge of computer networks and its application & internet technology.

Unit-I

Basics of Computer: Introduction, Generation of Computers, Classification of Computers, Hardware, Software: Types of Software, Memory Representation, RAM, ROM and Hard Disk.

Number System & Conversion: Decimal, Binary, Octal and Hexadecimal.

Unit-II

Basics of Programming: Introduction, History, Generations of Programming Languages, Types of Programming Languages, Flow Charts.

Fundamentals of C++ programming: Data Types, Operators, Writing and Executing C++ Programs, Standard I/O Functions, Goto Statement, Break and Continue Statement, Conditional Statements and Loops.

Unit-III

Functions: Introduction, Function Prototypes, Passing Values to Functions, Recursive Functions.

Arrays: Declaration and Initialization, Manipulating Array Elements, Multidimensional Arrays, String.

Pointer and Structure: Introduction, Declarations, Double Pointer, Pointer to Function, Function Returning Pointer, Pointer to Array, Array of Pointers, Dynamic Memory Allocation using Malloc and Calloc functions, Structures, Arrays of Structures, Pointers to Structures, Union.

Unit-IV

Operating System: Introduction, Functions of Operating System, Types of Operating System, Popular Operating Systems.

Database Management System: Introduction to DBMS, Data Models, Applications of DBMS, Architecture of Database Management System, DBA, Keys, Data Definition Language, Data Manipulation Language.

Unit-V

Computer Networks & Internet Technology: Introduction, Types of Network, Internetworking Devices, Network Topologies, E-commerce, WWW and Web Browser.

HTML: Introduction, Working with Text, Lists, Table, Frames, Hyperlinks, Images, Multimedia, Forms and Controls.

RECOMMENDED BOOKS

- Fundamentals of Computer Engineering, E. Balagurusamy, Tata McGraw Hill Education Pvt. Ltd.
- Let Us C++, Yashavant P. Kanetkar, BPB Publications.
- Operating System Concepts, Galvin, Wiley.
- Computer Fundamentals and C Programming, Sumitabha Das, McGraw Hill Education

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COURSE OUTCOMES

After completion of the course students would be able to:

CO1. Tell the fundamental concepts and techniques used in computer engineering.

CO2. Explain the working and features of the basic components of computer system.

CO3. Apply the concept and attributes to design programs for problem solving.

CO4. Compare various operating systems and also analyze the different approaches of maintaining data.

CO5. Determine the importance of various components of computer networking and web designing.

CO6. Develop a skill of programming using the constructs of C++.

BASIC COMPUTER ENGINEERING
100203

List of Programs

Q.1 Write a program to find the area and volume of sphere.
Q.2 Write a program to find out whether the character pressed through the keyboard is a digit or not (using conditional operator).
Q.3 Write a program to add the individual digits of a 3-digit number by % and / operator.
Q.4 Write a program to print the factors of a given number.
Q.5 Write a program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
Q.6 Write a program to check whether a given 3 digit number is Armstrong number or not using if-else.
Q.7 Write a program to find the GCD (greatest common divisor) of two given integers using non-recursive and recursive function.
Q.8 Write a program to print Fibonacci series using recursion.
Q.9 Write a program that uses a function to reverse a given string and use it to check whether the given string is a palindrome or not.
Q.10 Write a program to search a given element n present in the array or not.
Q.11 Write a program to sort the array elements in ascending order using bubble sort technique.
Q.12 Write a program to count the lines, words and characters in a given text.
Q.13 Write a program to determine if the given string is a palindrome or not.
Q.14 Write a program to copy one structure to another of same type.
Q.15 Write a program to swap two numbers using pointers.
Q.16 Design a table using basic HTML tags.
Q.17 Design an ordered and un-ordered List using basic HTML tags.
Q.18 Design a registration form using basic HTML tags
Q.19 Design a static home page using basic HTML tags.
Q.20 Add multimedia components to a web page.