GRADUATION REQUIREMENT (2021-22)

B. Tech. (Information Technology)

Department of Information Technology
College of Technology
G.B. Pant University of Agriculture of Technology Pantnagar-263145 (Uttarakhand)

GRADUATION REQUIREMENT (2021-22)

B. Tech. (Information Technology)

(BATCH: 2021)

Sr. No.	Course Code	Course Title	Hours per week			Credits	Pre-requisite	Remarks
			L	T	P			
1.	BPC-102	CHEMISTRY-I	3	0	3	4	NIL	New
2.	BPM-143	CALCULUS AND LINEAR ALGEBRA	3	1	0	4	NIL	New
3.	TEE-104	BASIC ELECTRICAL ENGINEERING	3	1	2	5	NIL	New
4.	TID/ TSW/ TCE/ TME-109	INTRODUCTION TO ENVIRONMENTAL ENGINEERING AND DISASTER MANAGEMENT	3	0	0	3	NIL	Existing
5.	TIT-121	PROGRAMMING FOR PROBLEM SOLVING	3	0	2	4	NIL	New
6.	TWP-101	WORK PROGRAMME	0	0	3	1	NIL	Existing
7.	TIC-100	INDUCTION PROGRAMME (2 WEEKS)	-	-	-	0	NIL	New
8.	BPP-151	PHYSICS WAVES AND OPTICS AND INTRODUCTION TO QUANTUM MECHANICS	3	1	2	5	NIL	New
9.	BPM-154	MULTIVARIABLE CALCULUS, TRANSFORMS & ORDINARY DIFFERENTIAL EQUATIONS	3	1	0	4	NIL	New
10.	TCE-114	ENGINEERING GRAPHICS & DESIGN	1	0	4	3	NIL	New
11.	TIP-103	WORKSHOP PRACTICES	1	0	4	3	NIL	New
12.	BHS-186	ENGLISH	2	0	2	3	NIL	New
13.	BHS-188	INDUSTRIAL SOCIOLOGY	3	0	0	3	NIL	Existing

14.	TIT/TCT-191	PRACTICAL TRAINING-I (2 WEEKS)	-	-	-	-	NIL	New
15.	TIT-233	DATASTRUCTURES	3	0	2	4	NIL	New
16.	TCT-202	DIGITAL ELECTRONICS	3	0	2	4	NIL	New
17.	BPS-228	PROBABILITY AND STATISTICS	3	1	0	4	NIL	New
18.	BHS-286	EFFECTIVE TECHNICAL COMMUNICATION	3	0	0	3	NIL	New
19.	NSS-201 or NCC-201	NATIONAL SERVICE SCHEME OR NATIONAL CADET CORPS	0	0	4	1	NIL	Existing
20.	TIT-234	FOUNDATIONS OF INFORMATION TECHNOLOGY	2	0	2	3	NIL	New
21.	TIT-235	FORMAL LANGUAGE & AUTOMATA THEORY	3	0	0	3	NIL	New
22.	TIT-241	DISCRETE MATHEMATICS	3	0	0	3	NIL	New
23.	TIT-245	COMPUTER ORGANIZATION	3	0	2	4	NIL	New
24.	TIT-243	OPERATING SYSTEMS	3	0	2	4	NIL	New
25.	NSS-202 or NCC-202	NATIONAL SERVICE SCHEME OR NATIONAL CADET CORPS	0	0	0	0	NIL	Existing
26.	TEC-301	ANALOG ELECTRONIC CIRCUITS	3	0	2	4	NIL	New
27.	TIT-244	OBJECT ORIENTED PROGRAMMING	2	0	4	4	NIL	New
28.	TIT/TCT-291	PRACTICAL TRAINING-II (2 weeks)	0	0	0	0	NIL	New
29.	TIT-351	DATABASE MANAGEMENT SYSTEMS	3	0	2	4	NIL	New
30.	TIT-352	JAVA PROGRAMMING	2	0	4	4	NIL	New
31.	TIT-*	ELECTIVE-I	3	0	0	3	NIL	New
32.	BHS-100	CONSTITUTION OF INDIA	1	0	0	1	NIL	New
33.	TIT-353	DESIGN & ANALYSIS OF ALGORITHMS	3	0	2	4	NIL	New
34.	TIT-362	E- COMMERCE	2	0	2	3	NIL	New
35.	NSS-301 or NCC-301	NATIONAL SERVICE SCHEME OR NATIONAL CADET CORPS	0	0	4	1	NIL	Existing

36.	TIT-*	ELECTIVE-II	3	0	0	3	NIL	New
37.	TIT-*	ELECTIVE-III	3	0	0	3	NIL	New
38.	******	OPEN ELECTIVE-I	-	-	-	3	NIL	New
39.	NSS-302 or NCC-302	NATIONAL SERVICE SCHEME OR NATIONAL CADET CORPS	0	0	0	0	NIL	Existing
40.	TIT-363	MODERN TRENDS IN INFORMATION TECHNOLOGY	2	0	2	3	NIL	New
41.	TIT-365	WEB AND INTERNET TECHNOLOGY	3	0	2	4	NIL	New
42.	TIT-364	COMPUTER NETWORKS	3	0	2	4	NIL	New
43.	TIT/TCT-391	PRACTICAL TRAINING-III (4 WEEKS)	0	0	0	0	NIL	New
44.	TIT-483	COMPUTER SYSTEM SECURITY	2	0	2	3	NIL	New
45.	TIT-*	ELECTIVE-IV	3	0	0	3	NIL	New
46.	TIT-*	ELECTIVE-V	3	0	0	3	NIL	New
47.	TIT-484	IT WORKSHOP	1	0	2	2	NIL	New
48.	******	OPEN ELECTIVE-II	-	-	-	3	NIL	New
49.	TIT-495A	PROJECT-I	0	0	8	4	NIL	New
50.	TIT-492	SEMINAR	0	0	2	1	NIL	Existing
51.	TIT-486	OPEN SOURCE SYSTEMS	2	0	2	3	NIL	New
52.	TIT-*	ELECTIVE-VI	3	0	0	3	NIL	New
53.	******	OPEN ELECTIVE-III	-	-	-	3	NIL	New
54.	******	OPEN ELECTIVE-IV	-	-	-	3	NIL	New
55.	TIT-495B	PROJECT-II	0	0	16	8	NIL	New
			TOTAL CREDITS			**162**		

Note:

1. Those students who have not taken Hindi at the High School or equivalent level will also require to register the course BHS-105, Elementary Hindi – 2 Credits.
2. An Induction Programme of Two week is to be offered to the students at the start of first year.
3. The Students can take open elective from any department of the University.

GRADUATION REQUIREMENTS FOR
B. TECH. (INFORMATION TECHNOLOGY) (REGULAR)
SEMESTER-WISE DISTRIBUTION OFCOURSES, BATCH-2021

Sr. No.	Course Code	Course Title	Hours per week			Credits
			L	T	P	
SEMESTER I (FIRST YEAR I-SEMESTER)						
1	TIC-100	Induction Programme (2 Weeks)	-	-	-	-
2	TWP-101	Work Programme	0	0	3	1
3	BPC-102	Chemistry-I	3	0	3	4
4	TEE-104	Basic Electrical Engineering	3	1	2	5
5	TID/ TSW/ TCE/ TME-109	Introduction to Environmental Engineering and Disaster Management	3	0	0	3
6	TIT-121	Programming for Problem Solving	3	0	2	4
7	BPM-143	Calculus and Linear Algebra	3	1	0	4
		Total Credits				**21**
SEMESTER II (FIRST YEAR II-SEMESTER)						
1	TIP-103	Workshop Practices	1	0	4	3
2	TCE-114	Engineering Graphics & Design	1	0	4	3
3	BPP-151	Physics Waves and Optics and Introduction to Quantum Mechanics	3	1	2	5
4	BPM-154	Multivariable Calculus, Transforms & Ordinary differential equations	3	1	0	4
5	BHS-186	English	2	0	2	3
6	BHS-188	Industrial Sociology	3	0	0	3
7	TIT/TCT-191	Practical Training-I (2 weeks)	-	-	-	-
		Total Credits				**21**

SEMESTER III (SECOND YEAR I-SEMESTER)

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	TCT-202	Digital Electronics	3	0	2	4
2.	BPS-228	Probability and Statistics	3	1	0	4
3.	TIT-233	Data Structures	3	0	2	4
4.	TIT-234	Foundations of Information Technology	2	0	2	3
5.	TIT-235	Formal Language & Automata Theory	3	0	0	3
6.	BHS-286	Effective Technical Communication	3	0	0	3
7.	NSS-201 or NCC-201	National Service Scheme or National Cadet Corps	0	0	4	1
				TOTAL CREDITS		**22**

SEMESTER IV (SECOND YEAR II-SEMESTER)

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	TIT-241	Discrete Mathematics	3	0	0	3
2.	TIT-243	Operating Systems	3	0	2	4
3.	TIT-244	Object Oriented Programming	2	0	4	4
4.	TIT-245	Computer Organization	3	0	2	4
5.	TEC-301	Analog Electronic Circuits	3	0	2	4
6.	NSS-202 or NCC-202	National Service Scheme or National Cadet Corps	0	0	0	0
7.	TIT/TCT-291	Practical Training-II (2 Weeks)	0	0	0	0
				TOTAL CREDITS		**19**

SEMESTER V (THIRD YEAR I-SEMESTER)

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	BHS-100	Constitution of India	1	0	0	1
2.	******	Open Elective-I	-	-	-	3
3.	TIT-351	Database Management Systems	3	0	2	4
4.	TIT-352	Java Programming	2	0	4	4
5.	TIT-353	Design &Analysis of Algorithms	3	0	2	4
6.	TIT-362	E- Commerce	2	0	2	3
7.	TIT-*	Elective-I	3	0	0	3
8.	NSS-301 or NCC-301	National Service Scheme or National Cadet Corps	0	0	4	1
					TOTAL CREDITS	**23**

SEMESTER VI (THIRD YEAR II-SEMESTER)

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	TIT-363	Modern Trends in Information Technology	2	0	2	3
2.	TIT-364	Computer Networks	3	0	2	4
3.	TIT-365	Web and Internet Technology	3	0	2	4
4.	******	Open Elective-II	-	-	-	3
5.	TIT-*	Elective-II	3	0	0	3
6.	TIT-*	Elective-III	3	0	0	3
7.	NSS-302 or NCC-302	National Service Scheme Or National Cadet Corps	0	0	0	0
8.	TIT/TCT-391	Practical Training-III (4 Weeks)	0	0	0	0
					TOTAL CREDITS	**20**

SEMESTER VII (FOURTH YEAR I-SEMESTER)

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	TIT-483	Computer System Security	2	0	2	3
2.	TIT-484	IT Workshop	1	0	2	2
3.	TIT-*	Elective-IV	3	0	0	3
4.	TIT-*	Elective-V	3	0	0	3
5.	******	Open Elective-III	-	-	-	3
6.	TIT-492	Seminar	0	0	2	1
7.	TIT-495A	Project-I	0	0	8	4
					TOTAL CREDITS	**19**

SEMESTER VIII (FOURTH YEAR II-SEMESTER)

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	******	Open Elective-IV	-	-	-	3
2.	TIT-486	Open Source Systems	2	0	2	3
3.	TIT-*	Elective-VI	3	0	0	3
4.	TIT-495B	Project-II	0	0	16	8
					TOTAL CREDITS	**17**

TIT-*: Elective Course- Course to be selected from the list of Programme Elective Courses.
********: Open Elective Course- The Students can take open elective from any department of the University.**
Total Credit Hours: 162

NOTE: Students will take either NSS or NCC and once they have opted, students will not be able to change NSS to NCC or NCC to NSS.

GRADUATION REQUIREMENTS FOR
B. TECH. IN INFORMATION TECHNOLOGY (REGULAR)
SEMESTER-WISE DISTRIBUTION OFCOURSES
(DIPLOMA BATCH –2022)

I-SEMESTER, B.TECH (I.T.), II YEAR

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	TCT-202	Digital Electronics	3	0	2	4
2.	BPS-228	Probability and Statistics	3	1	0	4
3.	TIT-233	Data Structures	3	0	2	4
4.	TIT-234	Foundations of Information Technology	2	0	2	3
5.	TIT-235	Formal Language & Automata Theory	3	0	0	3
6.	BHS-286	Effective Technical Communication	3	0	0	3
7.	NSS-201 or NCC-201	National Service Scheme or National Cadet Corps	0	0	4	1
8.	TWP-101	Work Programme	0	0	3	1
					TOTAL CREDITS	**23**

II-SEMESTER, B.TECH (I.T.), II YEAR

Sr. No.	Code	Course Title	Hours per week			Credits
			Lecture	Tutorial	Practical	
1.	TIT-241	Discrete Mathematics	3	0	0	3
2.	TIT-243	Operating Systems	3	0	2	4
3.	TIT-244	Object Oriented Programming	2	0	4	4
4.	TIT-245	Computer Organization	3	0	2	4
5.	TEC-301	Analog Electronic Circuits	3	0	2	4
6.	NSS-202 or NCC-202	National Service Scheme or National Cadet Corps	0	0	0	0
7.	TIT/TCT-291	Practical Training-II (2 Weeks)	0	0	0	0
					TOTAL CREDITS	**19**

I-SEMESTER, B.TECH (I.T.), III YEAR

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	BHS-100	Constitution of India	1	0	0	1
2.	******	Open Elective-I	-	-	-	3
3.	TIT-351	Database Management Systems	3	0	2	4
4.	TIT-352	Java Programming	2	0	4	4
5.	TIT-353	Design Analysis of Algorithms	3	0	2	4
6.	TIT-362	E- Commerce	2	0	2	3
7.	TIT-*	Elective-I	3	0	0	3
8.	NSS-301 or NCC-301	National Service Scheme or National Cadet Corps	0	0	4	1
					TOTAL CREDITS	**23**

II-SEMESTER, B.TECH (I.T.), III YEAR

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	TIT-363	Modern Trends in Information Technology	2	0	2	3
2.	TIT-364	Computer Networks	3	0	2	4
3.	TIT-365	Web and Internet Technology	3	0	2	4
4.	TIT-*	Elective-II	3	0	0	3
5.	TIT-*	Elective-III	3	0	0	3
6.	******	Open Elective-II	-	-	-	3
7.	NSS-302 or NCC-302	National Service Scheme or National Cadet Corps	0	0	0	0
8.	TIT/TCT-	Practical Training-III (4 Weeks)	0	0	0	0
					TOTAL CREDITS	**20**

I-SEMESTER, B.TECH (I.T.), IV YEAR

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	******	Open Elective-III	-	-	-	3
2.	TIT-483	Computer System Security	2	0	2	3
3.	TIT-484	IT Workshop	1	0	2	2
4.	TIT-*	Elective-IV	3	0	0	3
5.	TIT-*	Elective-V	3	0	0	3
6.	TIT-495A	Project-I	0	0	8	4
7.	TIT-492	Seminar	0	0	2	1
					TOTAL CREDITS	**19**

II-SEMESTER, B.TECH (I.T.), IV YEAR

Sr. No.	Code	Course Title	Hours per week			Credits
			L	**T**	**P**	
1.	******	Open Elective-IV	-	-	-	3
2.	TIT-486	Open Source Systems	2	0	2	3
3.	TIT-*	Elective-VI	3	0	0	3
4.	TIT-495B	Project-II	0	0	16	8
					TOTAL CREDITS	**17**

TIT-*: Elective Course- Course to be selected from the list of Programme Elective Courses.
********: Open Elective Course- The Students can take open elective from any department of the University.**

Total Credit Hours: 121

NOTE: Students will take either NSS or NCC and once they have opted, students will not be able to change NSS to NCC or NCC to NSS.

LIST OF B.TECH. (I.T.) PROGRAMME ELECTIVE COURSES

Sr. No.	Course No	Course Name	Credit (L-T-P)	Pre-requisite	Remarks
1.	TIT-301	COMPUTER ARCHITECTURE	3(3-0-0)	NIL	New
2.	TIT-302	IT MARKETING	3(3-0-0)	NIL	New
3.	TIT-303	THEORY OF COMPUTATION	3(3-0-0)	NIL	New
4.	TIT-304	SOFTWARE ENGINEERING	3(3-0-0)	NIL	New
5.	TIT-305	KNOWLEDGE MANAGEMENT	3(3-0-0)	NIL	New
6.	TIT-307	INTERNET OF THINGS	3(3-0-0)	NIL	New
7.	TIT-308	ARTIFICIAL INTELLIGENCE	3(3-0-0)	NIL	New
8.	TIT-309	DATA ANALYTICS	3(3-0-0)	NIL	New
9.	TIT-310	MULTIMEDIA TECHNOLOGY	3(3-0-0)	NIL	New
10.	TIT-311	COMPILER DESIGN	3(3-0-0)	NIL	New
11.	TIT-366	INTELLECTUAL PROPERTY RIGHTS	3(3-0-0)	NIL	New
12.	TIT-401	EMBEDDED SYSTEMS	3(3-0-0)	NIL	New
13.	TIT-402	MOBILE COMPUTING	3(3-0-0)	NIL	New
14.	TIT-403	CLOUD COMPUTING	3(3-0-0)	NIL	New
15.	TIT-404	COMPUTER GRAPHICS AND ANIMATION	3(3-0-0)	NIL	New
16.	TIT-405	DISTRIBUTED COMPUTING	3(3-0-0)	NIL	New
17.	TIT-406	IMAGE PROCESSING	3(3-0-0)	NIL	New
18.	TIT-407	DATA MINING & WARE HOUSING	3(3-0-0)	NIL	New
19.	TIT-408	DECISION SUPPORT SYSTEMS	3(3-0-0)	NIL	New
20.	TIT-409	AD-HOC & SENSOR NETWORKS	3(3-0-0)	NIL	New
21.	TIT-410	MACHINE LEARNING	3(3-0-0)	NIL	New
22.	TIT-411	MANAGEMENT INFORMATION SYSTEMS	3(3-0-0)	NIL	New
23.	TIT-412	SIMULATION & MODELING	3(3-0-0)	NIL	New

LIST OF B.TECH. (I.T.) PROGRAMME OPEN ELECTIVE COURSES

Sr. No.	Course No	Course Name	Credit (L-T-P)	Pre-requisite	Remarks
1.	TIT-305	KNOWLEDGE MANAGEMENT	3(3-0-0)	NIL	New
2.	TIT-366	INTELLECTUAL PROPERTY	3(3-0-0)	NIL	New
3.	TIT-406	IMAGE PROCESSING	3(3-0-0)	NIL	New
4.	TIT-411	MANAGEMENT INFORMATION SYSTEMS	3(3-0-0)	NIL	New

DETAILED 4-YEAR

CURRICULUM

CONTENTS

BRANCH: B. Tech. (I.T.)

PROFESSIONAL CORE COURSES

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Programming for Problem Solving TIT-121
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits :	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization: Yes c. Student research: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Programming for ProblemSolving
2. CourseNo : TIT-121
3. CreditHours : 4(3-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

S. No.	Lecture Topics	No. of Lectures
1.	***Unit I:*** Introduction to Programming, Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.), Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code	9
2.	***Unit 2(Part 1):*** Arithmetic expressions and precedence. **Unit 2(Part 2):**Conditional Branching and Loops Writing and evaluation of conditionals and consequent branching Iteration and loops	7
3.	***Unit 3:***Arrays Arrays (1-D, 2-D), Character arrays and Strings	5
4.	***Unit 4:*** Pointers Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)	3
5.	***Unit 5:*** Basic Algorithms Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)	5
6.	***Unit 6:*** Function Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference	5
7.	***Unit 7:*** Recursion Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.	5
8.	***Unit 8:*** Structure Structures, Defining structures and Array of Structures	**5**
9.	***Unit 9:*** File handling	**2**
10.	Pre-final	2
	Total	**48**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Familiarization with programming environment, Simple computational problems using arithmetic expressions	3
2.	Iterative problems based on branching & loops	3
3.	1D & 2D array implementation	3
4.	Pointers, structures and dynamic memory allocation	3
5.	Implementation of Functions including recursive function	2
6.	Implementation of file handling operations	2
	Total	**16**

REFERENCE BOOKS

(i) Byron Gottfried, Schaum's Outline of Programming with C,McGraw-Hill
(ii) E. Balaguruswamy, Programming in ANSI C, TataMcGraw-Hill
(iii) Let us C by YashwantKanetkar.
(iv) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall ofIndia

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

Course outcomes

1. Illustrate the flowchart and design an algorithm for a given problem and to develop IC programs using operators
2. Develop conditional and iterative statements to write Cprograms
3. Exercise user defined functions to solve real timeproblems
4. Inscribe C programs that use Pointers to access arrays, strings andfunctions.
5. Exercise user defined data types including structures and unions to solveproblems
6. Inscribe C programs using pointers and to allocate memory using dynamic memory managementfunctions.
7. Exercise files concept to show input and output of files inC

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Data Structures TIT-233
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Suchit Kumar Gupta/Er. Subodh Prasad
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Data Structures
2. CourseNo : TIT-233
3. CreditHours : 4(3-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the course:

1. To impart the basic concepts of data structures andalgorithms.
2. To understand concepts about searching and sortingtechniques
3. To understand basic concepts about stacks, queues, lists, trees andgraphs.
4. To enable them to write algorithms for solving problems with the help of fundamental datastructures

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	**Introduction:** Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. **Searching:** Linear Search and Binary Search Techniques and their complexity analysis.	9
2.	**Stacks and Queues**: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation - corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types ofQueues: Algorithms and their analysis.	11
3.	**Linked Lists:** Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, Doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis. **Trees:** Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of Binary Trees. B Tree, B+Tree: definitions, algorithms and analysis.	11
4.	**Sorting and Hashing:** Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods,Hashing.	9
5.	**Graph:** Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.	6
6.	Pre-final	2
	Total	**48**

S. No.	Name of Practical	No. of Practicals
1.	Program to perform various operations on Singly Linked List ADT	1-2
2.	Program to perform various operations on Arrays	3-4
3.	Program to perform various Sorting algorithms	5-6
4.	Program to perform various operations on Trees	7-9
5.	Program to perform various operations on Graphs	10-13

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

REFERENCE BOOKS

1. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, SartajSahni, Computer Science Press.
2. Algorithms, Data Structures, and Problem Solving with C++" , Illustrated Edition by Mark Allen Weiss, Addison-Wesley PublishingCompany
3. "How to Solve it by Computer", 2nd Impression by R. G. Dromey, PearsonEducation.

Course outcomes

1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify thecorrectness.
2. For a given Search problem (Linear Search and Binary Search) student will able to implementit.
3. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computationcomplexity.
4. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Timecomplexity.
5. Student will able to implement Graph search and traversal algorithms and determine the time and computationcomplexity.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Foundations of Information Technology TIT-234
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(2-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Foundations of Information Technology
2. CourseNo : TIT-234
3. CreditHours : 3(2-0-2)
4. Prerequisite : NIL
5. Syllabus/Catalogue Description
CourseDetails:

S. No.	Lecture Topics	No. of Lectures
1.	**Information Concept & Processing :** Definition of Information, Need for Information, Quality of Information, Value of Information, Categories and Levels of Information in Business Organization, Data concepts and Data Processing, data Representation-Number System.	5
2.	**Computer Appreciation:** Definition of an Electronic Digital Computer, History, Generations, Characteristics, and applications of computers, Classification of computers. Elements of Computers Processing System, Hardware CPU, Peripherals, Storage Media, Software Definition, Role and Categories, Firmware and Human-ware.	5
3.	**Computer & Communication:** Need for Data Transmission Over Distances, Types of Data Transmission, Media for Data Transmission, Networking of Computers-Introduction of LAN & WAN, Client-Server Architecture.	4
4.	**Programming Language Classification:** Computer Languages, Generation of Languages, Translators-Interpreters, Compilers, Assembles, Introduction to 4GLS.	5
5.	**Internet Technologies:** Basic Internet Applications, Collaborations tools. Understanding websites, web servers and blogs. Internet technologies Overview, Understanding the difference between internet and intranet. HTML and CSS. Information Security Basics, Various Cyber-Attacks: Denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks, Phishing and spear phishing attacks, Drive-by attack, Password attack, SQL injection attack, Cross-site scripting (XSS) attack, Eavesdropping attack. VIRUS, Wormsand Trojans.	11
6.	Pre-final	2
	Total	**32**

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

S. No.	Name of Practical	No. of Practicals
1.	Office Tools	1-4
2.	Internet Searching Tools And Techniques	5-6
3.	File Management & Windows Explorer Skills	7-9
4.	O.S. Installation of Various Types	10-13
5.	Educational Copyright, Computer Security	14-16

REFERENCE BOOKS

1. Foundation of Information Technology by D.S. Yadav, New Age International (P)Limited.
2. Rajaraman, V., "Introduction toComputer".
3. Morris, "ComputerOrganization".
4. Hamacher, "ComputerOrganization".
5. Kanter, "Managing InformationSystem".

Course outcomes

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

1. Understand the nature of the ITindustry.
2. Recognize the context and constraints of any informationsystem.
3. Recognize ethical issues associated with the use ofIT.
4. Model and analyze the ways that organizations or other systemswork.
5. Build appropriate models for the operation of an informationsystem.
6. Build an application which uses web and database technologies to provide a solution to a realistic problem.
7. Work and communicate as an effective member of a well managedteam.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Formal Language & Automata Theory TIT-235
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Formal Language & AutomataTheory
2. CourseNo : TIT-235
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the course

1. Develop a formal notation for strings, languages andmachines.
2. Design finite automata to accept a set of strings of alanguage.
3. Prove that a given language is regular and apply the closure properties oflanguages.
4. Design context free grammars to generate strings from a context free language and convert them into normalforms.
5. Prove equivalence of languages accepted by Push Down Automata and languages generated by context freegrammars
6. Identify the hierarchy of formal languages, grammars andmachines.
7. Distinguish between computability and non-computability and Decidability andundecidability.

S. No.	Lecture Topics	No. of Lectures
1.	Introduction: Alphabet, languages and grammars , productions and derivation, Chomsky hierarchy of languages. Regular languages and finite automata: Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) andequivalence with DFA.	8
2.	Regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages, minimization of finite automata. Context-free languages and pushdown automata: Context-free grammars (CFG)and languages (CFL),	12
3.	Chomsky and Greibachnormal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages,deterministicpushdownautomata, closure properties of CFLs. Context-sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence withCSG. Turing machines:	13
4.	The basic model for Turing machines (TM), Turing- recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators.	6
5.	Undecidability: Church-Turing thesis, universal Turing machine,theuniversal and diagonalization languages, reduction between languages and Rice s theorem, undecidable problems about languages.	7
6.	Prefinals	2
	Total	48

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

Suggestedbooks

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson EducationAsia.

Suggested reference books:

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson EducationAsia.
2. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science,Springer.

3. Michael Sipser, Introduction to the Theory of Computation, PWSPublishing.
4. John Martin, Introduction to Languages and The Theory of Computation, Tata McGrawHill.

Course Outcomes:

1. Write a formal notation for strings, languages andmachines.
2. Design finite automata to accept a set of strings of alanguage.
3. For a given language determine whether the given language is regular ornot.
4. Design context free grammars to generate strings of context freelanguage.
5. Determine equivalence of languages accepted by Push Down Automata and languages generated by context freegrammars
6. Write the hierarchy of formal languages, grammars andmachines.
7. Distinguish between computability and non-computability and Decidability andundecidability.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Discrete Mathematics TIT-241
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : DiscreteMathematics
2. CourseNo : TIT-241
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:
Objectives of the course:

1. This course provides students the opportunity to learn Discrete MathematicalStructures.
2. Familiarize thestudentwith Set theory (Proposition and logical operators. Truth table, tautologies and Implication, laws of logic, Mathematical Induction, Quantifiers) AlgebraicStructures.
3. Introduce students graph theory, finitefield.
4. Upon successful completion of this course, students will be ableto cover Set theory, Algebraic Structures, Groups, and finitefields

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	Set theory (Proposition and logical operators. Truth table, tautologies and Implication , laws of logic, Mathematical Induction, Quantifiers)	10
2.	Algebraic Structures, Groups: Monoids and groups, Subgroups, Groups, Homomorphism and Isomorphism. Groups Codes.	10
3.	Graph Theory: Introduction, Connectivity, Traversals and coloring Lattices: Lattices and semi lattices, sublattices, modular, geometrical, Boolean lattices	10
4.	Finite Fields, (Integral domain and fields Extension of fields, Existence theorem, finite fields), Boolean algebra, Atoms of a Boolean algebra as n – Tupple of O's and 1's Boolean Expression and Boolean function	10
5.	Boolean Sub algebra, Application Boolean Algebra to switching theory (NAND) gates and NOR gates.)	6
6.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:

1. KennethH.Rosen,DiscreteMathematicsanditsApplications,TataMcGraw-Hill
2. Susanna S. Epp, Discrete Mathematics with Applications,4th edition, Wadsworth Publishing Co.Inc.
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw -Hill.
4. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science", TMG Edition,TataMcgraw-Hill
5. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press.

Schaum's Outlines Series, Seymour Lipschutz, MarcLipson,

6. Discrete Mathematics, Tata McGraw -Hill
7. Swapan Kumar Sarkar, "A Text Book of Discrete Mathematics", S.ChandPublication.
8. C L Liu,"Elements of Discrete Mathematics", McGraw-HillPublication.

Course Outcomes:

1. For a given logic sentence express it in terms of predicates, quantifiers, and logicalconnectives.
2. For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference.
3. For a given a mathematical problem, classify its algebraicstructure.
4. Evaluate Boolean functions and simplify expressions using the properties of Booleanalgebra.
5. Developthe givenproblemasgraphnetworksandsolvewithtechniquesofgraphtheory.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Computer Organization TIT-245
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite:NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area of knowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Sanjay Joshi / Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : ComputerOrganization
2. CourseNo : TIT-245
3. CreditHours : 4(3-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the course:

1. To expose the students to the following: How Computer Systems work & the basicprinciples.
2. Instruction Level Architecture and Instruction Execution, the current state of art in memory system design, how I/O devices are accessed and itsprinciples.
3. To provide the knowledge on Instruction Level Parallelism, to impart the knowledge on micro programming, concepts of advanced pipeliningtechniques.

THEORY:

S. No.	Lecture Topics	No. of Lectures
1.	**Functional blocks of a computer**: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs. **Data representation**: signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.	12
2.	**Introduction** to x86 architecture. **CPU control unit design**: hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU. **Memory system design**: semiconductor memory technologies, memory organization. **Peripheral devices and their characteristics**: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB	13
3.	**Pipelining**: Basic concepts of pipelining, throughput and speedup, pipeline hazards. **Parallel Processors**: Introduction to parallel processors, Concurrent access to memory and cache coherency.	10
4.	Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.	11
5.	Pre-final	2
	Total	**48**

S. No.	Name of Practical	No. of Practicals
1.	Logic gates and flip flops	1-2
2.	Ripple Carry adder	3-4
3.	4-bit shift register	5-6
4.	Multiplier circuit	7-9
5.	Chip select generator circuit	10-13
6.	Memory read and write operations	14-15
7.	Assembly programs on arithmetic operations	16-17

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

REFERENCE BOOKS:

1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy,Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by CarlHamacher, McGraw Hill Higher Education.
3. "Computer Architecture and Organization", 3rd Edition by John P. Hayes,WCB/McGrawHill
4. "ComputerOrganizationandArchitecture:DesigningforPerformance",10thEditionbyWilliamStallings, Pearson Education.
5. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

Course outcomes

1. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instructionset.
2. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial portcommunication).
3. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe theprocess.
4. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with theCPU.
5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISCmethodology

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Operating Systems TIT-243
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. GovindVerma
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : OperatingSystems
2. CourseNo : TIT-243
3. CreditHours: 4(3-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:
Objectives of the course
Students will demonstrate:

1. Knowledge of process control, threads,concurrency,
2. Memory management scheduling, I/O and files, distributed systems, security,
3. Networking. Student teams will implement a significant portion of an operatingsystem.

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	**Introduction:** Basics of Operating Systems: Definition – Generations of Operating systems – Types of Operating Systems, OS Service, System Calls, OS structure: Layered, Monolithic, Microkernel Operating Systems – Concept of Virtual Machine	5
2.	**Process Management:** Processes: Definition , Process Relationship , Process states , Process State transitions , Process Control Block ,Context switching – Threads – Concept of multithreads , Benefits of threads – Types of threads Process Scheduling: Definition , Scheduling objectives ,Types of Schedulers,Scheduling criteria : CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) , Scheduling algorithms : Pre emptive and Non , pre emptive , FCFS– SJF – RR , Multiprocessor scheduling : Types , Performance evaluation of the scheduling.	10
3.	**Inter process Communication:** Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, and Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc., Scheduling, Scheduling Algorithms.	8
4.	**Deadlocks:** Definition, Deadlock characteristics , Deadlock Prevention , Deadlock Avoidance :banker's algorithm, Deadlock detection and Recovery.	6
5.	**Memory Management:** Basic Memory Management: Definition, Logical and Physical address map, Memory allocation : Contiguous Memory allocation – Fixed and variable partition – Internal and ExternalfragmentationandCompaction,Paging:Principleofoperation–Pageallocation – Hardware support for paging –,Protection and sharing – Disadvantages of paging. Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging (Concepts only) – Page Replacement policies : Optimal (OPT) , First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU)	10
6.	**I/O Management:** Principles of I/O Hardware: I/O devices, Device controllers , Direct memory access Principles of I/O Software: Goals of Interrupthandlers, Device drivers , Device independent I/O software , Secondary-Storage Structure: Disk structure ,Disk scheduling algorithm. File Management: File concept, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping),directory implementation (linear list, hash table),efficiency & performance.	7
7.	**Pre-final**	2
	Total	**48**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Introduction(Working with Linux - Shell Scripting)	1-2
2.	System Calls	3-4
3.	Process Management	5-6
4.	Scheduling Algorithms	7-9
5.	Multi Threading Using thread library	10-13
6.	Inter Process Communication : Shared Memory and Pipe	14-15
7.	Process/Thread Synchronization Memory Management	15-17

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

REFERENCE BOOKS:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia StudentEdition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall ofIndia.
3. Andrew Tanenbaum, Modern Operating Systems, PrenticeHall.
4. William Stallings, Operating Systems, PrenticeHall.
5. Harvey M. Deitel, An introduction to operating systems.Addison-Wesley.
6. Andrew Tanenbaum& Albert Woodhull, Operating Systems: Design and Implementation. Prentice-Hall.
7. Douglas Comer, Operating System Design - The XINU Approach.Prentice-Hall.
8. A.M. Lister, Fundamentals of Operating Systems. Macmillan(1979).

Course Outcomes

1. Create processes andthreads.
2. Develop algorithms for process scheduling for a given specification of CPU Utilization, Throughput, Turnaround Time, Waiting Time, ResponseTime.
3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the accesstime.
4. Design and implement file managementsystem.
5. For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/Ocontrollers.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Object Oriented Programming TIT-244
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(2-0-4)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite :NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech. Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. GovindVerma
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Object OrientedProgramming
2. CourseNo : TIT-244
3. CreditHours : 4(2-0-4)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the course

Students who successfully pass this course will be able to:

1. Justify the philosophy of object-oriented design and the concepts of encapsulation, abstraction, inheritance, andpolymorphism
2. Design, implement, test, and debug simple programs in an object-oriented programminglanguage
3. Describe how the class mechanism supports encapsulation and informationhiding
4. Design, implement, and test the implementation of "is-a" relationships among objects using a class hierarchy andinheritance
5. Compare and contrast the notions of overloading and overriding methods in an object-orientedlanguage;
6. Describe how iterators access the elements of acontainer.

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	Object oriented programming viz-a-viz traditional programming	4
2.	Objects, classes, Private and public, data encapsulation	4
3.	Inheritance and reusability polymorphism and overloading. C++/Java as a language for OOP	4
4.	Constructors, destructors and member functions derived classes and dynamic binding, virtual functions	3
5.	Input and Output streams. Arrays, Pointers and pointer arithmetic	3
6.	Structured data type in C++ templates implementation of stacks queue and trees using templates.	4
7.	Modeling object oriented systems, Class design issue. Advanced input output in C++/Java.	8
8.	Pre-final	2
	Total	**32**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Stream I/O: C++ /Java Streams, Java Stream Classes, Unformatted I/O Operations, Formatted I/O Operations, Manipulators, Designing own Manipulators.	1-4
2.	Disk I/O: File Stream Classes, Opening and Closing a File, File Modes, File Pointers, Sequential I/O Operations, Errors, Command Line Arguments.	5-8
3.	Templates: Function and Class Templates, Overloading of Template Functions.	9-10
4.	Standard Template Library: Components of STL, Containers, Algorithms, Iterators, Vectors, Lists, Maps, Common C++ Library Files.	11-13
5.	Exception Handling: Exceptions; Try, Throw and Catch; Multiple Catches, Rethrowing, Specifying Exceptions.	14-16

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

REFERENCE BOOKS:

1. E. Balagurusamy, "Object Oriented Programming with C++",TMH.
2. B. Stroustrup, "The C++ Programming Language",Addison-Wesley.
3. H. Schildt, "C++: The Complete Reference", FourthEdition,Osborne/McGraw-Hill.
4. Rumbaghet. al., "Object Oriented Modeling",PHI.
5. R.S. Pressman, "Software Engineering: A Practitioners Approach", McGrawHill.

Course outcomes

1. Understand the features of C++ supporting object orientedprogramming
2. Understand the relative merits of C++ as an object oriented programminglanguage
3. Understand how to produce object-oriented software usingC++
4. Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance andpolymorphism
5. Understand advanced features of C++ specifically stream I/O, templates and operator overloading

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Database Management Systems TIT-351
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite:NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Rajesh Shyam Singh /Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Database ManagementSystems
2. CourseNo : TIT-351
3. CreditHours : 4(3-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the course
At the end of the course the student will be able to do:

1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs, database modeling, relational, hierarchical, and networkmodels
3. To understand and use data manipulation language to query, update, and manage adatabase
4. To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), DataWarehousing.
5. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing aDBMS.

S. No.	Lecture Topics	No. of Lectures
1.	Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language(DML), **Data Models :** Entity –relationship model, Network model, relational and Object Oriented models, integrity constraints, data manipulation operations	10
2.	**Relational Query languages :** Relational Algebra, Tuple and Domain Relational Calculus, SQL, DDL and DML constructs, Open source and commercial DBMS: MYSQL, ORACLE, DB2, SQL SERVER **Relational Database Design :** Domain and data dependency, Armstrong's axioms, Normal Form, Dependency preservation, Lossless Design **Query processing and optimization :** Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms	12
3.	**Storage strategies :** Indices, B trees, Hashing	4
4.	**Transaction processing :** Concurrency control, ACID property, Serializability of Scheduling, Locking and time stamp based schedulers, Multiversion and optimistic concurrency control schemes, Database recovery	8
5.	**Database Security :** Authentication, Authorization and Access control, DAC, MAC and RBAC, Intrusion Detection, SQL injection	6
6.	**Advanced topics:** Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.	6
7.	Pre-final	2
	Total	**48**

PRACTICALS

S. No.	Name of Practical	No. of Practicals
1.	Write the queries for Data definition and Data Manipulation Language.	1
2.	Write SQL queries using Logical operators.	1
3.	Write SQL queries using SQL operators (Between, AND, IN(List), Like, IS NULL and also with negative expressions).	2
4.	Write SQL queries using character, number, date and group functions.	2
5.	Write SQL queries for Relational Algebra (UNION, INTERSECT, MINUS, etc.)	1

6.	Write SQL queries for extracting data from more than one table.	2
7.	Concepts of ROLL BACK, COMMIT and CHECK POINTS.	2
8.	Write program by using PL/SQL.	2
9	Concepts of ROLL BACK, COMMIT and CHECK POINTS.	1
10	Create Views, Cursors and triggers and write assertions.	2
	Total	16

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

REFERENCE BOOKS:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan,McGraw-Hill.
2. "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer SciencePress.
3. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education
4. "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley

Course Outcomes

1. For a given query write relational algebra expressions for that query and optimize the developed expressions
2. For a given specification of the requirement design the databases using E R method and normalization.
3. For a given specification construct the SQL queries for Open source and Commercial DBMS - MYSQL, ORACLE, andDB2.
4. For a given query optimize its execution using Query optimizationalgorithms
5. For a given transaction-processing system, determine the transaction atomicity,consistency, isolation, anddurability.
6. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability ofscheduling.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Java Programming TIT-352
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(2-0-4)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. GovindVerma
21.	Approved By	Course Curriculum Committee and BOFT

1.CourseTitle : Java Programming
2.Course No : TIT-352
3. CreditHours : 4(2-0-4)
4.Prerequisite : NIL
5. Syllabus/Catalogue Description:
Objectives of the course
After completing this course students should be able to
1. Solve problems using various Java language and libraryfeatures
2. Understand and use Object Oriented concepts to develop reusable, reliable, and maintainable software
Prerequisites Undergraduate courses or equivalent knowledge in programming in a high-levellanguage.

S. No.	Lecture Topics	No. of Lectures
1.	Introduction to Computers, the Internet and Java Introduction to Java Applications; Input/Output and Operators	2
2.	Introduction to Classes, Objects, Methods, and Strings Control Statements: Part 1; Assignment, ++ and – Operators, Control Statements: Part 2; Logical Operators	4
3.	Introduction to JShell: Java 9's REPL Debugging / Testing / GUI basic	2
4.	Methods: A Deeper Look Arrays and Array Lists	2
5.	Classes and Objects: A Deeper Look Object-Oriented Programming: Inheritance Object-Oriented Programming: Polymorphism and Interfaces	4
6.	Exception Handling: A Deeper Look	2
7.	JavaFX Graphical User Interface:	2
8.	Strings, Characters, and Regular Expressions Files, Streams, and Object Serialization	4
9.	Generic Collections Java SE 8 Lambdas and Streams	2
10.	Recursion, Searching, Sorting	4
11.	Introduction to Generic Classes and Methods Custom Generic Data Structures	2
12.	Pre-final	2
	Total	**32**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Developing classes and Object.	2
2.	Methods and String Manipulation	2
3.	Develop OOD concepts	4
4	Implementation of Exception Handling	2

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

Reference Books:

1. Text Java: How to Program (Early Objects), 11th Edition, by Paul Deitel and Harvey Deitel,Pearson
2. Java Software Solutions John Lewis, William Loftus. AddisonWesley
3. Introduction to Programming Using Java, Sixth Edition Version 6.0, June 2011 Author: David J.Eck
4. Head First Java, Bert Bates, Kathy Sierra, Publisher: O'Reilly Media,Inc.

Course Outcomes
After taking the course, students will be able to:
1. Specify s imple abstract data types and design implementations, using abstraction functions to documentthem.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on objectidentity.
3. Name and apply some common object-oriented design patterns and give examples of theiruse.
4. Design applications with an event-driven graphical userinterface

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Design and Analysis of Algorithms TIT-353
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Suchit Kumar Gupta / Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Design and Analysis ofAlgorithms
2. CourseNo : TIT-353
3. CreditHours : 4(3-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the course

1. Analyze the asymptotic performance ofalgorithms.
2. Write rigorous correctness proofs foralgorithms.
3. Demonstrate a familiarity with major algorithms and datastructures.
4. Apply important algorithmic design paradigms and methods ofanalysis
5. Synthesize efficient algorithms in common engineering designsituations.

Sr. No	Lecture topic	No. of Lectures
1.	Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds - best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters'theorem.	10
2.	Fundamental Algorithmic Strategies: Brute-Force, Greedy, Dynamic Programming, Branch- and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving , Bin Packing, Knap Sack TSP. Heuristics - characteristics and their applicationdomains.	10
3.	Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.	10
4.	Tractable and Intractable Problems: Computability of Algorithms, Computability classes - P,NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques. .	10
5.	Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP - PSPACE	6
6.	Pre-final	2
	Total	**48**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Using OpenMP, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.	1-4
2.	Obtain the Topological ordering of vertices in a given digraph.	5-6
3.	Compute the transitive closure of a given directed graph using Warshall's algorithm.	7-8
4.	Implement 0/1 Knapsack problem using Dynamic Programming	9-10
5.	From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.	11-12
6.	Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.	13-14
7.	Print all the nodes reachable from a given starting node in a digraph using BFS method.	15-16

DISTRIBUTION OF MARKS

IPre-finalExamination	15%	IIPre-final Examination	15%
Practical	20%	FinalExamination	50%

Suggested books:

1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivestand Clifford Stein, MITPress/McGraw-Hill.
2. Fundamentals of Algorithms -E. Horowitz et al.
3. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos,Pearson.
4. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia,Wiley.
5. Algorithms -- A Creative Approach, 3rd Edition, UdiManber, Addison-Wesley, Reading,MA.
6. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures andAlgorithms", Pearson Education, Reprint 2006.
7. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer,2008.

CourseOutcomes

1. For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
2. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedyalgorithms.
3. Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms. Derive and solve recurrencerelation.
4. Describe the dynamic programming paradigm and explain whenan algorithmic design situation calls for it. For a given problems of dynamic-programming and develop the dynamic programming algorithms, and analyze it to determine its computationalcomplexity.
5. For a given model engineering problemmodel it using graph and write the corresponding algorithm to solve theproblems.
6. Explain the ways to analyze randomized algorithms (expected running time, probability oferror).
7. Explain what an approximationalgorithm is. Compute the approximation factor of an approximation algorithm (PTAS andFPTAS).

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.l	E-Commerce TIT-362
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(2-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite : NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to a considerable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Binay Kumar Pandey / Er. Subodh Prasad
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : E-Commerce
2. CourseNo : TIT-362
3. CreditHours : 3(2-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:
Course Details:

S. No.	Lecture Topics	No.of Lectures
1.	Introduction: What is E Commerce, Forces behind E Commerce, E Commerce Industry Framework, Brief History of E Commerce, Inter Organizational E Commerce, Intra Organizational E Commerce, Consumer to Business Electronic Commerce, Architectural frame work	5
2.	Network Infrastructure for E Commerce: Network infrastructure for E Commerce, Market forces behind I-Way, Component of I Way, Access Equipment, Global Information Distribution Network, Broad band Telecommunication	5
3.	Mobile Commerce: Introduction to Mobile Commerce, Mobile Computing Applications, Wireless Application Protocols, WAP Technology, Mobile information Devices.	4
4.	Web Security: Introduction to Web Security, Firewalls & Transaction Security, Client Server Network, Emerging Client Server Security Threats, Firewalls & Network Security. Encryption: World Wide Web & Security, Encryption, transaction security, Secret Key Encryption, Public Key Encryption, virtual Private Networks (VPM), Implementation & Management Issues.	8
5.	Electronic Payments: Overview of Electronic Payments, Digital Token based Electronic Payment System, Smart Cards, Credit Card/ Debit Card based EPS, Emerging financial Instruments. Home Banking, Online Banking Net Commerce: EDI, EDI Application in Business, Legal requirement in E Commerce, Introduction to Supply Chain Management, CRM, issues in customer Relationship management.	8
6.	Pre-final	2
	Total	**32**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Blogging and Micro Blogging using Self and thirdparty domainwith/without the help of CMS(Content Management System)	3
2	Creating of E-Commerce portals with the help of various E-commerce tools	3
3.	Revenue generation using various available product based E-commerce portals	3
4.	Affiliate marketing	3
5.	Creation of own Website with self-hosting/free hosting	4
	TOTAL	16

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

Suggested books:

1. Ravi Kalakota, Andrew Winston, “Frontiers of Electronic Commerce”,AddisonWesley.
2. Pete Lohsin , John Vacca “Electronic Commerce”, New AgeInternational
3. The Complete E-Commerce Book: Design, Build & Maintain a Successful Web-based Business by Janice Reynolds(Author)
4. Alibaba: The House that Jack Ma by DuncanClark

Course Outcomes:

1. Demonstrate an understanding of the foundations and importance of E-commerce
2. Demonstrate an understanding of retailing in E-commerce by: Analyze the impact of E-commerce on business models andstrategy
3. Describe Internet trading relationships including Business to Consumer, Business-to-Business,Intra-organizational.
4. Describe the infrastructure forE-commerce
5. Describe the key features of Internet, Intranets and Extranets and explain how theyrelate to eachother.
6. Discuss legal issues and privacy in E-Commerce
7. Assess electronic paymentsystems
8. Recognize and discuss global E-commerce issues

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Modern Trends in Information Technology TIT-363
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(2-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. GovindVerma
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Modern Trends in InformationTechnology
2. CourseNo : TIT-363
3. CreditHours : 3(2-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:
Objectives of the course:

1. To understand the vision of IoT from a globalcontext.
2. Use of Devices, Gateways and Data Management inIoT.
3. To provide comprehensive knowledge of Cloud Computing concepts, technologies, architecture and applications.
4. To expose the students to frontier areas of Cloud Computing, while providing sufficient foundations to enable further study andresearch.
5. To provide a thorough introduction to the Android environment and tools for creating Androidapplications.
6. To impart knowledge of Objective-C and Apple iOS application design anddevelopment.

PRACTICAL

S. No.	Lecture Topics	No. of Lectures
1.	IoT-The Vision-Introduction, M2M towards IoT- the global context, A use case example, Differing Characteristics, An emerging industrial structure for IoT, M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations	3
2.	IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remotecontrol. Cloud Computing–History of Cloud Computing–Cloud Architecture, Cloud Storage–Why Cloud Computing Matters, Advantages of Cloud Computing, Disadvantages of Cloud Computing, Companies in the Cloud Today, Cloud Services	5
3.	Web-Based Application, Pros and Cons of Cloud Service Development, Types of Cloud Service Development: Software as a Service, Platform as a Service, Web Services, On-Demand Computing, Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds Collaborating via Web-Based Communication Tools, Evaluating Web Mail Services, Evaluating Web Conference Tools, Collaborating via Social Networks and Groupware, Collaborating via Blogs and Wikis	6
4.	Introduction to various mobile device OS, Introduction to Android and Working with Basic UI, Evaluation of Android and OHA, Architecture of Android OS, Introduction to Android SDK, Android Development tools : The Android Virtual Device and SDK Manager, The Android Emulator, Dalvik Debug Monitor Service (DDMS), The Android Debug Bridge(ADB)	8
5.	Android Application Structure: AndroidManifest.xml, Resources & R.java, Assets, Layouts &Drawable Resources, .apkstructure, Working with Basic UI with Android Activity: Widgets(Button, Image Button, Edit Text, Check Box, Toggle Button, Radio Button, Radio Group, Views, Progress Bar View and Auto Complete Text View, Text Fields, Views and View Groups	
6.	Introduction to iOS and Objective-C Basics, Introduction to Mac OS architecture, installing iPhone SDK, Components of SDK, Objective-C basics: Classes, Objects, and Methods, Data Types and Expressions, Control Structures, Inheritance, Categories & Protocol	8
7.	Pre-final	2
	Total	**32**

PRACTICALS

S. No.	Name of Practical	No. of Practicals
1.	Interacting with device peripherals (GPIO , ADC , servos)	1-2
2.	Connecting to the Internet (eg. The device showing the current weather forecast)	3-4
3.	Exposition of device functionality as services (1) (COAP protocol)	5-6
4.	Exposition of Basic UI with Android Activity	7-9
5.	Installation of iPhone SDK and program implementation	10-13
6.	Exposition of cloud services development	14-16

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

REFERENCE BOOKS:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, DavidBoyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
2. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT,2014.
3. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
4. MichaelMiller,CloudComputing:Web-BasedApplicationsThatChangetheWayYouWorkandCollaborateOnline,QuePublishing,August2008.
5. Beginning Android 4 Application Development, WEI-MENG LEE, WROXPublication-Wiley-India
6. Professional Android 4 Application Development by Reto Meier WROX Publication-Wiley-India,2012
7. Android Programming Unleashed, B.M. Harwani, SamsPublishing
8. Beginning Android 4 OnurCinarApressPublication
9. Beginning iPhone SDK Programming with Objective-C, WeiMeng Lee,Wrox

Course Outcomes:

1. Create a business case for an emerging informationtechnology
2. Identify factors affecting the successful adoption of new informationtechnologies
3. Identify the key attributes, business benefits, risks, and cost factors of a newtechnology
4. Know how to effectively use advanced search and selection metrics for identifying and selectingnew technology
5. Describe technology trends that presently drive or are expected to drive the selection of new technologies over the next decade

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Computer Networks TIT-364
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to a considerable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B. Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Computer Networks
2. CourseNo : TIT-364
3. CreditHours : 4(3-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:
Objectives of the course

1. To develop an understanding of modern network architectures from a design and performance perspective.
2. To introduce the student to the major concepts involved inwide-areanetworks (WANs), local area networks (LANs) and Wireless LANs(WLANs).
3. To provide an opportunity to do networkprogramming
4. To provide a WLAN measurementideas.

S. No.	Lecture Topics	No. of Lectures
1.	Data communication Components: Representation of data and its flow Networks , Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum. Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction- Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Goback - N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA,Slotted ALOHA, CSMA/CD,CDMA/CA	13
2.	Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back - N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA,Slotted ALOHA, CSMA/CD, CDMA/CA	10
3.	Network Layer: Switching, Logical addressing - IPV4, IPV6; Address mapping - ARP, RARP, BOOTP and DHCP-Delivery, Forwarding and Unicast Routing protocols.	8
4.	Transport Layer: Process to Process Communication, User Datagram Protocol (UDP),Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucketalgorithm.	8
5.	Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File TransferProtocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts ofCryptography	7
6.	Pre-final	2
	Total	**48**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, Routers etc.	1-3
2.	Preparing straight and cross cables.Study of various LAN topologies and their creation using network devices, cables and computers.	4-6
3.	Study of various LAN topologies and their creation using network devices, cables and computers.	7-9
4.	Configuration of TCP/IP Protocols in Windows and Linux.	10-13
5.	Implementation of file and printer sharing. Designing and implementing Class A, B, C Networks	14-16

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

REFERENCE BOOKS:

1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
2. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall ofIndia.
3. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States ofAmerica.

Course Outcomes:

1. To master the terminology and concepts of the OSI reference model and the TCP-IP referencemodel.
2. To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide areanetworks.
3. To be familiar with wireless networkingconcepts.
4. To be familiar with contemporary issues in networkingtechnologies.
5. To be familiar with network tools and networkprogramming.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Web And Internet Technology TIT-365
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(3-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : WEB and InternetTechnology
2. CourseNo : TIT-365
3. CreditHours : 4(3-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the Course

1. This course is an overview of the modern Web technologies used for the Webdevelopment.
2. The purpose of this course is to give students the basic understanding of how things work in the Web world from the technology point of view as well as to give the basic overview of the different technologies.
3. The topics include (although in some cases briefly): History of the Web, Hypertext Markup Language (HTML), Extensible HTML (XHTML), Cascading Style Sheets (CSS), and JavaScript. We will follow the guidance of the World Wide Web Consortium (W3C) to create interoperable and functional websites.

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	**Internet:** Internet Connecting to Internet : Telephone, cable, Satellite connection, choosing an ISP, Introduction to Internet services-Mail concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing Introduction to WWW : Protocols and programs, secure connections, application and development tools, the web browser, What is server, choices, setting up UNIX and Linux web servers, Logging users, dynamic IP Web Design: Web site design principles, planning the site and navigation,	5
2.	Introduction to HTML : The development process, Html tags and simpleHTML forms, web site structure Introduction to XHTML : XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser.	6
3.	Style sheets : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, bordersand boxes, margins, padding lists, positioning using CSS,CSS2	6
4.	Javascript : Client side scripting, What is Javascript, How to developJavascript, simple Javascript, variables, functions, conditions, loops and repetition. Inroduction to JSON	8
5.	Advance script, Javascript and objects, Javascript own objects, the DOM and web browser environments, forms and validations DHTML : Combining HTML, CSS and Javascript, events and buttons, controlling your browser, Ajax: Introduction, advantages&disadvantages,Purposeofit,ajaxbasedwebapplication,alternativesof ajax	9
6.	XML : Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT	6
7.	**Java Servlet and JSP:**Servelets Basic, Servlet API Basic, Life Cycle of a Servlet, Running Servlet, Debugging Servelets, Thread-safe Servelets, HTTPRedirects, Cookies, Introduction to Java Server pages (JSP).	6
8.	Pre-final	2
	Total	**48**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Developing classes and Object.	2
2.	Methods and String Manipulation	2

3.	Develop OOD concepts	4
4	Implementation of Exception Handling	2

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

REFERENCE BOOKS:

1. Steven Holzner," HTML Black Book", Dremtechpress.
2. Web Technologies, Black Book, DreamtechPress
3. Web Applications : Concepts and Real World Design, Knuckles,Wiley-India
4. Internet and World Wide Web How to program, P.J. Deitel& H.M. DeitelPearson.

Course Outcomes:

1. Analyze a web page and identify its elements andattributes.
2. Create web pages using XHTML and Cascading Stylessheets.
3. Build dynamic web pages using JavaScript (client sideprogramming).
4. Write non-trivial programs usingC#.
5. Create XMLdocuments.
6. Build and consume webservices.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Computer System Security TIT-483
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(2-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses: No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Suchit Kumar Gupta / Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Computer System Security
2. CourseNo : TIT-483
3. CreditHours : 3(2-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the Course:

This course provides students the opportunity to

1. Learn concepts of cryptography, security, attacks, services and mechanisms, Steganograpyetc.
2. At the end of the course, Students will be able to apply various security schemes to various systems, networks systemsetc.

3.Students will be to apply Web Security: Secure Socket Layer Security, Secure Electronic Transaction (Set), system security: Intruders, Viruses, Firewall Design Principles, TrustedSystems.

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	**Introduction to Cryptography:** Introduction to Security: Attacks, Services & Mechanisms. Security, Attacks, Security Services. Conventional Encryption: Classical Techniques. Conventional Encryption Model, And Steganograpy, Classical Encryption Techniques. Modern Techniques : Simplified DES, Block Chiper Principles, DES standard, DES Strength Differential & Linear Cryptanalysis, Block Chiper Design principles, Block chopper Modes of Operation.	6
2.	**Conventional Encryption algorithms:** Triples DES, Blowfish, International Data Encryption Algorithm, RCS, CAST-128,RC2 Placement & Encryption function, key Distribution, Random Number Generation, Placement of Encryption Function.	4
3.	**Public Key Encryption:** Public- Key Cryptography: Principles of Public –Key Cryptosystems, RSA Algorithm, Key Management, Fermat's &Fuler'sTheorm, Primarily, The Chinese Remainder Theorem.	7
4.	**H Hash Functions:** Authentication Requirements, Authentication function, Message Authentication Codes, Hash Functions, Birthday Attacks, Security of Hash Function & MACS, MD5 Message Digest Algorithm, Birthday Attacks, Security of Hash Function & MACS, MD5 Message Digest Algorithm, Secure HashAlgorithm (SHA) Digital Signature: Digital Signatures, Authentication Protocol, Digital Signature Standard (DSS), Proof of Digital Signature Algorithm	6
5.	**Network & System Security:** Authentication Applications; Kerberos X.509,directory authentication Service electronic Mail Security, Pretty Good Privacy (PGP),S/Mine, Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management, Web Security :Secure Socket Layer Security, Secure Electronic Transaction (Set),system security : Intruders, Viruses, Firewall DesignPrinciples, Trusted Systems.	7
6.	Pre-final	2
	Total	**32**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1	Implementation of substitution and transposition techniques	1
2	Implementation of DES algorithm	2-3
3.	Implementation of block chiper algorithm	4-5
4.	Implementation of RSA algorithm	6-10
5.	Implementation of Digital Signature Standardalgorithm	11-14
6.	CASE study and comparison on various cryptographic algorithm	15-16

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical	20%	Final Examination	50%

REFERENCE BOOKS:

1. William Stallings, “Cryptography and Network Security: Principles and Practice”Hall.
2. Johannes A Buchmann, “Introduction to cryptography”,Springer-Verlag.
3. AtulKahate, “Cryptography and Network Security”,TMH.

Course Outcomes:

1. The ability to determine the computer security strategy, the location of these systems`administrator.
2. The students are expected to have the ability to specify security policies including: protected resources, defined procedures and available technologies and the role of people involved in theprocedure.
3. Understand how malicious code functions (e.g., viruses), what the vulnerabilities that make propagation possible (e.g., buffer overflows), and what methods and practices are available for mitigation (e.g., the CommonCriteria).

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	IT Workshop TIT-484
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	2(1-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B. Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er. GovindVerma
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : ITWorkshop
2. CourseNo : TIT-484
3. CreditHours : 2(1-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:
Objective of the course:

1. To impart the basic concepts and working of IT Workshop using SciLab.
2. To make students practically sound on varioustechnologies.

S. No.	Lecture Topics	No. of Lectures
1.	Introduction: Overview of Scilab, How to get and install Scilab: Installing Scilab under Windows, Installing Scilab under Linux, Installing Scilab under Mac OS, Getting help from Scilab demonstrations and macros Getting started with: console, editor	2
2.	Basic elements of the language: Creating real variables, Variable names, Comments and continuation lines, Elementary mathematical functions, Pre-definedmathematicalvariables,Booleans,Complexnumbers,Integers:Overview of integers, Conversions between integers, Circular integers and portability issues, Floating point integers; The ans variable, Strings, Dynamic type of variables	3
3.	Matrices Overview: Create a matrix of real values, The empty matrix, Query matrices, Accessing the elements of a matrix, The colon ":" operator, The eye matrix, The dollar "$" operator, Low-level operations, Elementwise operations, Conjugate transpose and non-conjugate transpose, Multiplication of two vectors, Comparing two real matrices, Issues with floating point integers, More on elementary functions, Higher-level linear algebra	4
4.	Looping and branching: The if statement, The select, The for statement, The while statement, The break and continue statements. Functions: Overview, Defining a function, Function libraries, Managing output arguments, Levels in the call stack, The return statement, Debugging functions with pause.	3
5.	Plotting: Overview, 2D plot, Contour plots, Titles, axes and legends, Export	2
6.	Pre-final	2
	Total	**16**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Installation of Sci Lab and starting with console and editor	1
2	Creation of real variables, Pre-defined mathematical variables, Booleans use of Comments and continuation lines, Elementary mathematical functions, Complex numbers, Integers: Overview of integers, Conversions between integers, Circular integers and portability issues, Floating point integers; The ans variable, Strings, Dynamic type of variables	3
3.	Matrix implementation and elementary operation over the matrix, Conjugate transposeandnon-conjugatetranspose,DemonstrationonHigher-levellinear algebra	3
4.	Looping and branching: Implementation of The if statement, The select, The for statement, The while statement, The break and continue statements.	3
5.	Functions: Defining a function, Function libraries, Managing output arguments, Levels in the call stack, The return statement, Debugging functions with pause.	3
6.	Plotting: Overview, 2D plot, Contour plots, Titles, axes and legends, Export	3
	TOTAL	16

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical Examination	20%	Final Examination	50%

Suggested books:

1. Scilab: I. Fundamentals: Sci Lab from theory to Practice by Perrine Mathieu, PhilippeRoux2016
2. Programming in Scilab 4.1 byVinu

Course Outcomes:

1. Understanding the Basic elements of SciLab.
2. Matrices Overview and performation over SciLab.
3. Various kinds of plotting like 2D plotting, Contourplotting.
4. Sci Lab Looping and branching, the implementation of various logical statements.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Open Source System TIT-486
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(2-0-2)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Open SourceSystems
2. CourseNo : TIT-486
3. CreditHours : 3(2-0-2)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the course:

1. Students will become familiar with the open source movement, its philosophy and history, the open source process and its development methods, tools, communication mechanisms and licensing issues. During the semester studentswill:
2. Choose between the various open source licenses and learn the implications for users, developers, and the software community ingeneral
3. Use the communication modes particular to the open source world through participation in such things as mailing lists, IRC, wikis,etc.
4. Become familiar with and become adapt using the tools of open source development, for example: distributed revision control; documentation tools; automated build and test systems; debuggers; source code utilities; tracking systems; online resources,etc.
5. Write software that integrates and interacts with the open project's code. For example: addons; bug fixes; new features;etc.
6. Learn and understand Agile development methodology and use it to develop open source software within the project
7. Work collaboratively with fellow students and other members of the project'scommunity

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	**History and Emergence of Open Source Software:** The philosophy of OSS, Richard Stallman, The Cathedral and the Bazaar (CatB), commercial software vs OSS, free software vs freeware.Opensourcedevelopmentmodels.ApplicationProgrammingInterface(API).GNU Project**,** Free Software Foundation**.**	6
2.	**Community Building:** Importance of Communities in Open Source Movement. JBoss Community. Developing blog, group, forum, social network for social purpose.	4
3.	**Open Standards:** National Information Standards Organization (NISO), The Digital Library Federation (DLF). The Dublin Core Metadata Initiative. MARC standards, Resource DescriptionandAccess(RDA).OpenArchivesInitiative.OAI-PMH.Search/Retrievalvia URL (SRU), SRW/CQL. Java Platform, Enterprise Edition (Java EE).	5
4.	**Open Source Licenses:** GNU General Public License (GPL) version 2,3, GNU Lesser General Public License (LGPL) version 2.1,3, GNU Affero General Public License (AGPL) version 3, Apache License, Version 2.0, Artistic License 2.0, etc.	5
5.	**Operating System:** The Linux operating system and its use both for desktops and as server software.	4
6.	**Webserver:** Apache HTTP Server and its flavors. WAMP server (Windows, Apache, MySQL, PHP). Open Source MySQL. Apache, MySQL, PHP, JAVA as development platform.	3
7.	Open Source Software: Category of Open Source Software. OSS for podcasts, RDBMS, online social networks, etc. open source bibliometricsoftwares like pajek, ucinet, etc	3
8.	Pre-final	2
	Total	**32**

PRACTICAL

S. No.	Name of Practical	No. of Practicals
1.	Unix installation	1-4
2.	Web server intsallation	5-8
3.	MYSQL INSTALLATION	9-12
4.	Study of various open source softwares	13-16

DISTRIBUTION OF MARKS

I Pre-final Examination	15%	II Pre-final Examination	15%
Practical Examination	20%	Final Examination	50%

REFERENCE BOOKS:

1. Open Source Technology and Policy by Fadi P. Deek& James A. M. McHugh, New Jersey Institute of Technology

2. Fundamentals of Open Source Software, M. N.Rao

Course Outcomes:

1. Ability to install and run open-source operatingsystems.
2. Ability to gather information about Free and Open Source Software projects from software releases and from sites on theinternet.
3. Ability to build and modify one or more Free and Open Source Softwarepackages.
4. Ability to use a version control system and to interface with version control systems used by development communities.
5. Ability to contribute software to and interact with Free and Open Source Software developmentprojects.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Project-I TIT-495A
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	4(0-0-8)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To provide practical knowledge of different approaches and emerging technologies to students
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Project-I
2. CourseNo. : TIT-495A
3. CreditsHours : 4(0-0-8)
4. Pre-requisite : NIL

5. Guidelines:

The object of Project Work I is to enable the student to take up investigative study in the broad field of Information Technology, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or group of students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&Dwork.

The assignment to normally include: Survey and study of published literature on the assigned topic; Working out a preliminary Approach to the Problem relating to the assigned topic; Conducting preliminary Analysis/Modelling/Simulation/Experiment/Design/Feasibility; Preparing a Written Report on the Study conducted for presentation to the Department; Final Seminar, as oral Presentation before a departmental committee.

6. MarksDistribution

Internal Evaluation on the basis of understanding the project by the students, presentation, usefulness and documentation.

DISTRIBUTION OF MARKS

Total: 100 Marks

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	Project-II TIT-495B
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	8(0-0-16)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To provide practical knowledge of different approaches and emerging technologies to students
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Professional Core Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Project-II
2. CourseNo. : TIT-495B
3. CreditsHours : 8(0-0-16)
4. Pre-requisite : NIL

5. Guidelines:

The object of Project Work II is to enable the student to extend further the investigative study taken up under Project-I or any independent study taken altogether by an individual or group of students, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:

In depth study of the topic assigned in the light of the Report prepared under: Review and finalization of the Approach to the Problem relating to the assigned topic; Preparing an Action Plan for conducting the investigation, including team work; Detailed Analysis/ Modeling/ Simulation/ Design/ Problem Solving/ Experiment as needed; Final development of product/process, testing, results, conclusions and future directions; Preparing a paper for Conference presentation/Publication in Journals, if possible; Preparing a Dissertation in the standard format for being evaluated by theDepartment.
Final Seminar Presentation before a Departmental Committee.

6. MarksDistribution

Internal Evaluation on the basis of understanding the project by the students, presentation, usefulness and documentation.

DISTRIBUTION OF MARKS
Total: 100 Marks

PROFESSIONAL ELECTIVE COURSES SYLLABUS

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	COMPUTER ARCHITECTURE TIT-301
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B. Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. **CourseTitle : COMPUTERARCHITECTURE**
2. **CourseNo : TIT-301**
3. **CreditHours : 3(3-0-0)**
4. **Prerequisite : NIL**
5. **Syllabus/CatalogueDescription**

Objectives of the course:

1. This course provides the students with opportunity to learn about advancements in the computer architecture which influenced the performance ofcomputer.
2. To know about architecture of different components of ALU viz. adders, multipliers etc, cache architecture, associativity in caches, pipelining in processors, different aspects ofmultiprocessors.

Theory

S. No.	Lecture Topics	No. of Lectures
1.	Instruction set architecture, op-code encoding techniques, processor performance	8
2.	ALU, adders, carry propagation adders, CLA adders, Booths Multiplier.	8
3.	Memory technology, direct-mapped vs. associative caches, write-through vs write-back caches, analyzing cache memory performance.	12
4.	Characteristics of multiprocessors, interconnection structures, time shared common bus, multi port memory, cross bar switch, system bus, inter processor communication and synchronization, conditions for incoherence, solutions to cache coherence.	12
5.	Parallel processing, pipelining, pipelining hazards and resolution.	6
6.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:

1. Computer System Architecture by Morris Mano,PHI
2. Modern Processor Design by John Paul Shen, Mikko H Lipasti,TMH

Course Outcomes:

After completing this course, students will be able to:

1. Design basic and intermediate RISC pipelines, including the instruction set, data paths, and ways of dealing with pipelinehazards.
2. Consider various techniques of instruction-level parallelism, including superscalar execution, branch prediction, and speculation, in design of high-performanceprocessors.
3. State and understand memory hierarchy design, memory access time formula, performance improvement techniques, andtrade-offs.
4. State and compare properties of shared memory and distributed multiprocessor systems and cache coherency protocols.
5. Learn from additional topics in computer architecture, such as multi-core processors, thread-level parallelism, and warehousecomputing.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	IT MARKETING TIT-302
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. **CourseTitle : IT MARKETING**
2. **CourseNo : TIT-302**
3. **CreditHours : 3(3-0-0)**
4. **Prerequisite : NIL**
5. **Syllabus/CatalogueDescription:**

Fundamentals IT marketing, Industrial Buyer Behavior models, Decision making units, Technology and Marketing, System selling, Role of service, Intangibles in Industrial Marketing, Derived Demand Methodologies, Globalization, Contract Review, Selling, Strategies for Diversification, Market Planning and Direct Restructuring, Marketing strategy case studies. Marketing orientation, Pricing Decision, Promotion, Distribution Sales Mgt, Marketing Information Systems, Market Planning & Control, Market Research.

Objectives of the course:

At the end of the course the student will be able to do:

1. To familiarize students with real life marketing problems by exposing them tomarketing
2. Practices and consultingsituation.
3. To apply their knowledge in solving engineeringproblems.
4. To develop a business model for optimizing the resources in terms of requirements and demands pertaining to different entities existing in thesystem.
5. To facilitate students in developing and presenting practical solutions to a specific problem assigned by afirm.

Theory

S. No.	Lecture Topics	No. of Lectures
1.	Microeconomics Demand Theory & Demand Forecasting, Production Theory, Cost Theory, X-Inefficiency.	12
2.	Market Dynamics Forms of Market, Elements of Competition, Perfect Competition, Monopoly & Prince Discrimination, Imperfect Competition Oligopoly. Pricing Policies, Profit Concepts & Measurement, Entry Deterring Pricing, Predatory Pricing, Implicit Price Fixing, Multi-product Pricing, Peak Load Pricing, Two part Tariff, Product Life Cycle, Information Problems and Associated Cost.	12
3.	Firm as an Organization, Objectives of the Firm, Types of the Firm, Firm versus markets, Uncertainty and Firm, Vertical and Horizontal Integration, Diversification, Merges and Takeovers	12
4.	Macroeconomics, Macroeconomic Aggregates and Concepts, Simple macroeconomic Models, Business Cycle, Inflation, Unemployment, Input Output Analysis.	10
5.	**Prefinal**	2
	Total	48

DISTRIBUTION OF MARKS

I Pre-final Examination	**20%**	**II Pre-final Examination**	**20%**
Assignment	**10%**	**Final Examination**	**50%**

Suggested books:

1. Gupta, G.S. "ManagerialEconomics".
2. Davis, H., "Managerial Economics", ELBS – Pitman.

Suggested reference books

1. Mote, V.N., Paul Samuel& Gupta, G.S. "managerial Economics: Concepts andCases",Tata McGraw Hill Co. Ltd. NewDelhi.
2. RamakrishnaRao, T.V.S. "Theory of firms: Economic and ManagerialAspects",Affiliated East West Press Pvt. Ltd. NewDelhi.
3. Dean, Joel, "Managerial Economics", PrenticeHall.

Course Outcomes

At the end of the course, students will demonstrate the ability to:

1. Understand the role of IT marketing and its aim andobjectives.
2. Understand the problems and research queries that a marketing managerfaces.
3. Analyze and design a behavior model for the problems being faced in realworld.
4. Understand and devise strategies for sales, marketing, pricing etc in anorganization.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	THEORY OF COMPUTATION TIT-303
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area of knowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. **CourseTitle : THEORY OF COMPUTATION**
2. **CourseNo : TIT-303**
3. **CreditHours : 3(3-0-0)**
4. **Prerequisite : NIL**
5. **Syllabus/CatalogueDescription:**

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	Deterministic and Non- deterministic computation; Wang machines, post machines, RAMs and their equivalence, Universal machines, Halting problem, Decidability and undecidability .	10
2.	Introduction to recursive function theory, equivalence of general recursive function and Turing computable functions, Church's thesis, regular, Context free, context sensitive languages and their relation to automata, complexity classes	10
3.	Introduction to logic for computer: Syntax of propositional formulas, Truth and the semantics of propositional Logic, Notions of satisfiability, validity, inconsistency, Deduction Systems for propositional logic, Completeness of Deductive system.	10
4.	Theorem Proving, Introduction to model theory, Completeness and compactness theorems, First order theories, Robinsons Revolution.	10
5.	Herbrand models, Completeness of resolution, Application of resolution to automatic theorem proving and logic programming.	6
6.	**Prefinal**	2
	Total	48

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOK:

1. Introduction to computer theory, Cohen DanielA.
2. Introduction to theory of computation, GurariEitenM.
3. Recursive function theory and logic,AnnYasuhara

Course Outcomes:

After completing this course, students will be able to:

1. Analyze and design finite automata, pushdown automata, Turing machines, formal languages, andgrammars.
2. Demonstrate their understanding of key notions, such as algorithm, computability, decidability, and complexity through problemsolving.
3. Prove the basic results of the Theory of Computation.
4state and explain the relevance of the Church-Turingthesis.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	SOFTWARE ENGINEERING TIT-304
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : SOFTWAREENGINEERING
2. CourseNo : TIT-304
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:
Objectives of the course:
1. This course provides the students with opportunity to learn SoftwareEngineering.
2. It provides the student to know the basic concepts of software requirement specification, testing principles, software project management, reliability and quality assurance and applications that help in industry to make a project and enhance the advance knowledge ofstudents.

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	Development Phase: Preliminary Design, Detailed Design, Organization for software development.	10
2.	Maintenance Phase: Software Engineering, Maintenance	9
3.	Structured Coding: Importance of structure, Structured coding, code format.	9
4.	Software Engineering for Small Projects: Nature of small projects, small project project development, small project maintenance, Fundamentals ofSoftware Software cost estimation methods and Procedures.	10
5.	Management Issues: An Organizational framework, software project failure, education, how to establish software engineering.	8
6.	Pre-final	2
7.	**Total**	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:
1.K. K. Aggarwal&Yogesh Singh, "Software Engineering", New Age International, 200 I.
2.R. S. Pressman, "Software Engineering - A practitioner's approach", 5th Ed., McGraw Hill Int. Ed., 200 I.
3.R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.
4.P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.

Course Outcomes:
After completing this course, students will be able to:
1. Acquire strong fundamental knowledge in science, mathematics, fundamentals of computer science, software engineering and multidisciplinary engineering to begin in practice as a softwareengineer.
2. Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economicconcerns.
3. Deliver quality software products by possessing the leadership skills as an individual or contributing to the team development and demonstrating effective and modern working strategies by applying both communication and negotiation management skill.
4. Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professionaldevelopment.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	INTERNET OF THINGS TIT-307
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education: Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to a considerable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B. Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : INTERNET OF THINGS
2. CourseNo : TIT-307
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL

5. Syllabus/Catalogue Description: Internet of Things (IoT) is presently a hot technology worldwide. Government, academia, and industry are involved in different aspects of research, implementation, and business with IoT. IoT cuts across different application domain verticals ranging from civilian to defence sectors. These domains include agriculture, space, healthcare, manufacturing, construction, water, and mining, which are presently transitioning their legacy infrastructure to support IoT. Today it is possible to envision pervasive connectivity, storage, and computation, which, in turn, gives rise to building different IoT solutions. IoT-based applications such as innovative shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems, are gradually relying on IoT based systems. Therefore, it is very important to learn the fundamentals of this emergingtechnology.

Objectives of the course:

1. Vision and Introduction toIoT.
2. Understand IoT Marketperspective.
3. Data and Knowledge Management and use of Devices in IoTTechnology.
4. Understand State of the Art – IoTArchitecture.
5. Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation inIoT.

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics.	8
2.	M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.	10
3.	M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management	8
4.	IoT Architecture-State of the Art – Introduction, State of the art, Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model	8
5.	IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. Industrial Automation- Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things, Commercial Building Automation- Introduction, Case study: phase one-commercial building automation today, Case study: phase two- commercial building automation in the future.	12
6.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignments	10%	Final Examination	50%

REFERENCE BOOKS:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press,2014.
2. Vijay Madisetti and ArshdeepBahga, “Internet of Things (A Hands-on-Approach)”, 1st Edition, VPT,2014.

3. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, Apress Publications,2013

Course Outcomes:

At the end of the course the student will be able to:

1. Understand the vision of IoT from a globalcontext.
2. Determine the Market perspective ofIoT.
3. Use of Devices, Gateways and Data Management inIoT.
4. Building state of the art architecture inIoT.
5. Application of IoT in Industrial and Commercial Building Automation and Real World DesignConstraints.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	ARTIFICIAL INTELLIGENCE TIT-308
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : ARTIFICIALINTELLIGENCE
2. CourseNo : TIT-308
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	**What Is Artificial Intelligence:** The Computer and the Brain; Theories of Intelligence, Detecting and Measuring Intelligence, What makes a computer program intelligent? The AI problems; what is an AI technique? Problems, Problem Spaces and Search: Defining the problem as a state space search, Production systems and its characteristics, Issues in the design of search programs. **Knowledge Representation:** Knowledge Representation Issues, Representation and Mappings, Approaches to knowledge Representation, Issues in knowledge Representation, Structural/Causal networks	8
2.	**Using Predicate Logic:** Representing simple Facts in Logic,Representing Instance and ISaRelationships,Computablefunctionsandpredicates,Resolution,NaturalDeduction ,RepresentingKnowledgeusingRules,Proceduralversusdeclarativeknowledge,Logic Programming ,Forward versus Backward reasoning ,Matching.	10
3.	**Heuristic Search Techniques :** Search Applications, Basic search Algorithms ,The " BritishMuseum"Procedure,GenerateandTest,DepthfirstSearch,Breadthfirstsearch ,Uniformcostsearch,Hillclimbing,IntelligentSearching:Bestfirstsearch,TheA* Algorithm, Measuring search, Design of Heuristics, Choice of Search Algorithm.	10
4.	**Game Playing:** MINMAX andGameTrees cutting of search with staticEvaluations. **alpha-beta pruning**: Analysis of Alpha-Beta Pruning Alternatives toAlpha-Beta Pruning Enhancements to the Alpha-Beta Algorithm Quiescence search Iterative deepening, Killer MoveHeuristics.	8
5.	**Natural Language Processing :** Syntax, semantics, and pragmatics Parsing Languages, - Regular Languages, Context free languages Context free subsets of Natural languages Weak and strong context free Languages General Grammars and Augmented Transition Networks Natural Language interfaces to software systems Case study of one or more examples from Natural Language Processing, Question, Answering, Expert system, Vision etc.	10
6.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignments	10%	Final Examination	50%

REFERENCE BOOKS:

1. Artificial Intelligence by Elaine Rich,Kerin Knight, Tata McGrawHill
2. Principles of Artificial Intelligence by Nills J Nillson; NarosaPubl.
3. Artificial Intelligence by Winston; AdditionWesley
4. Introduction to Artificial Intelligence by CharniakandMcDermott Addition Wesley

Course Outcomes:
After completing this course, students will be able to:
1. Demonstrate knowledge of the building blocks of AI as presented in terms of intelligentagents.
2. Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solvethem.

3. Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
4. Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference orplanning.
5. Formulate and solve problems with uncertain information using Bayesianapproaches.
6. Apply concept Natural Language processing to problems leading to understanding of cognitivecomputing.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	DATA ANALYTICS TIT-309
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : DATAANALYTICS
2. CourseNo : TIT-309
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the course:

1. The Student should be made to be exposed to big data learn the different ways of data analysis be familiar with data streams learn the mining and clustering be familiar with thevisualization.
2. Know about structural equationmodeling.

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	Basic statistics, probability theory, statistical distribution.	6
2.	Introduction to Big Data Platform – Challenges of conventional systems - Web data – Evolution of Analytic scalability, analytic processes and tools, analysis vs reporting - Modern data analytic tools, statistical concepts: Sampling distributions, re-sampling, prediction error.	8
3.	Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Analysis of time series: linear systems analysis, nonlinear dynamics - Rule induction - Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks	10
4.	Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform (RTAP) applications	10
5.	Structural equation modeling- Single group analysis, Multiple group analysis, MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications:	12
6.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignments	10%	Final Examination	50%

REFERENCE BOOKS:

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer,2007.
2. AnandRajaraman and Jeffrey David Ullman, Mining of Massive Datasets,Cambridge University Press,2012.

Course Outcomes:

After completing this course, students will be able to:
1. Obtain, clean/process and transformdata.
2. Analyze and interpret data using an ethically responsibleapproach.
3. Use appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potentialissues.
4. Apply computing theory, languages and algorithms, as well as mathematical and statistical models, and the principles of optimization to appropriately formulate and use dataanalyses.
5. Formulate and use appropriate models of data analysis to solve hidden solutions to business-relatedchallenges.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	MULTIMEDIA TECHNOLOGY TIT-310
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : MULTIMEDIA TECHNOLOGY
2. CourseNo : TIT-310
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/Catalogue Description:
Objectives of the course:

1. Introduction, Stages of Multimedia Projects, Multimedia BuildingBlocks.
2. Data Compression, Speech Compression & Synthesis, Images,Video.

Theory

S. No.	Lecture Topics	No. of Lectures
1.	Introduction: Introduction to Multimedia, Multimedia objects, Multimedia in business & work.	6
2.	Stages of Multimedia Projects: Multimedia Hardware, Memory & Storage Devices, Communication Devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools Card and page based authoring tools.	12
3.	Multimedia Building Blocks: Text, sound, MIDI, Digital Audio, audio file formats, MIDI under windows environment, Audio & video Capture	10
4.	Images: Multiple monitors, bitmaps, vector drawing, lossy graphic compression, image file formation animations, Images standards, JPEG Compression, ZigZag Coding.	9
5.	Video: Video representation, Colors, Video Compression, MPEG standard, recent development in Multimedia.	9
6.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignments	10%	Final Examination	50%

REFERENCE BOOKS:

1. Tay Vaughan "Multimedia, Making it work", Osborne McGrawHill
2. Buford, "Multimedia Systems", AddisonWesley
3. Mark Nelson " Data Compression Book",BPB
4. Rosch "Multimedia Bible", SamsPublishing

Course Outcomes:

Students successfully completing this course will be able to:
1. Discuss the technical details of common multimedia data formats, protocols, and compression techniques of digital images, video and audiocontent.
2. Describe and understand the technical details of JPEG and MPEG families ofstandards.
3. Discuss the significance of "Quality of Service" in multimedianetworking.
4. Develop simple but demonstrative multimedia applications using JAI andJMF.
5. Understand and describe technical aspects of popular multimedia webapplications.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	COMPILER DESIGN TIT-311
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : Compiler Design
2. CourseNo : TIT-311
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:
Objectives of the course:

1. Lexical analyzer, design of assemblers, two pass assembler location counter, symbol definition, symbol table,manipulation.
2. Expression parser expression evaluation machine code generation bootstrapping, absolute loader, relocation, relocating loader, linker, link editor, dynamicloader.
3. Dynamic linker debugger segments, multiple locations counters macros-macro pre-processor macro assembler.
4. Introduction to compilation recursive descent parser code generation for assignment statements, expression, conditional statements etc.

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	**Introduction:** Translator & compiler Cousin of compliers boot strapping, compiler writing tools, phases of compilers.	3
2.	**Lexical Analyzer:** The role of lexical analyzer regular expression finite automata, implementation of Lexical analyzer from DFA, scanning & token generation; Buffer management of various desired features of lexical analyzer.	6
3.	**Parsing:** Syntactic specification of programming languages, context freegrammar, capabilities of context free grammar, Basic Parsing technique-shift reduce, operator precedence top down predictive passing LR parsing	6
4.	**Assembler**: Design of Assembler-statement of problem, data structure format of data bases Algorithm, look for modularity	4
5.	Loaders-design of absolute loader-statement of problem, data structure format of data bases, Algorithm.	2
6.	Macros – features of, micro-facility- macro institution argument conditional macro expansion. Implementation-two pass algorithm, single pass algorithm, Implementation within an assembler.	2
7.	**Symbol Table:** Symbol, contents of symbol table data structure representation of scope information, implementation, simple list self organizing list, hash table run time storage administration-case of FORTRAN, ALGOL	6
8.	**Code Generation of Optimization:** Syntax direct translation Intermediate code- Quadruple Triple Translation of statements assignment, Boolean Expression & arithmetic expression.	3
9.	Principle services of optimization, loop optimization, loop invariant computation, Induction value elimination	3
10.	Problems in code generation, machine model A simple code generator.	2
11.	Pre-final	2
	Total	**39**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:

1. Introduction to Automata Theory, Languages, and Computation By Hopcroft, Motwani, & Ullman (2nd, Second Edition), PearsonPublication
2. Principles, Techniques and Tools, by Alfred V. Aho , Monika, Ravi Sethi , D. Jeffrey Ulman, PearsonPublication
3. Principles of Compiler Design by RohitKhurana, ITL ESL PearsonPublication

Course Outcomes:

Students successfully completing this course will be able to:
1. Describe the design of a compiler including its phases andcomponents.
2. Develop a large, complex, but well-structured software system that implements various phases of a compiler such as the scanner, parser, code generator, andoptimizer.

3. Describe current developments in compiler design and implementation.
4. Identify the similarities and differences among various parsing techniques and grammar transformation techniques.
5. Describe the role of the compiler in ensuring the security, privacy and integrity ofdata.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	EMBEDDED SYSTEMS TIT-401
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : EMBEDEDSYSTEMS
2. Course No : TIT-401
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/Catalogue Description:

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	Introduction to Embedded Systems – The build process for embedded systems- Structural units in Embedded processor , selection of processor & memory devices- DMA – Memory management methods- Timer and Counting devices, Watchdog Timer, Real Time Clock.	9
2.	Embedded computing platform- CPU bus, memory devices, I/O devices, interfacing, designing with microprocessors, debugging techniques. Program design and analysis- models of program, assembly and linking, compilation techniques, energy, power and size.	10
3.	Embedded Product Development Life Cycle- objectives, different phases of EDLC, Modelling of EDLC; issues in Hardware-software Co-design	9
4.	I/O Device Ports & Buses– Serial Bus communication protocols - RS232 standard – RS422 – RS485 - CAN Bus -Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I2C)	10
5.	State machine model, Sequential Program Model, concurrent Model, object oriented Model.	8
6.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOK:

1. Wolf, W. Computers as components- Principles of embedded computing system design. Academic Press (Indian edition available from Harcourt India Pvt. Ltd., 27M Block market, Greater Kailash II, New Delhi-110 048.)

Course Outcomes:
Students successfully completing this course will be able to:
1. Understand what is a microcontroller, microcomputer, embedded system.
2. Understand different components of a micro-controller and theirinteractions.
3. Become familiar with programming environment used to develop embeddedsystems.
4. Understand key concepts of embedded systems like IO, timers, interrupts, interaction with peripheral devices.
5. Learn debugging techniques for an embeddedsystem.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles: Course No.	MOBILE COMPUTING TIT-402
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. **CourseTitle : MOBILECOMPUTING**
2. **CourseNo : TIT-402**
3. **CreditHours : 3(3-0-0)**
4. **Prerequisite : NIL**
5. **Syllabus/CatalogueDescription:**

Objectives of the course:

1. Understand the basic concept of mobilecomputing
2. be familiar with network protocolstack
3. Learn the basics of mobile telecommunication &ad-hocNetwork
5. Gain Knowledge about different platforms and applicationdevelopment

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	Introduction to Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signalling. Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signalling, Performance Analysis: Admission control and handoffs	12
2.	2.5/3G Mobile Wireless systems: packet switched Data Introduction, 3G CDMA cellular standards, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G. 2.5/3G TDMA: General Packet Radio Services (GRPS) and EDGE.	10
3.	Access Scheduling techniques in cellular systems Slotted Aloha access, integrated access: voice and data, scheduling in packet based cellular systems. Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.	10
4.	Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML).	6
5.	Simulations Results Analysis and Viewing Tools Display Forms: Tables, Graphs, and Multidimensional Visualization Terminals, X and MS Windows, and Web Interfaces of Model Results	4
6.	Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies. Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems.	4
7.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:

1. Jochen Schiller, “Mobile Communications”, Second Edition, Pearson Education,2004.
2. Raj Kamal, “Mobile Computing”, Oxford Higher Education,2008.
3. SipraDasBit, Biplab K. Sikdar, “Mobile Computing”, PHI,2009.

Course Outcomes:

Students successfully completing this course will be able to:

1. Describe the basic concepts and principles in mobilecomputing.
2. Understand the concept of Wireless LANs, PAN, Mobile Networks, and SensorNetworks.
3. Explain the structure and components for Mobile IP and MobilityManagement.
4. Understand positioning techniques and location-based services andapplications.
5. Describe the important issues and concerns on security andprivacy.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	COMPUTER GRAPHICS AND ANIMATION TIT-404
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : COMPUTER GRAPHICS ANDANIMATION
2. CourseNo : TIT-404
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

Objectives of the course:
1. Learning the fundamentals of computergraphics;
2. Learning to program computer graphicsalgorithms;
3. Learning the mathematics behind computergraphics;

THEORY

S. No.	Lecture Topics	No. of Lectures
1-	Introduction: What is computer graphics and what are the applications, Graphics Systems: Video display devices, Raster scan and random scan displays, Flat panel displays, Three-dimensional viewing devices, Video controller, Input devices, Graphics on the internet, Graphics software, Coordinate representations. Introduction to OpenGL, Basic OpenGL syntax, Related libraries, Header Files, Display-window management using GLUT, A complete OpenGL program.	8
2-	Geometric Transformations: Two dimensional translation, Rotation and scaling, Matrix representations and homogeneous coordinates, Inverse transformations, Composite transformations, Reflection, Shear, Raster methods for geometric transformations, Geometric transformations in three-dimensional space, Affine transformations, OpenGL geometric-transformation programming examples.	8
3-	Two Dimensional Viewing: Viewing pipeline, Clipping window, Normalization and viewport transformations, Clipping Algorithms: Cohen-Sutherland line clipping, Liang-Barsky line clipping, Line clipping against non rectangular clip windows, PolygonClipping: Sutherland-Hodgman, Weiler-Atherton, Curve clipping, Text clipping	10
4-	Three dimensional viewing, Transformations from world to viewing coordinates, 3-D Clipping Three-Dimensional Object Representations: Polyhedra, Curved andquadric surfaces, Blobby objects, Spline representations, Bezier spline curves, Bezier surfaces, B-spline curves, B-spline Surfaces, Octrees, Introduction tofractals.	8
5-	Simulations Results Analysis and Viewing Tools Display Forms: Tables, Graphs, and Multidimensional Visualization Terminals, X and MS Windows, andWeb Interfaces Validation of ModelResults	8
6-	Visible Surface Detection Methods: Classification, Back-Face detection, Depth- Buffer method, A-buffer method, Scan-line method, Curved surfaces. Illumination Models and Surface Rendering Methods: Basic illumination models-Ambient light, Diffuse reflection, Specular reflection and the Phong model, Polygon Rendering Methods: Gouraud surface rendering, Phong surface rendering, Ray tracing, Texture mapping.	4
7-	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:

1. Hughes, Van Dam, et al. Computer Graphics Principles and Practice 3e, Pearson,2014
2. OpenGL Programming Guide, Addison-Wesley,2004.
3. OpenGL Reference Manual, Addison-Wesley,2004.
4. E. Angel, OpenGL: A Primer Addison-Wesley, 2004.
5. P Shirley, Fundamentals of Computer Graphics, 2e, AK Peters,2005

Course Outcomes:

Students successfully completing this course will be able to:
1. List the basic concepts used in computergraphics.
2. Implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
3. Describe the importance of viewing andprojections.
4. Define the fundamentals of animation, virtual reality and its relatedtechnologies.
5. Understand a typical graphicspipeline
6. Design an application with the principles of virtualreality.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	DISTRIBUTED COMPUTING TIT-405
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : DISTRIBUTEDCOMPUTING
2. CourseNo : TIT-405
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/Catalogue Description:

Objectives of the course:

1. Motivation, Topology, Communication, System Type, Filesystem.
2. Modes of Computation, Event Ordering,Synchronization.
3. Deadlock Handling, Robustness, Reaching Agreement Election Algorithmsetc.

THEORY

S. No.	Lecture Topics	No. of Lectures
1-	The Trend To Distributed Processing: Meaning of distributed processing/computing, Local Vs remote distribution, Distributed data and categories of data diatribe, Centralization Vs de centralization. Types Of Distributed Systems: Horizontal Vs vertical distribution, Function distribution vs. system distribution, Hierarchical distributed processing, Non cooperative system, cooperatingsystems	8
2-	Private Networks and Public Networks: Introduction to Distributed Algorithms: Parallelism and distribution, Basic Elements; Processes, Communication paths, Features of distributed algorithms, Classifying distributed algorithms Election And Mutual Exclusion Algorithms: Ricart and Agrawala/Suzuki KasamiAlgorithms, Messages and time stamping, Algorithm for regenerating the token, Various Elective Algorithms	8
3-	Algorithms for Detection and Resolution of Deadlock: Problem of Deadlock, Characterization of deadlock situation, Distribution of a centralized algorithm: Lomet'salgorithms, TheRosenkrantz, Stearns and Lewis Algor., Algorithms for detection deadlocks, Deadlocks due to communications: algorithm of chandy, Misra and Haas Algorithms for Detecting Termination: Problem of termination, Termination and Deadlock, Useofdiffusingcomputation:algorithmofdikstraandscholtein,Terminationona ring:algorithmofDijkstra, feijen and van Gasteren, Use of time stamiping-Rana's Algorithm	10
4-	Protocols for Data Transfer: Introduction, Protocols for the implementations of CSP:Silberschatz's protocol Bernstein's protocol, Methodsof or scribble broadcasting of Messages: The problem, context of the problem	8
5-	Management of Distributed Data: Nature and Distribution of data Consistency of duplicated data, Detection of mutual in Consistency: algorithm of Parker et.al. Maintaining mutual consistency, initializing a new site, Distribution of control algorithms, Construction of a total ordering, distributed tonicity.	6
6-	Problems Of Gaining Consensus In The Presence Of Uncertainties (Or How To Avoid Byzantine Quarrels):The problem of consensus, Thelamport, shostak, and Pease alga., Solutions using signed messages, Broad casting in a less connected system, Thebabaoglu and Drummed algo.	6
7-	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	**20%**	**II Pre-final Examination**	**20%**
Assignment	**10%**	**Final Examination**	**50%**

REFERENCE BOOKS:

1. Computer Networks and Distributed Processing by James Martin.PHI
2. Distributed systems Concepts and Design by G.Conloris et.al; addisionWesleyPHI
3. Distributed Algorithms and protocols by Michel Raynal, John Wiley& Sons.PHI

Course Outcomes:

Students successfully completing this course will be able to:

1. Explain why to design a distributed system and what the desired properties of such systemsare.
2. List the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of theirsolutions.
3. Discuss how the principles are applied in contemporary distributed systems and specific distributed infrastructure such as cloud infrastructure and cloudplatforms.
4. Explain how these principles and features affect software design on specific applicationproblems.
5. Analyze workflow applications and workflow management mechanisms on multiple virtual instances and the challenges with respect to secure data storage, communications, configurability, performance, etc., in distributed systems andclouds.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	DATA MINING AND WAREHOUSING TIT-407
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : DATA MINING ANDWAREHOUSING
2. CourseNo : TIT-407
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/Catalogue Description:

Theory

S. No.	Lecture Topics	No. of Lectures
1-	Data Warehousing: Multidimensional Data Model, OLAP operations, Ware house schema Data Ware housing architecture, Ware house server, Metadata, OLAP Engine. Data Mining (DM) Definitions, KDD vs. Data Mining, DBMS vs. DM, DM Techniques Issues and challenges in DM, DM application areas – Case Studies.	10
2-	Methods to discover Association Rules, A Priori Algorithm, Partition Algorithm, Pioneer- Search Algorithm, and Dynamic Item set counting Algorithm, FP-tree Growth Algorithm Incremental Algorithm Border Algorithm, and Generalized Association rule.	8
3-	Introduction, Clustering Paradigms, Partitioning Algorithm, K-Medoid Algorithm,CLARA,CLARANSHierarchicalClustering,DBSCAN,BIRCH, CURE, Categorical Clustering Algorithms, STIRR, ROCK, CACTUS.	10
4-	Introduction, Tree Construction principle, Best Split, Spitting Indices, Splitting Criteria, Decision Tree construction Algorithms, CART, ID3 C4.5, CHAID, Decision Tree Construction with Presorting, Rain Forest, Approximate Methods, CLOUDS, BOAT, Pruning Technique, Integration of Pruning and construction.	10
5-	Introduction, Temporal Association Rules, Sequence Mining, GSP Algorithm, SPADE, SPIRIT, WUM, Episode Discovery, Event Prediction Problem, Time-Series Analysis, Spatial Mining, Spatial Mining Tasks, Spatial Clustering, Spatial Trends.	8
6-	Pre-final	2
	Total :	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	**20%**	**II Pre-final Examination**	**20%**
Assignment	**10%**	**Final Examination**	**50%**

REFERENCE BOOKS:

1. Berson, “Data Warehousing, Data-Mining & OLAP”,TMH.
2. Mallach, “Decision Support and Data Warehousing System”,TMH.
3. BhavaniThura-is-ingham, “Data-Mining Technologies, Techniques Tools & Trends”, CRCPress.
4. Navathe, “ Fundamental of Database Sytem”, PersonEducation
5. Margaret H. Dunham,“Data-Mining. Introductory & Advanced Topics, PearsonEducation.
6. PeiterAdrians ,DolfZantinge, “Data-Mining,” PersonEducation.

Course Outcomes:

Students successfully completing this course will be able to:
1. Identify the scope and necessity of Data Mining & Warehousing for thesociety.
2. Describe the designing of Data Warehousing so that it can be able to solve the rootproblems.
3. To understand various tools of Data Mining and their techniques to solve the real timeproblems.
4. To develop ability to design various algorithms based on data miningtools.
5. To develop further interest in research and design of new Data Miningtechniques.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	DECISION SUPPORT SYSTEMS TIT-408
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : DECISION SUPPORTSYSTEMS
2. CourseNo : TIT-408
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/Catalogue Description:

Theory

S. No.	Lecture Topics	No. of Lectures
1-	Introduction to decision support systems, decision theory, rational decisions, applicability. Database management systems, MySQL in Linux platform. Relational database concept, relationships, normal forms, database design for complex systems.	10
2-	Database queries, query languages and query optimization for decision support systems. Implementing SQL through server side scripting. User interfaces, HTML+PHP as user interface (UI) designing tools. Server side programming, interfacing with MySQL etc.	8
3-	Usability considerations of UI, information gathering and presentation for decision support, manipulation of query results.	8
4-	Decision support system models, model-database, simulation models. Mathematical and empirical models, model validation and verification. Output analysis, alternate decisions analysis. Economic order quantity models, implementing a EOQ decision support system, considerations.	10
5-	Application of decision support system in manufacturing systems. Enterprise resource planning implementation of decision support systems and applications. Advancements in decision support systems, knowledgebased systems, artificially intelligent systems.	10
6-	Pre-final	2
	Total :	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	**20%**	**II Pre-final Examination**	**20%**
Assignment	**10%**	**Final Examination**	**50%**

REFERENCE BOOKS:

1. Decision Support Systems and Intelligent Systems, Seventh Edition, Efraim Turban, Jay E. Aronson,Richard V. McCarthy, Prentice-Hall of India, 2007
2. Decision Support Systems, A Knowledge-Based Approach, Clyde W. Holsapple and Andrew B.Whinsto
3. Decision Support Systems For Business Intelligence by Vicki L. Sauter

Course Outcomes:
Students successfully completing this course will be able to:
1. Recognize the relationship between business information needs and decisionmaking
2. Appraise the general nature and range of decision supportsystems
3. Appraise issues related to the development of DSS
4. Select appropriate modelingtechniques.
5. Analyze, design and implement decision supportsystems.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	AD-HOC & SENSOR NETWORKS TIT-409
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area ofknowledge: No d. A further development of courses:No e. An Introductory survey of special area of knowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to a considerable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

CourseTitle : Ad-hoc & Sensor Networks
CourseNo. : TIT-409
CreditHours : 3(3-0-0)
Prerequisite : Nil
Catalogue Description: issues in Ad-Hoc Wireless Networks**,** routing protocols, Sensor Network, WSN routing, Mesh Networks, Vehicular Mesh Networks.

Objectives of the course:

1. This course provides students the opportunity to learn the advance concept of Adhoc& SensorNetworks.
2. It provides the student to know advance concepts in Ad-Hoc Wireless Networks **,** routing protocols, Sensor Network, WSN routing, Mesh Networks, Vehicular Mesh Networks and to know the constraints of the wireless physical layer that affect the design an performance of Ad-hoc sensor network andArchitecture.

Theory

S. No.	Lecture Topics	No. of Lectures
1-	Issues in Ad-Hoc Wireless Networks. MAC Protocols overview, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.	6
2-	Classifications of routing protocols, Hierarchical and Power aware, Multicast routing Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP Over Ad Hoc, Feedback based Ad Hoc TCP, and Split TCP.	8
3-	Introduction to Sensor NetworkArchitecture,Data dissemination, Gathering.MAC Protocols, self-organizing, Hybrid TDMA/FDMA and CSMA based MAC.	8
4-	Issues in WSN routing – OLSR, AODV. Localization Indoor and Sensor Network Localization. QoS in WSN.	8
5-	Mesh Networks, MAC IEEE 802.11s Architecture, Opportunistic routing, Self configuration and Auto configuration, Capacity Models Fairness, Heterogeneous Mesh Networks, and Vehicular Mesh Networks.	8
6-	Issues in Ad-Hoc Wireless Networks. MAC Protocols overview, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.	8
7-	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:

1. C. Siva Ram Murthy and B. Smanoj, “Ad Hoc Wireless Networks – Architectures and Protocols”, Pearson Education,2004.
2. Feng Zhao and Leonidas Guibas, “Wireless Sensor Networks”, Morgan Kaufman Publishers,2004.
3. C.K. Toh, “Ad Hoc Mobile Wireless Networks”, Pearson Education,2002.
4. Thomas Krag and SebastinBuettrich, “Wireless Mesh Networking”, O’Reilly Publishers,2007.

Course Outcomes:

Students successfully completing this course will be able to:

1. Describe an adhoc network and analyze various technologies associated withit.
2. Analyze transport layer and various protocols associated withit.
3. Analyze adhoc& sensor based networks and compute various parameters associated withit..
4. Understand routing challenges and design issues inwireless.
5. Learn routing strategies in wireless sensornetworks.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	MACHINE LEARNING TIT-410
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : MACHINELEARNING
2. CourseNo : TIT-410
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:
THEORY

S. No.	Lecture Topics	No. of Lectures
1.	Evolution of Computing-Soft Computing Constituents – rom Conventional AI to Computational Intelligence-Machine Learning Basics.	8
2.	Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, crossover, inversion &deletion, mutation operator, Bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem), Differences & similarities between GA & other traditional methods, Applications of GA.	10
3.	Machine Learning using Neural Network, Adaptive Networks– Feed Forward Networks – Supervised Learning Neural Networks– RadialBasisFunctionNetworks-ReinforcementLearning–UnsupervisedLearningNeuralNetworks– Adaptive Resonance Architectures–Advances in Neural Networks	10
4.	FuzzySets–OperationsonFuzzySets–FuzzyRelations–MembershipFunctions-FuzzyRulesandFuzzyReasoning–FuzzyInferenceSystems–FuzzyExpertSystems– Fuzzy Decision Making	8
5.	Adaptive Neuro - Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling– Classification and Regression Trees–Data Clustering Algorithms– Rule base Structure Identification–Neuro-Fuzzy Control– Case Studies.	10
6.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignments	10%	Final Examination	50%

REFERENCE BOOKS:

1. Jyh- Shing Roger Jang, Chuen- Tsai Sun, EijiMizutani, “Neuro-Fuzzy and Soft Computing”, Prentice-Hall of India,2003
2. Kwang H. Lee, “First course on Fuzzy Theory and Applications”, Springer– Verlag Berlin Heidelberg, 2005

Course Outcomes:

On completion of the course students will be able to:
1. Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity,etc.
2. Have an understanding of the strengths and weaknesses of many popular machine learningapproaches.
3. Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervisedlearning.
4. Design and implement various machine learning algorithms in a range of real-worldapplications.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	MANAGEMENT INFORMATION SYSTEMS TIT-411
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to a considerable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : MANAGEMENT INFORMATIONSYSTEMS
2. Course No : TIT-411
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription

CATALOGUE DESCRIPTION:
Introduction to management information systems, system approach to management and information, MIS planning and development analysis, design tools, data modeling, MIS design and evaluation, Technological aspects of MIS.

S. No.	Lecture Topics	No. of Lectures
1.	Introduction: Basic definitions of information systems (IS) and MIS etc, Levels of management, concept and types of management information, functions and rolesofmanagementinformationneedsofmanagers,propertiesofuseful management information characteristics of MIS, structure of MIS.	6
2.	System Approach To Information And Management: System concepts, feedback and control, control of system performance, other system characteristics, a business as a system, Is concepts, Is model, Is activities, Is resources, operations information systems, Is for management decision making, information reporting systems, decision support system, executive information system.	8
3.	Mis Planning and Development Analysis and Design Tools: Introduction to planning terminology, types of planning, role of planning, tactical and operational planning, planning methodologies, business system planning(BSP),BSPapproach,criticalsuccessfactors(CSF),CSFapproach, development cycle,	8
4.	Systems investigation, planning and feasibility, organizational environment, system requirements analysis, system design, user interface design, data design, process design, logical system design, physical system design.	8
5.	Data Modeling: Hierarchical, Network, Relational, Micro-based, client server models.	8
7.	Mis Design and Evaluation: Gross design, detailed design, steps in the design of MIS, Evaluation, technological and behavioral aspects,	8
8.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:

1. Management Information System by O. Brain (TMHPub.)
2. Management Information System by Jawadegar (TMHPub.)

Course Outcomes:

1 Describe the role of information technology and information systems inbusiness
2 Record the current issues of information technology and relate those issues to thefirm
3 Reproduce a working knowledge of concepts and terminology related to information technology
4 Appraise the knowledge previously acquired of MicrosoftOffice
5 Analyze how information technology impacts afirm
6 Interpret how to use information technology to solve business problems
7 Illustrate the impact of information systems insociety

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	SIMULATOIN & MODELING TIT-412
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. **CourseTitle : Simulation andModeling**
2. **CourseNo : TIT-412**
3. **CreditHours : 3(3-0-0)**
4. **Prerequisite : NIL**
5. **Syllabus/CatalogueDescription**

Objectives of the course:

1. The course aims to teach the generic (i.e., tool and application domain independent) concepts of modelling and simulation.
2. By the end of this course, you should have a deep understanding of the concepts of modelling and simulation of dynamic systems using a variety offormalisms.
3. Able to build modelling and simulationsystems.
4. Ample background to understand and use existing modelling and simulationsystems.
5. The course presents general modelling and simulation principles by applying them to concreteproblems.

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	Simulation Basics Handling Stepped and Event-based Time in Simulations Discrete versus Continuous Modelling Numerical Techniques Sources and Propagation of Error	6
2.	Dynamical, Finite State, and Complex Model Simulations Graph or Network Transitions Based Simulations Actor Based Simulations Mesh Based Simulations Hybrid Simulations	8
3.	Converting to Parallel and Distributed Simulations Partitioning the Data Partitioning the Algorithms Handling Inter-partition Dependencies	8
4.	Probability and Statistics for Simulations and Analysis Introduction to Queues and Random Noise Random Variates Generation Sensitivity Analysis	8
5.	Simulations Results Analysis and Viewing Tools Display Forms: Tables, Graphs, and Multidimensional Visualization Terminals, X and MS Windows, and Web Interfaces Validation of Model Results	8
7.	Open Source Software: Category of Open Source Software. OSS for podcasts, RDBMS, online social networks, etc. open source bibliometricsoftwareslike pajek, ucinet, etc	8
8.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:

1. A plethora of modelling formalisms: Paul A. Fishwick. Simulation Model Design and Execution, building digital worlds: Prentice Hall,1995.

2. The foundations of modelling and simulation: Bernard P. Zeigler, Herbert Praehofer, and Tag Gon Kim. Theory of Modelling and Simulation: Integrating Discrete Event and Continuous Complex Dynamic Systems. Academic Press, second edition, 2000. Chapters 1 - 9, 17,18.
3. Random variates, random number generation: Averill M. Law and David W. Kelton. Simulation Modeling and Analysis. McGraw-Hill, 1991. Chapters 8,9.
4. Discrete event world views: Osman Balci. The implementation of four conceptual frameworks for simulation modeling in high-level languages. In M. Abrams, P. Haigh, and J. Comfort, editors, Proceedings of the 1988 Winter Simulation Conference, pages 287-295. Society for Computer Simulation International (SCS),1988.
5. The process interaction language GPSS: Geoffrey Gordon. System Simulation. Prentice Hall of India, second edition, 1996. Chapters 8 -10.
6. Continuous system modelling theory, causality, Forrester System Dynamics: Francois E. Cellier. Continuous System Modeling. Springer-Verlag, New York, 1991. Chapters 1, 2, 5, 7, 10, 11,15.
7. Numerical simulation, System Dynamics: HartmutBossel. Modeling and Simulation. A.K. Peters, Ltd., 289 Linden Street, Wellesley, MA 02181, 1994. Chapters 1 -3.
8. Petri Nets and Timed Models: Christos G. Cassandras. Discrete Event Systems. Irwin,1993.
9. Statecharts and applications in object-oriented software design: David Harel. On visual formalisms. Communications of the ACM, 31(5):514-530, May1988.

Course Outcomes

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

1. Characterize engineering systems in terms of their essential elements, purpose, parameters, constraints, performance requirements, sub-systems, interconnections and environmentalcontext.
2. Engineering problem modeling and solving through the relationship between theoretical, mathematical, and computational modeling for predicting and optimizing performance andobjective.
3. Mathematical modeling real world situations related to engineering systems development, prediction and evaluation of outcomes against design criteria.
4. Develop solutions and extract results from the information generated in the context of the engineering domain to assist engineering decisionmaking.
5. Interpret the model and apply the results to resolve critical issues in a real worldenvironment.
6. Develop different models to suit special characteristics of the system beingmodeled.

OPEN ELECTIVE COURSES

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	Course Titles : Course No.:	KNOWLEDGE MANAGEMENT TIT-305
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre- requisite:NIL b. An Introductory survey of knowledge represented by the department:No c. An Introductory survey of special area ofknowledge: No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to a considerable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : KNOWLEDGE MANAGEMENT
2. CourseNo : TIT-305
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/Catalogue Description:
Objectives of the course:
Introduction, Knowledge assets; how to manage and make use of knowledge assets, developing knowledge; preserving knowledge; using knowledge, and sharing knowledge, planning and control of actions, Knowledge Management Difficulties, Knowledge engineering methods and tools, Knowledge Management Framework, van der Spek and de Hoogstrategies, Techniques to Manage Knowledge ,SWOT (Strengths Weaknesses Opportunities Threats) analysis, balanced scorecards, modeling languages such as: IDEF (Process Flow and Object State Description Capture Method), and RADs (Role Activity Diagrams,); Knowledge Asset Road Maps, IT Support for Knowledge Management , Dependency Networks

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:
K. K. Aggarwal&Yogesh Singh

Course Outcomes:
After completing this course, students will be able to:
1. Define the nature and topology of knowledge and knowledge management within a businesscontext.
2. Identify technologies that are most useful for capturing/acquiring, organizing, distributing, and sharing knowledge within anenterprise.
3. Explain how to formulate a knowledge management strategy, identify major requirements and issues for designing enterprise knowledge architecture and implementing knowledge managementproject
4. To understand the theoretical foundation for knowledge and to build capabilities to manage knowledge within and across organizationalboundaries.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	Intellectual Property Rights TIT-366
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to a considerable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. **CourseTitle : Intellectual PropertyRights**
2. **CourseNo : TIT-366**
3. **CreditHours : 3(3-0-0)**
4. **Prerequisite : NIL**
5. **Syllabus/CatalogueDescription**

S. No.	Lecture Topics	No. of Lectures
1.	Introduction: Introduction, Protection of Intellectual Property, Types of Intellectual Property Rights: Patents, Trademarks, Copyrights, Industrial Designs, Geographical Indications, International Conventions: Brief Background	6
2.	Patents: General Introduction of a Patent, Product / Design Patents & Terminology, Patent Claims, Patent Life and Geographical Boundaries, Utilization of Intellectual Patents, Patent Search, Patent Databases & Library, Patent Acts & Rules, Legal Decision making process, Ownership of Patents	8
3.	Obtain IPR Rights: Elements of patentability, Patentable subject matter, Utility, novelty and non-obviousness, Illustrations: Using business method patents in commerce, Worldwide Patent Protection (TRIPS, Paris Convention, PCT and PatentHarmonization), Indian & US Patent Acts & Latest Amendments.	8
4.	Patent Valuations & Business Concerns : Meaning of Trademarks, Different kinds of marks (brand names, logos, signatures, symbols), Use of a Mark, Registration of Trademarks Procedure, Opposition to Registration-Procedure, Domain Names ,Nature of Copyright, Copyright pertaining to Software/Internet, Nature of Geographical Indications, Conditions & Procedure for Registration, Offences.	8
5.	Commercializing and Future Developments of IPR: Antitrust Laws, Employee Confidentiality, Assignment of Intellectual Property Rights, Technology Transfer Agreements, Intellectual Property Issues in the Sale of Business, Care & Maintenance of Confidential Information.	8
6.	Legal Auditing of Intellectual ,IPR developments for Database, Indian TraditionalMedicine&IPProtection,Folklore,PatentingofLifeForms, International Traditional Medicines & Health Foods.	8
7.	Pre-final	2
	Total	**48**

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOKS:

1. IEEEpapers.
2. ACMpapers.
3. SCIjournals
4. Intellectual Property Rights and the Law, Dr. G.B. Reddy, Gogia LawAgency.
5. Law relating to Intellectual Property, Dr. B.L.Wadehra, Universal Law PublishingCo.
6. IPR P.Narayanan
7. Law of Intellectual Property, Dr.S.R. Myneni, Asian LawHouse,

Course Outcomes:

1- The students once they complete their academicprojects

2- They get awareness of acquiring the patent and copyright for their innovativeworks.

3- They also get the knowledge of plagiarism in their innovations which can be questionedlegally.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	CLOUD COMPUTING TIT-403
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Dr. H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : CLOUDCOMPUTING
2. Course No : TIT-403
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/CatalogueDescription:

THEORY

S. No.	Lecture Topics	No. of Lectures
1.	Cloud Computing–History ofCloudComputing–CloudArchitecture–CloudStorage–WhyCloudComputingMatters–AdvantagesofCloudComputing–DisadvantagesofCloudComputing–CompaniesintheCloudToday–CloudServices.	8
2.	Web-Based Application –ProsandConsofCloudServiceDevelopment–TypesofCloudServiceDevelopment– Software as a Service–Platform as a Service – Web Services– On-Demand Computing– Discovering Cloud Services Development Services and Tools– Amazon Ec2 – Google App Engine – IBM Clouds	9
3.	CentralizingEmail Communications– Collaborating on Schedules–Collaborating on To-Do Lists– Collaborating Contact Lists–CloudComputingfortheCommunityCollaboratingonGroupProjectsandEvents– Cloud Computing for the Corporation.	9
4.	Collaborating on Calendars, Schedules and Task Management–CollaboratingviaWeb-BasedCommunicationTools–EvaluatingWebMailServices–CloudComputing–HistoryofCloudComputing–CloudArchitecture–CloudStorage–WhyCloudComputingMatters–AdvantagesofCloudComputing–DisadvantagesofCloudComputing–CompaniesintheCloudToday–CloudServices.	10
5.	Web-Based Application –Pros and Cons of Cloud Service Development–Types of Cloud Service Development– Software as a Service–Plat form as a Service – Web Services– On-Demand Computing– Discovering Cloud Services Development Services and Tools– Amazon Ec2 – Google App Engine – IBM Clouds Centralizing Email Communications– Collaborating on Schedules–Collaborating on To-Do Lists– Collaborating Contact Lists– Cloud Computing for the Community–Collaborating on Group Projects and Events– Cloud Computing for the Corporation.	10
6.	Pre-final	2
	Total	48

DISTRIBUTION OF MARKS

I Pre-final Examination	20%	II Pre-final Examination	20%
Assignment	10%	Final Examination	50%

REFERENCE BOOK:

1. Michael Miller, Cloud Computing: Web Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

Course Outcomes:

Students successfully completing this course will be able to:

1. Define Cloud Computing and memorize the different Cloud service and deploymentmodels
2. Describe importance of virtualization along with theirtechnologies.
3. Use and Examine different cloud computingservices
4. Analyze the components of open stack & Google Cloud platform and understand Mobile CloudComputing
5. Describe the key components of Amazon webService
   Design & develop backup strategies for cloud data based onfeatures.

PROPOSAL FOR A NEW COURSE

1.	College :	College of Technology
2.	Department :	Information Technology
3.	CourseTitles: CourseTitles.	IMAGE PROCESSING TIT-406
4.	Catalogue Description :	Attached
5.	To be offered :	B. Tech. Information Technology
6.	Credits:	3(3-0-0)
7.	Is this new courses :	Yes
8.	Curricular purpose of the courses :	To give theoretical and Practical knowledge in the field of Information Technology to the students.
9.	General education purpose :	a. General education:Yes b. Department specialization:Yes c. Studentresearch: No d. Outgrowth of instructors research programme:No
10.	Relation to other courses :	a. Pre-requisite: NIL b. An Introductory survey of knowledge represented by the department: No c. An Introductory survey of special area of knowledge:No d. A further development of courses:No e. An Introductory survey of special area ofknowledge represented by some other department:No f. A summarizing or integrated course:No g. In your judgment does this course overlap to aconsiderable extent with any other course:No
11.	What are the urgent reasons why this course(s) should be offered at the present time :	Due to proposed Syllabus to be mandatory Implemented
12.	The course(s) will not replace any existing courses :	New Course
13.	The course(s) will not require additional staff over and above :	Not required
14.	What is the exact place of this course(s) in the development of the educational programme of your department:	Elective Course of B.Tech Information Technology Department.
15.	Lectures :	Attached
16.	Practical/Tutorials:	Attached
17.	References:	Attached
18.	Classroom, laboratory and other facilities :	Required facilities exist.
19.	Would the introduction of this course(s) require additional staff :	No
20.	Prepared by	Er. Subodh Prasad/ Er.H.L.Mandoria
21.	Approved By	Course Curriculum Committee and BOFT

1. CourseTitle : IMAGEPROCESSING
2. CourseNo : TIT-406
3. CreditHours : 3(3-0-0)
4. Prerequisite : NIL
5. Syllabus/Catalogue Description: Image processing, and various image Transforms, Image Enhancement Techniques, Image restoration Techniques and methods, image compression and Segmentation used in digital image processing.

Objectives of the course:
1. Mathematically represent the various types of images and analyzethem.
2. Process these images for the enhancement of certain properties or for optimized use of theresources.
3. Develop algorithms for image compression andcoding.

Theory

S. No.	Lecture Topics	No. of Lectures
1-	**Image Fundamentals**-Elements of visual perception, image sensing and acquisition, image sampling and quantization, basic relationships between pixels – neighborhood, adjacency, connectivity, distance measures.	6
2-	**Image Enhancements and Filtering**-Gray level transformations, histogram equalization and specifications, pixel-domain smoothing filters – linear and order-statistics, pixel-domain sharpening filters – first and second derivative, two-dimensional DFT and its inverse, frequency domain filters – low-pass and high-pass.	8
3-	**Color Image Processing**-Color models–RGB, YUV, HSI; Color transformations–formulation, color complements, color slicing, tone and color corrections; Color image smoothing and sharpening; Color Segmentation.	7
4-	**Image Segmentation**- Detection of discontinuities, edge linking and boundary detection, thresholding – global and adaptive, region-based segmentation.	8
5-	**Wavelets and Multi-resolution image processing**- Uncertainty principles of Fourier Transform, Time-frequency localization, continuous wavelet transforms, wavelet bases and multi-resolution analysis, wavelets and Subband filter banks, wavelet packets.	8
6-	**Image Compression-Redundancy**–inter-pixel and psycho-visual; Lossless compression – predictive, entropy; Lossy compression- predictive and transform coding; Discrete Cosine Transform; Still image compression standards – JPEG and JPEG-2000.	9
7-	Prefinal	2
	Total :	**48**

DISTRIBUTION OF MARKS

IPre-finalExamination	**20%**	**IIPre-final Examination**	**20%**
Assignment	**10%**	**FinalExamination**	**50%**

TEXT/REFERENCE BOOKS:

1. R.C. Gonzalez and R.E. Woods, Digital Image Processing, Second Edition, Pearson Education 3rd edition2008
2. Anil Kumar Jain, Fundamentals of Digital Image Processing, Prentice Hall of India.2nd edition2004
3. Murat Tekalp , Digital Video Processing" Prentice Hall, 2nd edition2015

Course Outcomes:
1. To apply knowledge of mathematics, science, andengineering
2. An ability to design and conduct experiments, as well as to analyze and interpretdata
3. To design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, andsustainability
4. To function on multidisciplinary teams and to identify, formulate, and solve engineeringproblems
5. To use the techniques, skills, and modern engineering tools necessary for engineeringpractice.