MATS UNIVERSITY

MATS School of Engineering & I.T

Department of Computer Science and Engineering (B.Tech Scheme)

Semester - 1								
S.No.	Code	Subject	Total Credit	Periods per week			Scheme of marks	
				L	T	P	ESE	IM
1	BT100	Engineering Mathematics – I	4	3	1	-	70	30
2	BT101	Engineering Physics	4	3	1	-	70	30
3	BT102	Programming for Logic Building	3	3	0	-	70	30
4	BT103	Engineering Graphics & Design	2	2	0	-	70	30
5	BT104	Environmental Sciences	1	1	0	-	70	30
6	BT105	Technical English	2	2	0	-	70	30
7	BT106	Engineering Physics Laboratory	1	-	-	2	30	20
8	BT107	Programming and Soft Skill Laboratory	1	-	-	2	30	20
9	BT108	Engineering Graphics & Design Laboratory	2	-	-	4	30	20
10	BT109	Communication Skills Laboratory	1	-	-	2	30	20
11	BT110	Manufacturing Practices - I Laboratory	2	-	-	4	30	20
Total			**23**	**14**	**2**	**14**	**570**	**280**
Semester - 2								
S.No.	Code	Subject	Total Credit	Periods per week			Scheme of marks	
				L	T	P	ESE	IM
1	BT200	Engineering Mathematics - II	4	3	1	-	70	30
2	BT201	Engineering Chemistry	3	3	-	-	70	30
3	BT202	Basic Electrical & Electronics Engineering	3	3	-	-	70	30
4	BT203	Object Oriented Programming	3	3	-	-	70	30
5	BT204	Constitution of India, Professional Ethics and Human Rights	1	1	-	-	70	30
6	BT2052	Introduction to Scripting	3	3	-	-	70	30
7	BT206	Engineering Chemistry Laboratory	1	-	-	2	30	20
8	BT207	Basic Electrical & Electronics Engineering Laboratory	1	-	-	2	30	20
9	BT208	Advance Programming Laboratory	1	-	-	2	30	20
10	BT2092	Java Script Laboratory	1	-	-	2	30	20
11	BT210	Manufacturing Practices - II Laboratory	2	-	-	4	30	20
Total			**23**	**16**	**1**	**12**	**570**	**280**
Semester - 3								
S.No.	Code	Subject	Total Credit	Periods per week			Scheme of marks	
				L	T	P	ESE	IM
1	BT320	Advanced Engineering Mathematics	3	3	-	-	70	30
2	BT321	Data Structures	4	3	1	-	70	30
3	BT322	Java Programming	4	3	1	-	70	30
4	BT323	Computer Organization and Design	3	3	-	-	70	30
5	BT324	Digital Electronics & Logic Design	3	3	-	-	70	30
6	BT305	Universal Human Values	1	1	-	-	70	30
7	BT326	Data Structures Laboratory	1	-	-	2	30	20
8	BT327	Java Programming Laboratory	1	-	-	2	30	20
9	BT328	Digital Electronics & Logic Design Laboratory	1	-	-	2	30	20
10	BT329	Web Technology Laboratory (HTML/DHTML/CSS/XML)	1	-	-	2	30	20
Total			**22**	**16**	**2**	**8**	**540**	**260**

MATS UNIVERSITY

MATS School of Engineering & I.T

Department of Computer Science and Engineering (B.Tech Scheme)

Semester - 4								
S.No.	Code	Subject	Total Credit	Periods per week			Scheme of marks	
				L	T	P	ESE	IM
1	BT420	Discrete Mathematics	3	3	-	-	70	30
2	BT421	Operating Systems	3	3	-	-	70	30
3	BT422	Analysis and Design of Algorithms	3	3	-	-	70	30
4	BT423	Database Management System	3	3	-	-	70	30
5	BT424	Database Management System Laboratory	1	-	-	2	30	20
6	BT425	Analysis and Design of Algorithms Laboratory	1	-	-	2	30	20
7	BT426	Unix & Shell Programming Laboratory	1	-	-	2	30	20
8	BT427	GUI (Graphical User Interface) Laboratory	1	-	-	2	30	20
9	BTP2XX	Professional Elective - I	3	3	-	-	70	30
10	BTOXX	Open Elective - I	3	3	-	-	70	30
Total			**22**	**18**	**0**	**8**	**540**	**260**
Semester - 5								
S.No.	Code	Subject	Total Credit	Periods per week			Scheme of marks	
				L	T	P	ESE	IM
1	BT520	Theory of Computation	4	3	1	-	70	30
2	BT521	Computer Graphics	3	3	-	-	70	30
3	BT522	Microprocessor & Interfacing	3	3	-	-	70	30
4	BT523	Artificial Intelligence & Expert System	3	3	-	-	70	30
5	BT524	Computer Graphics Laboratory	1	-	-	2	30	20
6	BT525	Microprocessor Laboratory	1	-	-	2	30	20
7	BT526	Artificial Intelligence & Expert System Laboratory	1	-	-	2	30	20
8	BT527	Vocational Training/ Internship - I	3	-	-	-	0	50
9	BTP2XX	Professional Elective - II	3	3	-	-	70	30
Total			**22**	**15**	**1**	**6**	**440**	**260**
Semester - 6								
S.No.	Code	Subject	Total Credit	Periods per week			Scheme of marks	
				L	T	P	ESE	IM
1	BT620	Compiler Design	4	3	1	-	70	30
2	BT621	Computer Network	4	3	1	-	70	30
3	BT622	Software Engineering & Project Management	3	3	-	-	70	30
4	BT623	Computer Network Laboratory	1	-	-	2	30	20
5	BT624	Web Application Development Laboratory (PHP & My SQL)	1	-	-	2	30	20
6	BT625	Android Application Development Laboratory	1	-	-	2	30	20
7	BT626	Project – I	2	-	-	4	70	30
8	BTP2XX	Professional Elective - III	3	3	-	-	70	30
9	BTOXX	Open Elective - II	3	3	-	-	70	30
Total			**22**	**15**	**2**	**10**	**510**	**240**

MATS UNIVERSITY

MATS School of Engineering & I.T

Department of Computer Science and Engineering (B.Tech Scheme)

Semester - 7								
S.No.	Code	Subject	Total Credit	Periods per week			Scheme of marks	
				L	T	P	ESE	IM
1	BT720	Internet of Things	3	3	-	-	70	30
2	BT721	Network Security	3	3	-	-	70	30
3	BT722	Soft Computing	3	3	-	-	70	30
4	BT723	Internet of Things Laboratory	1	-	-	2	30	20
5	BT724	Python Laboratory	1	-	-	2	30	20
6	BT725	Internship - II	3	-	-	-	0	50
7	BT726	Project – II	2	-	-	4	70	30
8	BTP2XX	Professional Elective - IV	3	3	-	-	70	30
9	BTOXX	Open Elective - III	3	3	-	-	70	30
Total			**22**	**15**	**0**	**8**	**480**	**270**
Semester - 8								
S.No.	Code	Subject	Total Credit	Periods per week			Scheme of marks	
				L	T	P	ESE	IM
1	BT820	Internship/ Traning - III	6	-	-	-	70	30
2	BT821	Project - III	6	-	-	-	120	80
3	BTP2XX	Professional Elective - V (Through Online Mode/ MOOC)	3	-	-	-	70	30
4	BTOXX	Open Elective - IV (Through Online Mode/ MOOC)	3	-	-	-	70	30
Total			**18**	**0**	**0**	**0**	**330**	**170**
		Total Credit =	**174**				**6000**	

Additional Subjects & Scheme for Honours Group

S.No.	Code	Subject	Total Credit	Periods per week			Scheme of marks	
				L	T	P	ESE	IM
Semester - 5								
1	BTH2XX	Honours Core I	3	3	0	-	70	30
2	BTH2XX	Honours Laboratory I	1	-	-	2	30	20
Total			4	3	0	2	100	50
Semester - 6								
1	BTH2XX	Honours Core II	3	3	0	-	70	30
2	BTH2XX	Honours Laboratory II	1	-	-	2	30	20
Total			4	3	0	2	100	50
Semester - 7								
1	BTH2XX	Honours Core III	3	3	0	-	70	30
2	BTH2XX	Honours Laboratory III	1	-	-	2	30	20
Total			4	3	0	2	100	50
Semester - 8								
1	BTH2XX	Honours Core IV (Through Online Mode/ MOOCs)	4	4	0	0	70	30
2	BTH2XX	Honours Core V (Through Online Mode/ MOOCs)	4	4	0	0	70	30
Total			8	8	0	0	140	60
		Total Credit =	**194**				**6650**	

MATS UNIVERSITY, RAIPUR (CG)

Department of Computer Science and Engineering

School of Engineering and Information Technology

Syllabus
of
B. Tech. Computer Science and Engineering
Scheme - 2020

ACADEMIC REGULATIONS FOR B. TECH.
(Effective from 2020)

1.0 Vision, Mission and Objectives

1.1 The Vision of the University is "To become a world class center in providing globally relevant education".

The University has identified itself with a mission to provide every individual with a conducive environment suitable to achieve his / her career goals, with a strong emphasis on personality development, and to offer quality education in all spheres of engineering, technology, applied sciences and management, without compromising on the quality and code of ethics.

1.2 Further, the University always strives

To train our students with the latest and the best in the rapidly changing fields of Engineering, Technology, Management, Science & Humanities.

To develop the students with a global outlook possessing, state of the art skills, capable of taking up challenging responsibilities in the respective fields.

To mould our students as citizens with moral, ethical and social values so as to fulfil their obligations to the nation and the society.

To promote research in the field of Science, Humanities, Engineering, Technology and allied branches.

1.3 Aims and Objectives of the University are focused on

Providing world class education in engineering, technology, applied sciences and management.

Keeping pace with the ever changing technological scenario to help the students to gain proper direction to emerge as competent professionals fully aware of their commitment to the society and nation.

To inculcate a flair for research, development and entrepreneurship.

2.0 Admission

2.1. The admission policy and procedure shall be decided from time to time by the Board of Management (BOM) of the University, following guidelines issued by Ministry of Human Resource Development (MHRD), Government of India. The number of seats in each branch of the B.Tech programme will be decided by BOM as per the directives from MHRD, Government of India and taking into account the market demands. Some seats for Non Resident Indians and a few seats for foreign nationals shall be made available.

2.2. (i) Full-Time:

At the time of applying for admission, the candidates should have passed / appeared and be awaiting results of the final examination of the 10+2 system or its equivalent with Mathematics, Physics and Chemistry as subjects of study.

(ii) Lateral Entry:

At the time of applying for admission, the candidates should have a Diploma in Engineering/Technology in the relevant branch of specialization awarded by the State Board of Technical Education, C.G or any other authority accepted by the Board of Management of the University as equivalent thereto.

2.3. The selected candidates will be admitted to the third semester of the B.Tech programme after he/she fulfils all the admission requirements set by the University and after the payment of the prescribed fees.

2.4. In all matters relating to admission to the B.Tech programme, the decision of the Universityand its interpretation given by the Chancellor of the University shall be final.
2.5. If at any time after admission, it is found that a candidate has not fulfilled any of the requirements stipulated by the University, theUniversitymay revoke the admission of the candidate with information to the Academic Council.

3.0 Structure of the B.Tech Programme

3.1 The programme of instruction will consist of:
i) A general Core foundation (**CF**) programme comprising

English;

Basic Sciences (BS) including Physics, Chemistry, Mathematics;

Engineering Sciences (ES), including Materials, Workshop, Drawing, Basics of Electrical/Electronics/Mechanical/Computer Engineering, and Instrumentation;

ii) Compulsory Core courses (**CC**) consisting of

a. Professional Core (**PC**), an engineering core programme introducing the students to the foundations of engineering in his/her branch (Department) comprising theory and Practical/ field work/ Mini project/ Project ;

b. Professional Electives (**PE**) - an elective programme enabling the students to take up a group of courses for specialisation/ interest to him/her in his/her branch (Department);

iii) Engineering Electives (**EE**) - Engineering electives offered by other engineering departments;
iv) Open Electives (**OE**) - Courses offered by non-Engineering departments (Humanities and Management Schools) other than communication skills and personality development credit courses;

In addition, a student should satisfactorily complete NSS/NCC/NSO and Professional practice like Seminar and/or Internship in Industry or elsewhere, Soft skill development.
3.2 The complete programme will consist of 4 categories: **Core Foundation (CF)** consists of English, Basic Sciences, Engineering Sciences; **Core Courses (CC)** consists of Professional Core (PC), Professional Elective (PE), and Practical/field work/projects; **Engineering Elective (EE)** and **Open Electives (OE)** distributed over seven semesters with two semesters per year. The eighth semester may be left for the project work so that the student can take up industrial project.
3.3 All the Professional Electives shall be from VI semester onwards and VIII semester may be left for the project work.
3.4 The Open Elective shall start from IV semester**.**
3.5 Every B. Tech. Programme will have a curriculum and syllabi (course contents) approved by Academic Council.
3.6 Credits are assigned to the courses based on the following general pattern:
● One credit for one hour/week/Semester for *Theory/Lecture (L)* or *Tutorials (T) Courses;* and,

● One credit for three hours/week/Semester for *Laboratory/Practical (P) Courses;*

● *One credit for 4 weeks of Industrial Training and*

● *One credit for 4 hours of project per week per semester.*

NOTE: Other student activities not demanding intellectual work or enabling proper assessments like, practical training, study tour and guest lecture not to carry *Credits;*

Practice Lectures (hrs/wk/Sem.)	Tutorials (Hrs/wk/Sem.)	Practical Work (Hrs/wk/Sem.)	*Credits* (L: T: P)	Total *Credits*
3	*0*	*0*	*3:0:0*	*3*
3	*1*	*0*	*3:0:0*	*4*
2	*1*	*0*	*2:1:0*	*3*
2	*0*	*2*	*2:0:1*	*3*
2	*1*	*2*	*2:1:1*	*4*
0	*0*	*3*	*0:0:1*	*1*
0	*0*	*6*	*0:0:2*	*2*

3.7 The curriculum of any branch of the B. Tech. programme is designed to have a minimum total of **180 credits** for the award of B. Tech. degree.

3.8 No semester shall have more than six lecture based courses and four laboratory courses as prescribed in the curriculum carrying a maximum of 30 credits, subject to the following:

Students are permitted to register for an additional course for earning additional credits from the Vth semester onwards provided the student have at least 75% in earlier semester without any arrears .

However, in special cases, students of VII semester will be permitted to take two additional subjects to the following conditions:

a) The maximum number of credits registered in any semester shall not exceed 30.

b) No withdrawal from any of the courses for which a student has registered will be allowed, except as per regulation **8.0**.

c) The student's Faculty Adviser and Head of the Dept. recommends the same.

4.0 Maximum Duration of the Programme

(i) Full-Time:

A student is expected to complete the B.Tech programme in **eight semesters**. However, a student may complete the programme at a slower pace, but in any case **not more than 12 semesters**, excluding semesters withdrawn on medical grounds, etc.

(ii) **Lateral Entry:**

A student is expected to complete the B.Tech programme in **six semesters**. However, a student may complete the programme at a slower pace, but in any case **not more than 12 semesters**, excluding semesters withdrawn on medical grounds, etc.

5.0 Discipline

5.1 Every student is required to observe discipline and decorous behaviour both inside and outside the campus and not to indulge in any activity which will tend to bring down the prestige of the University.

5.2 Any act of indiscipline of a student reported to the Dean (Academic) will be referred to a Discipline Committee so constituted. The Committee will enquire into the charges and decide on a suitable punishment if the charges are substantiated. The committee will also authorize the Dean (Academic) to recommend to the Vice Chancellor the implementation of the decision. The student concerned may appeal to the Vice Chancellor whose decision will be final. The Dean (Academic) will report the action taken at the next meeting of the Council.

5.3 Ragging of any form is a criminal and non-bailable offence in our country. The current State and Central legislations provide for stringent punishment including imprisonment. Once the involvement of student(s) is established in ragging, the offending student(s) will be dismissed from the institution. Every senior student of the institute, along with the parent, shall give an undertaking every year in this regard and this should be submitted at the time of enrolment.

6. Declaration of results

6.1 (i) A candidate who secures not less than 40% of total marks prescribed for a course with a minimum of 45% of the marks prescribed for the end semester examination shall be declared to have passed the course and earned the specified credits for the course.

6.2 After the valuation of the answer scripts, the tabulated results are to be scrutinized by the Result Passing Boards of UG programmes constituted by the Vice-Chancellor. The recommendations of the Result Passing Boards will be placed before the Standing Sub Committee of the Academic Council constituted by the Chancellor for scrutiny. The minutes of the Standing Sub Committee along with the results are to be placed before the Vice-Chancellor for approval. After getting the approval of the Vice-Chancellor, the results will be published by the Controller of Examination/Registrar.

6.3 If a candidate fails to secure a pass in a course due to not satisfying the minimum requirement in the end semester examination, he/she shall register and re-appear for the end semester examination during the following semester. However, the sessional marks secured by the candidate will be retained for all such attempts.

MATS UNIVERSITY, RAIPUR (C.G.)
SCHOOL OF ENGINEERING & IT.

PROGRAMME OUTCOME:

This programmes are designed to prepare graduates to attain the following program outcomes:

1. An ability to apply knowledge of mathematics, science and engineering to solve practical complex problems.
2. An ability to identify, critically analyzes, formulate and solve engineering problems using principles of mathematics, sciences, and engineering sciences.
3. An ability to select appropriate engineering tools and techniques and use them with skill and proficiency.
4. An ability to use the modern tools, resources and IT tools for complex engineering problems.
5. An ability to design a system and process to meet desired needs of society within realistic limitations such as health, safety, security and environmental considerations.
6. An ability to create and conduct experiments, interpret data, design of experiments and provide well informed conclusions.
7. An ability to understand the impact of engineering solutions within purview of laws, in a contemporary, global, economical, environmental, and social context for sustainable development of society.
8. An Ability to develop ability to work individually and in a team as a member or a leader to develop professional ethics and leadership qualities.
9. An ability to function professionally with ethical response ability as an individual as well as in multidisciplinary teams with positive attitude for engineering practice.
10. An ability to communicate effectively on complex engineering activities and effective documentation.
11. An ability to appreciate the importance of goal setting and to recognize the need for life-long learning for technological change.
12. An ability to become a good mining engineer to give good and safe working condition to the workers and employees.

PROGRAMME SPECIFIC OUTCOMES:

1. **Professional skills**

Ability to utilize the knowledge of mining/aerospace engineering in innovative, dynamic and challenging environment for design and development of new technology or concept.

2. **Industrial skills**

Ability to impart knowledge through simulation language skills and general purpose CAD/CAE packages to solve practical, design and analysis problems of components to complete the challenge of airworthiness for flight vehicles.

3. **Practical implementation and testing skills**

Providing different types of in house training and industry practice to develop and test the experimental setup for products with more innovative technologies.

4. **Successful career and entrepreneurship**

To prepare the students with broad aerospace knowledge to design, developed systems and subsystems of aerospace to become technocrats and entrepreneurs.

Department of Computer Science & Engineering
MATS University, Raipur (C.G.)
Syllabus for B. Tech. Computer Science and Engineering
(Scheme: 2020)

SEMESTER - I

S. No.	Code	Subject	Periods per week			Scheme of marks		Total Credit
			L	T	P	ESE	IM	
1.	BT100	Engineering Mathematics – I	3	1	-	70	30	4
2.	BT101	Engineering Physics	3	1	-	70	30	4
3.	BT102	Programming for Logic Building	3	0	-	70	30	3
4.	BT103	Engineering Graphics & Design	2	0	-	70	30	2
5.	BT104	Environmental Sciences	1	0	-	70	30	1
6.	BT105	Technical English	2	0	-	70	30	2
7.	BT106	Engineering Physics Laboratory	-	-	2	30	20	1
8.	BT107	Programming & Soft Skills Laboratory	-	-	2	30	20	1
9.	BT108	Engineering Graphics & Design Laboratory	-	-	4	30	20	2
10.	BT109	Communication Skills laboratory	-	-	2	30	20	1
11	BT 110	Manufacturing Practices – I Lab	-	-	4	30	20	2
Total			**14**	**2**	**14**	**570**	**280**	**23**

L – Lecture, T – Tutorial, ESE – End Semester Examination,
P – Practical, IM – Internal Marks (Include Class Test & Teacher's Assessments)

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Semester: I B.Tech **Branch: All Streams of Engineering**
Subject: Engineering Mathematics-I **Code: BT 100**
Total Theory Periods: 60 **Total Tutorial Periods: 00**
Total Credits: 04

OBJECTIVES:

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT-I

MATRICES

Real vector space, Subspace, Linear span, Linear dependence and linear independence of vectors, Basis, Dimension, Linear transformation, Matrix associated with a linear transformation, Rank and inverse by elementary transformation (Gauss Jordan method), System of linear equations, Eigenvalues and eigenvectors, Cayley-Hamilton theorem, Diagonalization of matrices.

UNIT- II

DIFFERENTIAL CALCULUS

Successive differentiation, Lebnitz theorem, Rolle's Theorem, Taylor's theorem with Lagrange's form of remainder, Expansions of functions in Taylor's and McLaurin's series

UNIT-III

PARTIAL DIFFERENTIATION

Functions of two variables: Limit, continuity and partial derivatives, derivatives of higher order, Euler's theorem on homogeneous functions, Total derivative, Change of variables, Jacobians, Maxima, minima and saddle points of functions of two variables

UNIT-IV

ORDINARY DIFFERENTIAL EQUATION

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations of first order and higher degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Ordinary differential equations of higher order linear differential equations with constant coefficients & variable coefficients, method of variation of parameters, Cauchy-Euler equation,Legendre polynomials and their properties

UNIT-V

MULTIPLE INTEGRAL

Beta and Gamma functions – elementary properties, Double and triple integrals, change of order of integration, Application to area and volume.

OUTCOMES:

- This course equips students to have basic knowledge and understanding in one fields of materials, integral and differential calculus.

NAME OF TEXT BOOKS:

1. Higher Engineering Mathematics by B.S.Grewal (42th edition)-Khanna Publisher.
2. Advanced Engineering Mathematics by Erwin Kreyszig (8th edition)-John Wiley & Sons.

NAME OF REFERENCE BOOKS:

1. Differential Calculus by Gorakh Prasad-Pothisala Private Limited.
2.Advanced Engineering Mathematics by R.K.Jain and S.R.K. Iyengar-Narosa Publishing House.
3.Applied Mathematics by P.N.Wartikar&J.N.Wartikar Vol-ll –Pune VidyarthiGrihaPrakasan, Pune.
4. Integral Calculus by Gorakh Prasad-Pothisala Private Limited.

Department of Computer Science & Engineering
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Semester: I B.Tech | **Branch: All Streams of Engineering**
Subject: Engineering Physics | **Code: BT101**
Total Theory Periods: 45 | **Total Tutorial Periods: 00**
Total Credits : 03

OBJECTIVES:

- To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

Unit -I

THEORY OF RELATIVITY SPACE

Time and motion, frame of reference, Galilean Transformation Outline of relativity, Michelson-Morley experiment, Special theory of Relativity, transformation of space and time, Time dilation, Doppler effect ,length contraction, addition of velocities, Relativistic mass: variation of mass with velocity, kinetic energy, equivalence of mass and energy, Relation between energy and momentum.

Unit- II

(a) LASERS

Temporal and spatial coherence of light wave Principle of laser, Laser characteristics, components of laser, Principle of Ruby, He-Ne &Nd -YAG lasers, application, basic concepts of Holography (only introductory part, No detail derivation)

(b) FIBRES OPTICS:

Optical fibers: Introduction & advantages, structure & classification, Option of propagation in fiber, attenuation & distortion, acceptance angle and cone, numerical aperture (only introductory part, No detail derivation).

Unit -III

NUCLEAR PHYSICS

Controlled and uncontrolled chain reaction, criteria of critical mass, nuclear reactor and its site selection & numerical ,nuclear forces, Nuclear fusion in stars . Introduction of elementary particles. Electron ballistic: Motion of charged particles in electric and magnetic field. Aston and Bainbridge mass spectrograph.

Unit -IV

WAVE OPTICS

Wedge shaped films, Interferences by division of amplitude: Newton's rings and its applications Interference by division of wave front: Fresnel's bi prism, fringe width, diffraction grating, resolving power of grating,

Unit- V

SOLID STATE DEVICES:

Transistor: Input and Output characteristics in CE mode, Transistor as an amplifier, Hartley Oscillator. FET: Input and output characteristics of J-FETs & MOSFETs, Operational amplifiers (Op-Amp).

OUTCOMES:

The students will have knowledge on the basics of physics related to properties of matter, optics, acoustics etc., and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications.

TEXT BOOKS:

1. Gaur and Gupta “Engineering Physics”
2. Avadhanulu and Kshirsagar “Engineering Physics”.
3. Verma H.C.: Concepts of Physics, Part-1 & Part-2, BharatiBhawan (P&D)
4. A.K. Tayal: Engineering Mechanics (Statics and Dynamics)

REFERENCE BOOKS:

• Jenkins and White: “Optics”, MeGrew-Hill Book Company.
• Singh R.B.: “Physics of Oscillations and Waves”
• Ghatak A.K.: “Optics”
• Mani and Mehta: “Modern Physics”, Affiliated East-West Press Pvt. Ltd, 1998.
• Sanjeev Puri: Modern Physics, narosa Pub. Co.2004.
• Azroff: Solid State Physics, Tata McGraw-Hill, 2004.
• Theraja: B.L., Basic Electronics, S.Chand, 2002.
• Puri: Digital Electronics, Tata McGraw-Hill, 2002.
• Millman, J and Halkias: integrated Electronics, Tata MeGraw-Hill, 2004.
• Tyagrajan and Ghatak: Lasers, Macmillan, 2001. •

Department of Computer Science & Engineering
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Syllabus for B. Tech. Computer Science and Engineering
(Scheme: 2020)

Semester: I B.Tech | **Branch: All Streams of Engineering**
Subject: Programming For Logic Building | **Subject Code: BT 102**
Total Theory Periods: 60 | **Total Tutorial Periods: 00**
Total Credits: 03

COURSE OBJECTIVE:

- To distinguish and recognize low-level and high-level programming languages
- To know fundamental concepts of structured programming
- To understand logic development
- To design pseudo logic for various programming problems.
- To understand the basic structure of a program including sequence, decisions and looping.
- To design solutions to real world problems using C language.
- To use C language for problem solving and numerical computations.
- To apply computer-programming concepts to new problems or situations.

UNIT – I
ELEMENTS OF C LANGUAGE

Tools for Problem Solving: Problem Analysis, Flowchart, Algorithm Development. Top-Down Program Design, Structured Design Approach, Origin of C, Features & Characteristic of C, C Compiler, Character Set, Keywords, Identifiers, Constants, Variables, Input/ Output Statements, Basic Data Types, Operators and Expressions, Basic structure of C programs, A simple C Program.

UNIT – II
CONTROL FLOW CONSTRUCTION

Decision making and branching: Simple if statement, if else statement, Nesting of if-else statement, else - if Ladder, Switch statement, Operator, goto statement, Decision making and looping, While statement, Do-While statement, For statement, Jumps in loops, Break and Continue statement.

UNIT – III
DEFINING AND MANIPULATING ARRAYS

One Dimensional Arrays: Declaration of Arrays, Initialization of Arrays, Reading and Writing of integer, real and Character arrays, sorting and Searching in Arrays, Multi-Dimensional Arrays, Handling of Character Strings.

UNIT – IV
USER DEFINED FUNCTIONS

Syntax of Function, Calling functions, Actual & Formal Arguments, Categories of Functions, Function prototype, Scope Rules: Local & Global variables, Recursion, Recursion vs. iteration, Passing Arguments: call by values & call by reference, passing array to function.
Structures: Declaration and initialization of Structure, Array of structures, Array within structure, structure within structure, Structures and functions, Introduction to unions.

UNIT – V

POINTER DATA TYPE AND ITS APPLICATION

Pointer Operator, Pointer Expression, Initialization of pointers, Pointer Arithmetic, Pointer and Function Arguments, Pointer to function, Pointer and Arrays, Pointers and String, Arrays of Pointers, Pointers to Pointers, Dynamic memory allocation.

Files in C: Defining and Opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, Random access to files.

COURSE OUTCOME:

After completion of the course study, students are going to be in a position to

1. Analyze issues and style algorithms in pseudo code.
2. Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems
3. Read, perceive and trace the execution of programs written in C language.
4. Develop confidence for self-education and ability for life-long learning needed for Computer language.
5. Write down C program for a given algorithm by means of modular approach.

TEXT BOOKS:

1. The C programming Language, Dennis M Ritchie and Kernighan, PHI.
2. Let us C, YashwantKanetkar, BPB Publication.
3. Programming in C, E. Balaguruswamy, TMH.

REFERENCE BOOKS:

1. Programming in C, Byron Gottfried, Schaum's series outline TMH.
2. Programming in C, Ghosh, PHI.
3. Computer Programming in C, V. Raja Raman, PHI.

Department of Computer Science & Engineering
MATS University, Raipur (C.G.)
Syllabus for B. Tech. Computer Science and Engineering
(Scheme: 2020)

Semester: I B.Tech **Branch: All Streams of Engineering** **Subject: Engineering Graphics** **Code: BT 103**

Total Theory Periods: 45 **Total Tutorial Periods: 20**

Total Credits : 04

OBJECTIVES:

- To develop in students, graphic skills for communication of concepts, ideas and design of engineering products.
- To expose them to existing national standards related to technical drawings.

UNIT – I

a) IMPORTANCE OF ENGINEERING DRAWING: Scales: Representative Fraction, Type of Scale, Plain and Diagonal Scale.

b) ENGINEERING CURVES: Conic section, Ellipse, parabola, hyperbola, Cycloidal Curves: Cycloid, Epicycloids, Hypocycloid and Involutes.

UNIT – II

a) PROJECTION: Introduction, Principle of Projection, method of projection, planes of projection, four quadrants, first and third angle projection and reference line symbols for methods of projection, Orthographic projection.

b) PROJECTION OF POINTS: Introduction point situated in first, second, third & fourth quadrant. Projection of lines: Introduction, line parallel to one or both the planes, line contained by one or both the planes, line perpendicular to one of the planes, line inclined to one plane and parallel to other. Line inclined to both the planes. [Simple problems only]

UNIT – III

a) PROJECTIONS OF PLANES: Introduction, types of planes, projection of planes, projection of planes perpendicular to both the reference planes, perpendicular to one plane and parallel to the other plane, perpendicular to one plane and inclined to the other plane.

b) PROJECTIONS OF SOLIDS: Introduction, types of solids, projections of solids in simple position, projections of solids with axes inclined to one of the reference planes and parallel to the other, projections of solids with axes inclined to both H.P. and the V.P., section planes, types of sections, true shape of section, section of solids.

UNIT – IV

a) DEVELOPMENT OF SURFACES: Introduction, methods of development, development of lateral surfaces of right solids, cube, prisms, cylinders, pyramids & cone.

b) ISOMETRIC PROJECTION: Introduction, Isometric axes, lines & planes, Isometric scale, Isometric projection and Isometric view of simple objects.

UNIT – V

COMPUTER AIDED DRAWING: Introduction to CAD, benefits and limitation of CAD, CAD Software's, AutoCAD introduction, Basic Commands of AutoCAD, Concept of Layers, Dimensioning and text, Creation of two dimensional drawing.

OUTCOMES:

On Completion of the course the student will be able to

- Perform free hand sketching of basic geometrical constructions and multiple views of objects.
- Do orthographic projection of lines and plane surfaces.
- Draw projections and solids and development of surfaces.
- Prepare isometric and perspective sections of simple solids.
- Demonstrate computer aided drafting.

TEXT BOOKS:

(i) Bhatt, N.D., "Elementary Engineering Drawing", Charotar Book Stall, Anand

(ii) George Omura, "Mastering AutoCAD" B.P.B. Publication, New Delhi

REFERENCE BOOKS:

(i) Engineering Graphics – Laxminarayanan& V. and VaishWanar, R.S. Jain Brothers, New Delhi

(ii) Engineering Graphics – Chandra, AM & Chandra Satish 1998.

(iii) Engineering Graphics – K.L. Narayan and P. Kannaih, Tata McGraw Hill

(iv) A Text book of Engineering Drawing (Plane & Solid Geometry) – N.D. Bhatt & V.M. Panchal, Charotar Publishing House

(v) The Fundamental of Engineering drawing and Graphics Technology – French and Vireck, McGraw Hill.

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Semester: I B. Tech **Branch: All Streams of Engineering**
Subject: Environmental Sciences **Code: BT 104**
Total Theory Periods: 15 **Total Tutorial Periods: 00**
Total Credits: 01

UNIT-I:

CONCEPTS OF ENVIRONMENTAL SCIENCES AND NATURAL RESOURCES

Environment, Levels of organizations in environment, Structure and functions in an ecosystem; Biosphere, its Origin and distribution on land, in water and in air, Broad nature of chemical composition of plants and animals. Renewable and Non-renewable Resources, Forests, water, minerals, Food and land (with example of one case study); Energy, Growing energy needs, energy sources (conventional and alternative).

UNIT-II:

BIODIVERSITY AND ITS CONSERVATION

Biodiversity at global, national and local levels: India as a mega-diversity nation; Threats to biodiversity (biotic, abiotic stresses), and strategies for conservation.

UNIT-III:

ENVIRONMENTAL POLLUTION

Types of pollution- Air, water (including urban, rural, marine), soil, noise, thermal, nuclear; Pollution prevention; Management of pollution- Rural/Urban/Industrial waste management [with case study of any one type, e.g., power (thermal/nuclear), fertilizer, tannin, leather, chemical, sugar], Solid/Liquid waste management, disaster management.

UNIT-IV:

ENVIRONMENTAL BIOTECHNOLOGY AND ENVIRONMENTAL MONITORING
Biotechnology for environmental protection- Biological indicators, bio-sensors; Remedial measures- Bio-remediation, phyto-remediation, bio-pesticides, bio-fertilizers; Bio-reactors- Design and application. Monitoring- Identification of environmental problem, tools for monitoring (remote sensing, GIS); Sampling strategies- Air, water, soil sampling techniques.

UNIT-V:

SOCIAL ISSUES AND ENVIRONMENT

Problems relating to urban environment- Population pressure, water scarcity, industrialization; remedial measures; Climate change- Reasons, effects (global warming, ozone layer depletion, acid rain) with one case study; Legal issues- Environmental legislation (Acts and issues involved), Environmental ethics

TEXTBOOKS:

1. Gilbert M. Masters, “Introduction to Environmental Engineering and Science”, 2nd Edition, Pearson Education, 2004.

2. Benny Joseph, “Environmental Science and Engineering”, Tata McGraw-Hill, New Delhi, 2006.

REFERENCE BOOKS:

1. A. K. Chatterji, “Introduction to Environmental Biotechnology”, Prentice Hall of India, New Delhi, 2006.

2. R.K. Trivedi,“Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Vol. I and II, Enviro Media.

3. Nebel B. J., “Environmental Science”, Prentice Hall of India, New Delhi, 1987.

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Semester: I B.Tech | **Branch: All Streams of Engineering**
Subject: Technical English | **Code: BT 105**
Total Theory Periods: 45 | **Total Tutorial Periods: 00**
Total Credits : 02

OBJECTIVES:

- To enable learners of Engineering and Technology develop their basic communication skills in English.
- To emphasize specially the development of speaking skills amongst learners of Engineering and Technology.
- To ensure that learners use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading and writing leading to effective and efficient communication.

UNIT-I

Technical vocabulary-meaning in context, sequencing words, articles, prepositions, intensive reading and predicting content-reading and interpretation- process description.

UNIT-II

Phrases/structures indicating use/purpose- nonverbal communication- listening- corelating verbal and nonverbal communication-speaking in group discussion- formal letter writing-writing analytical paragraphs.

UNIT III

Cause and effect expressions- different grammatical forms of the same word- speaking stress and intonation- writing using connectives- report writing- types, structures, data collection, content form recommendation.

UNIT –IV

Numerical adjectives- oral instructions- descriptive writings, letter of application-content, format (c.v./biodata)-imperative forms –checklists, yes/no question forms- e mail communication.

UNIT-V

Speaking – discussion of problems and solutions- creative and critical thinking, writing a proposal.

OUTCOMES:

Learners should be able to

- Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Read different genres of texts adopting various reading strategies.

Listen/view and comprehend different spoken discourses/excerpts in different accents.

BOOKS AND REFERENCES:

1. P.k. dutta, g. Rajeevan and c.l.n.prakash, ‘a course in communication skills,. Cambridge university press, india2007

2. Krishna mohan and meerabanerjee, ‘developing communication skills’ Macmillan india limited

3. Edger thrope, showickthrope, ‘objective english’ second edition,pearson education,2007

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Semester: I B.Tech. | **Branch: All Streams of Engineering**
Lab: Engineering Physics Lab | **Code: BT 106**
Total Practical Periods: 30 | **Total Credit: 01**

OBJECTIVES:

- To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of matter.

OUTCOMES:

- The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.

LIST OF EXPERIMENTS (Any ten experiments can be performed)

1. To determine the surface tension by Capillary/Jager's method.
2. To determine the wave length of light by Newton's rings method.
3. To determine the wave length of light by Fresnel's Biprism.
4. To determine the focal length of combination of two thin lenses by nodal slide assembly and its verification.
5. To determine specific resistance of a wire by Carry Foster's Bridge.
6. To determine the Hall coefficient of semiconductor.
7. To determine e/m by Thomson's method.
8. Study of Photo – Cell and determination of Planck's constant.
9. Determination of wavelength of a spectral line using diffraction grating.
10. Determination of divergence of LASER beam.
11. Determination of grating element of a diffraction grating using LASER beam.
12. To determine the coefficients of viscosity of a liquid by capillary flow/Stoke's method.
13. To determine the frequency of A.C. mains using sonometer.
14. To determine the moment of inertia of flywheel.
15 To determine the forbidden energy gap of semiconductor diode.
16. To determine the mechanical equivalent of heat (J) by Calender&Barne's method.
17. To determine the numerical aperture (NA) of the given fiber cables.
18. To study the characteristics of LDR.

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Semester: I B.Tech. | **Branch: All Streams of Engineering**
Lab: Programming & soft skills laboratory | **Code: BT 107**
Total Practical Periods: 30 | **Total Credits: 01**

List of Programs:

1. Write a program to take the radius of a sphere as input and print the volume and surface area of that sphere.
2. Write a program to take a 5-digit number as input and calculate the sum of its digits.
3. Write a program to take three sides of a triangle as input and verify whether the triangle is an isosceles, scalene Oran equilateral triangle.
4. Write a program that will take 3 positive integers as input and verify whether or not they form a Pythagorean triplet or not.
5. Write a program to print all the Prime numbers between a given ranges.
6. Write a program to define a function that will take an integer as argument and return the sum of digits of that integer**.**
7. Write a program to define a macro that can calculate the greater of two of its arguments. Use this macro to calculate the greatest of 4 integers.
8. Write a program to define a recursive function that will print the reverse of its integer argument.
9. Write a program to print the sum of first N even numbers using recursive function.
10. Write a program to sort an array using Bubble sort technique.
11. Write a program that will take the elements of two integer arrays of 5 element each, and insert the common elements of both the array into a third array (Set intersection)
12. Write a program to take 5 names as input and print the longest name.
13. Write a program to check whether two given strings are palindrome or not using user defined function.
14. Write a program to find sum of all array elements by passing array as an argument using user define functions.
15. Write a program to convert decimal number to binary number using the function.
16. Write a program to get the largest and smallest element of an array using the function.
17. Write a program to define a structure Student that will contain the roll number, name and total marks of a student. The program will ask the user to input the details of 5

students and print the details of all the students whose total marks is greater than a given value.

18 Write a program to define a union Contact that will contain the members Mobile no and E-mail id. Now define structure Employee that will contain name, roll number, mode of contact (mob/e-mail) and a variable of type Contact as members. The program will ask the user to give the details of two Employees including mode of contact and the contact num/ E-mail. Print the details of both the Employees.

19 Write a program to count vowels and consonants in a string using pointer.

20 Write a program to swap two numbers using pointers.

21 Write a program to find sum of array elements using Dynamic Memory Allocation.

22 Write a program that will ask the user to input a file name and copy the contents of that file into another file.

23 Write a program that will take any number of integers from the command line as argument and print the sum of all those integers.

24 Write a program to process sequential file for payroll data.

25 Write a program to process random file of library data.

Smart Working with MS-Office

MS-Word

a) Creating, editing, saving and printing text documents
b) Font and paragraph formatting
c) Simple character formatting
d) Inserting tables, smart art, page breaks
e) Using lists and styles
f) Working with images
g) Using Spelling and Grammar check
h) Understanding document properties
i) Mail Merge

MS-Excel

a) Spreadsheet basics
b) Creating, editing, saving and printing spreadsheets

c) Working with functions & formulas
d) Modifying worksheets with color &auto formats
e) Graphically representing data : Charts & Graphs
f) Speeding data entry : Using Data Forms
g) Analyzing data : Data Menu, Subtotal, Filtering Data
h) Formatting worksheets
i) Securing & Protecting spreadsheets

MS-PowerPoint

a) Opening, viewing, creating, and printing slides
b) Applying auto layouts
c) Adding custom animation
d) Using slide transitions
e) Graphically representing data : Charts & Graphs
f) Creating Professional Slide for Presentation.

LIST OF EQUIPMENT'S / MACHINE REQUIRED:

PCs, C-Compiler, C Online Compiler, Microsoft Office (version 2007 or above)

REFERENCES:

1. Programming in ANSI C – E. Balaguruswamy Tata Mc-Gcraw Hill.
2. Let us C, YashwantKanetkar, BPB Publication
3. C: The Complete Reference, Herbert Schildt, McGraw Hill.
4. Office 2007 for Dummies, Wallace Wang, Wiley Publishing
5. MS-Office 2010 Training Guide, Satish Jain/M.Geeta/Kratika, BPB Publications

Semester: I B.Tech **Branch: All Streams of Engineering**
Lab: Engineering Graphics Lab **Code: BT 108**
Total Practical Periods: 30 **Total Credits: 02**

LIST OF EXPERIMENTS

Component-1

Sheet-1: Projection of Solids (4 problems) + Section and Development of solid surfaces (4 problems) Sheet -2: Orthographic projection without section (4 problems).
Sheet -3: Orthographic projection with section (4 problems). Sheet- 4: Isometric Projections (6 problems).

Component -2

One A-3 size sketch book consisting of:-
1) 6 problems each from Projection of Curves, Lines, Planes and Solids.
2) 6 problems from Section and Development of Solids.
3) 4 problems each from the Orthographic Projections (with Section), Reading of orthographic projections and Isometric projections.

Component - 3

1. An introduction of cad software and its utilities in the engineering software.
2. Study of the basic initial setting and viewing of drafting software interface.
3. Study of various tool bar options and exercises to familiarize all the drawing tools.
4. Use of various modify commands of drafting software.
5. Dimensioning in 2d and 3d entities.
6. Draw different types of 3d modeling entities using viewing commands, to view them (isometric projection).
7. Sectioning of solid primitives and rendering in 3d.
8. Intersection of solid primitives.

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(Scheme: 2020)

Semester: I B.Tech | **Branch: All Streams of Engineering**
Lab: Communication & Soft Skills | **Code: BT 109**
Total Practical Periods: 30 | **Total Credits: 01**

LIST OF TASKS:

1. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English; intelligent listening in situations such as interview in which one is a candidate.

2. Vocabulary building, Creativity, using Advertisements, Case Studies etc.

3. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking

4. Cross-Cultural Communication: Role-Play/ Non-Verbal Communication.

5. Meetings- making meeting effective, chairing a meeting, decision making, seeking opinions , interrupting and handling interruptions, clarifications, closure- Agenda, Minute writing.

6. Group Discussion – dynamics of group discussion, Lateral thinking, Brainstorming and Negotiation skills

7. Resume writing – CV – structural differences, structure and presentation, planning, defining the career objective

8. Interview Skills – formal & informal interviews, concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing 9. Writing Skills - Business Communication, Essays for competitive examinations.

10. Technical Report Writing/ Project Proposals – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Feasibility, Progress and Project Reports.

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Semester: I B.Tech **Branch: All Streams of Engineering**
Lab:Manufacturing Practices -I **Code: BT 110**
Total Practical Periods: 45 (15 Instructional Periods) **Total Credits: 02**

INSTRUCTIONAL SYLLABUS

Carpentry:
Timber, definition, engineering applications, seasoning and preservation, plywood and ply boards.

Foundry:
Moulding sands, constituents and characteristics. Pattern, definition, materials, types, core prints. Role of gate, runner, riser, core and chaplets. Causes and remedies of some common casting defects like blow holes, cavities, inclusions.

Welding:
Definitions of welding, brazing and soldering processes, and their applications, Oxyacetylene gas welding process, equipment and techniques, type of flames and their applications. Manual met an arc Welding technique and equipment, AC and DC welding, electrodes, constituents and functions of electrode coating, Welding positions. Type of weld joint. Common welding defects such ascracks, undercutting slag inclusion, porosity.

LIST OF EXPERIMENTS

1. T-Lap joint and Bridle joint (Carpentry shop)
2. Mould of any pattern (foundry shop)
3. Casting of any simple pattern (foundry shop)
4. (a) Gas welding practice by students on mild steel flat

   (b) Lap joint by Gas welding
5. (a) MMA Welding practice by students

   (b) Square butt joint by MMA Welding
6. (a) Lap joint by MMA Welding

   (b) Demonstration of brazing

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SEMESTER - II

S. No.	Code	Subject	Periods per week			Scheme of marks		Total Credit
			L	T	P	ESE	IM	
1.	BT200	Engineering Mathematics –II	3	1	-	70	30	4
2.	BT201	Engineering Chemistry	3	-	-	70	30	3
3.	BT202	Basic Electrical & Electronics Engineering	3	-	-	70	30	3
4.	BT203	Object Oriented Programming	3	-	-	70	30	3
5.	BT204	Constitution of India, Professional Ethics and Human Rights	1	-	-	70	30	1
6.	BT205	Professional Elective	3	-	-	70	30	3
	BT2051	Fundamental of Mechanical Engineering (For Aero/Mech/Mining/Civil)						
	BT2052	Introduction to Scripting (For CSE/Elex/Electrical)						
7.	BT206	Engineering Chemistry Lab	-	-	2	30	20	1
8.	BT207	Basic Electrical & Electronics Engineering Lab	-	-	2	30	20	1
9.	BT208	Advance Programming Laboratory	-	-	2	30	20	1
10.	BT209	Professional Elective Laboratory	-	-	2	30	20	1
	BT2091	Fundamental of Mechanical Engineering laboratory (For Aero/Mech/Mining/Civil)						
	BT2092	Java Script Laboratory (For CSE/Elex/Electrical)						
11.	BT210	Manufacturing Practices – II Laboratory	-	-	4	30	20	2
Total			**16**	**1**	**12**	**570**	**280**	**23**

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Semester: 2nd B.Tech **Branch: All Streams of Engineering**
Subject: Engineering Mathematics-II **Code: BT200**
Total Theory Periods: 60 **Total Credits: 04**

OBJECTIVES:

- To make the scholars perceive the series analysis could be a powerful methodology wherever the formulas square measure integrals and to possess information of increasing periodic functions that explore sort of applications of Fourier series.
- To possess intensive information of PDE those arise in mathematical descriptions of things in engineering. To review a few amount which will take any of a given vary of values that will not be foreseen because it is however can be delineated in terms of their likelihood.
- To acquaint the student with the concepts of vector calculus needed for problems in all engineering disciplines.
- To produce a sound background of advanced analysis to perform an intensive investigation of major theorems of complex analysis and to use these ideas to a large vary of issues that features the analysis of each complex line integrals and real integrals.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I

FOURIER SERIES

Fourier series, Even odd function, Half range sine and cosine series, Parseval's theorem, practical harmonic analysis & Fourier Transform

UNIT II

PARTIAL DIFFERENTIAL EQUATION

Formation, Solution by direct integration method, Linear equation of first order, Homogeneous linear equation with constant coefficients, Non-homogeneous linear equations, Method of separation of variables & application of PDE

UNIT III

COMPLEX ANALYSIS

Derivative, Cauchy-Riemann equations, Analytic functions, Harmonic functions, Flow problems, Complex integration, Cauchy theorem, Cauchy integral formula, Taylor & Laurent series, Singularity, Residue

UNIT IV

LAPLACE TRANSFORMATION

Definition, Transform of elementary functions, Properties of Laplace transform, of derivatives & integrals, Multiplication by tn, Division by t, Evaluation of integrals, Inverse Laplace

function, Convolution theorem, Unit step functions, Unit impulse function, periodic function. Application to solution of ordinary differential equations

UNIT V

VECTOR CALCULUS

Directional derivative, Gradient, Divergence and curl, Line, Surface and Volume integrals, Green's, Gauss's &Stoke's theorem (without proof) and applications

OUTCOMES:

The subject helps the students to develop the fundamentals and basic concepts in vector calculus, PDE, Laplace transform and complex functions. Students will be able to solve problems related to engineering applications by using these techniques.

TEXT BOOKS:

1. Higher Engineering Mathematics by B.S.Grewal (40th edition)-Khanna Publisher.
2. Advanced Engineering Mathematics by Erwin Kreyszig (8th edition)-John Wiley & Sons.

REFERENCE BOOKS:

1. Differential Calculus by Gorakh Prasad-Pothisala Private Limited.
2. Advanced Engineering Mathematics by R.K.Jain and S.R.K. Iyengar-Narosa Publishing House.
3. Applied Mathematics by P.N.Wartikar&J.N.Wartikar Vol-ll –Pune VidyarthiGrihaPrakasan, Pune

MATS UNIVERSITY, RAIPUR (C.G.)

SCHOOL OF ENGINEERING & I.T

Semester:II B.Tech **Branch: All Streams of Engineering**
Subject: Engineering Chemistry **Code: BT 201**
Total Theory Periods: 45 **Total Tutorial Periods: 00**
Total Credits: 03

OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
- Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
- Preparation, properties and applications of engineering materials.
- Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels

OUTCOMES:

- The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

UNIT-I:

(a) ELECTROCHEMISTRY AND BATTERY TECHNOLOGY
ELECTROCHEMISTRY: Introduction, Derivation of Nernst equation for electrode potential. Reference electrodes: Introduction, construction, working and applications of calomel and Ag / AgCl electrodes. Measurement of electrode potential using calomel electrode. Ion selective electrode: Introduction; Construction and working of glass electrode, determination of pH using glass electrode. Concentration cells: Electrolyte concentration cells, numerical problems.

(b) BATTERY TECHNOLOGY:

Introduction, classification - primary, secondary and reserve batteries. Characteristics - cell potential, current, capacity, electricity storage density, energy efficiency; cycle 10 hours life

and shelf life. Construction, working and applications of Zinc Air, Nickel- metal hydride batteries. Lithium batteries: Introduction, construction, working and applications of Li-MnO2 and Li-ion batteries.

(c) **FUEL CELLS:**

Introduction, difference between conventional cell and fuel cell, limitations & advantages. Construction, working & applications of methanol-oxygen fuel cell with H2SO4 electrolyte.

UNIT-II:

(a) CORROSION AND METAL FINISHING CORROSION:

Introduction, electrochemical theory of corrosion, galvanic series. Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of metal, nature of corrosion product, nature of medium – pH, conductivity, and temperature. Types of corrosion- Differential metal, differential aeration (Pitting and water line) and stress. Corrosion control: Inorganic coatings Anodizing of Al and phosphating; Metal coatings-Galvanization and Tinning. Cathodic protection (sacrificial anodic and impressed current methods).

(b) **METAL FINISHING:**

Introduction, Technological importance. Electroplating: Introduction, principles governing-Polarization, decomposition potential and overvoltage. Factors influencing the nature of electro deposit-current density, concentration of metal ion & electrolyte; pH, temperature & throwing power of plating bath; additives- brighteners, levelers, structure modifiers & wetting agents. Electroplating of Nickel (Watt's Bath) and Chromium (decorative and hard). Electro less plating: Introduction, distinction between electroplating and electro less plating, electro less plating of copper & manufacture of double sided Printed Circuit Board with copper.

UNIT-III:

(a)FUELS AND SOLAR ENERGY FUELS:

Introduction, classification, calorific value- gross and net calorific values, determination of calorific value of fuel using bomb calorimeter, numerical problems. Cracking: Introduction fluidized catalytic cracking, synthesis of petrol by Fishcher-Tropsch process, reformation of petrol, octane and cetane numbers. Gasoline and diesel knocking and their mechanism, anti-knocking agents, power alcohol & biodiesel.

(b)SOLAR ENERGY:

Introduction, utilization and conversion, photovoltaic cells- construction and working. Design of PV cells: modules, panels & arrays. Advantages & disadvantages of PV cells. Production of solar grade silicon: Union carbide process, purification of silicon (zone refining), doping of silicon-diffusion technique (N&P types).

UNIT-IV:

POLYMERS:

Introduction, types of polymerization: addition and condensation, mechanism of polymerization- free radical mechanism taking vinyl chloride as an example. Molecular weight of polymers: number average and weight average, numerical problems. Glass transition temperature (Tg): Factors influencing Tg-Flexibility, inter molecular forces, molecular mass, branching & cross linking and stereo regularity. Significance of Tg. Structure property relationship: crystallinity, tensile strength, elasticity & chemical resistivity. Synthesis, properties and applications of PMMA (plexi glass), Polyurethane and polycarbonate. Elastomers: Introduction, synthesis, properties and applications of Silicone rubber. Adhesives: Introduction, synthesis, properties and applications of epoxy resin. Polymer Composites: Introduction, synthesis, properties and applications of Kevlar. Conducting polymers: Introduction, mechanism of conduction in Poly aniline and applications of conducting poly aniline.

UNIT-V:

WATER TECHNOLOGY AND NANOMATERIALS

(a)WATER TECHNOLOGY:

Introduction, boiler troubles with disadvantages & prevention methods-scale and sludge formation, priming and foaming, boiler corrosion (due to dissolved O2, CO2 and MgCl2). Determination of DO, BOD and COD, numerical problems on COD. Sewage treatment: Primary, secondary (activated sludge method) and tertiary methods. Softening of water by ion exchange process. Desalination of sea water by reverse osmosis & electro dialysis (ion selective).

(b)NANO MATERIALS:

Introduction, properties (size dependent). Synthesis-bottom up approach (sol-gel, precipitation, gas condensation & chemical vapour condensation processes). Nano scale materials- carbon nano tubes, nano wires, fullerenes, dendrimers, nano rods, &nano composites.

TEXTBOOKS:

1. B.S.Jai Prakash, R.Venugopal, Sivakumaraiah&PushpaIyengar., “Chemistry for Engineering Students”, Subhash Publications, Bangalore.

2. R.V.Gadag&A.Nityananda Shetty., “Engineering Chemistry”, I K International Publishing House Private Ltd. New Delhi.

3. P.C.Jain& Monica Jain., “Engineering Chemistry”, Dhanpat Rai Publications, New Delhi.

REFERENCE BOOKS:

1. O.G.Palanna,“Engineering Chemistry”, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint.

2. G.A.Ozin& A.C. Arsenault, “Nano chemistry A Chemical Approach to Nanomaterials”, RSC publishing, 2005.

3. "Wiley Engineering Chemistry", Wiley India Pvt. Ltd. New Delhi. Second Edition.

4. V.R.Gowariker, N.V.Viswanathan&J.Sreedhar., "Polymer Science", Wiley-Eastern Ltd.

5. M.G.Fontana., "Corrosion Engineering", Tata McGraw Hill Publishing Pvt. Ltd. New Delhi.

MATS UNIVERSITY, RAIPUR (C.G.)

SCHOOL OF ENGINEERING & I.T

Semester:II B.Tech **Branch: All Streams of Engineering**

Subject: Basic Electrical & Electronics Engineering **Code: BT 202**

Total Theory Periods: 45 **Total Tutorial Periods: 15**

Total Credits: 03

Unit – I

D.C. Networks:

Elementary idea about power generation, transmission and distribution. Node voltage and mesh current method. Superposition, Thevenin's and Norton's theorems. Star- delta and Delta- star conversions.

Unit – II

Single Phase A.C. Circuits:

Single phase EMF generation, Effective & Average values of sinusoids and determination of form-factor, Analysis of simple series R-L, R-C and RLC circuits, power and power factor

Unit – III

(a) Three Phase AC circuits:

Introduction, Generation of Three-phase EMF, Phase sequence, Connection of Three-phase Windings - Delta and Star connection: Line and Phase quantities, phasor diagrams, Power equations in balanced conditions.

(b)Magnetic Circuits:

Introduction, Magneto motive force (MMF), Magnetic field strength, Reluctance, B-H curve, Comparison of the Electric and Magnetic Circuits, Series-Parallel Magnetic Circuit, Leakage flux and fringing, Magnetic Hysteresis, Eddy currents.

Unit – IV

(a)Single phase Transformers:

Introduction, Principles of operation, Constructional details, Ideal Transformer and Practical Transformer, EMF equation, Rating, Phasor diagram on no load, Losses, Efficiency calculations.

(b)Direct current machines:

Basic concepts and elementary idea of AC and DC machines, construction and working principal of DC Generator, emf and torque equation dc machine and types of dc motor.

Unit – V

(a)Semiconductor Devices and Applications

Introduction - Characteristics of PN Junction Diode – Zener Effect - Zener Diode and its Characteristics - Half wave and Full wave Rectifiers - Voltage Regulation. Bipolar Junction Transistor - CB, CE, CC Configurations and Characteristics - Elementary Treatment of Small Signal Amplifier

(b)Digital Electronics

Binary Number System – Boolean algebra theorems, Digital circuits - Introduction to sequential Circuits,

Flip-Flops - Registers and Counters – A/D and D/A Conversion.

TEXT BOOKS:

1. V.N. Mittle and Arvind Mittal, “Basic Electrical Engineering”, Second Edition, Tata McGraw Hill.
2. 2 Del Torro, Vincent “Electrical Engineering Fundamentals”, Second Edition Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS:

1. Fitzrald and Higgonbothom, “Basic Electrical Engineering”, Fifth Edition, McGraw Hill.

2. D.P. Kothari and I.J. Nagrath, “Theory and Problems of Basic Electrical Engineering”, PHI.

3. I.J. Nagrath and D.P. Kothari, ”Electrical Machines”, Tata McGraw Hill.

4. Ashfaq Hussain, “Fundamentals of Electrical Engineering”, Third Edition, Dhanpat Rai and Co.

5. H. Cotton, ”Advance Electrical Technology,” ISSAC Pitman, London. 6. Parker Smith S. (Ed.

Parker Smith N.N.), “Problems in Electrical Engineering”, Tenth edition, Asia publication.

Department of Computer Science & Engineering
MATS University, Raipur (C.G.)
Syllabus for B. Tech. Computer Science and Engineering
(Scheme: 2020)

Semester:II B.Tech. **Branch: All Streams of Engineering**
Subject:Object Oriented Programming **Code: BT 203**
Total Theory Periods: 45 **Total Tutorial Periods: 00**
Total Credits: 03

COURSE OBJECTIVE:

1. To learn the object-oriented programming concepts using C++.
2. To design and implement C++ programs with the concept of OOP.
3. To understand implementation issues related to object-oriented techniques.
4. To learn how to build good quality software using object-oriented programming technique.

UNIT-I
INTRODUCTION TO OOP AND C++

Concept of Object Oriented Programming, Procedural programming Vs. Object oriented programming (OOP), Features and Benefits of OOPs, Object Oriented Languages, Introduction to C++, C++ Compiler, C++ Standard library, Basics of a typical C++ environment and C++ program, Pre-processors directives, and illustrative simple C++ programs. Header files and namespaces, library files, Data Types, Keywords, Operators and Expressions, Control Structure, Loops, Arrays, Structures, Functions.

UNIT-II
CLASSES & OBJECT, CONSTRUCTORS&DESTRUCTORS

Introduction to class, class object creation, Access of class members, Scope of class and its member, Nested class, Data hiding & encapsulation, Friend function, Array within a class, Array of object as function argument, Function returning object, Static member. Constructor function, Parameterized multiple constructor, Default constructor, Dynamic memory allocation with new and delete, Copy constructor, Constant and class, Data conversion between objects of different classes, Destructor function.

UNIT- III
INHERITANCE, POINTER, VIRTUAL FUNCTIONS & POLYMORPHISM

Fundamentals of operator overloading, restrictions on operators overloading, operator functions as class members vs. as Friend functions, Overloading, <<, >> Overloading unary operators, overloading binary operators. Introduction to inheritance, Base classes and derived classes, protected members, Casting base class pointers to derived class pointers, Using member functions, Overriding base class members in a derived class, public, protected and private inheritance, Using constructors and destructors in derived classes, Implicit derived class object to base class object conversion, Composition Vs. Inheritance. Introduction to virtual functions, Abstract base classes and concrete classes, new classes and dynamic binding, virtual destructors, polymorphism, dynamic binding.

UNIT-IV
FILE I/O, TEMPLATES& EXCEPTION HANDLING

Files and streams, Creating a sequential access file, Reading data from a sequential access file, Updating sequential access files, Random access files, creating a random access file, Writing data randomly to a random access file, reading data sequentially from a random access file. Stream Input/output classes and objects, Stream output, Stream input, Unformatted I/O (with read and write), Stream manipulators. Function templates, Overloading template functions, Class template, Class templates and non-type parameters, Templates and inheritance, Templates and friends, Templates and static members. Basics of C++ Exception handling: Try Throw, Catch, Throwing an exception, catching an exception, rethrowing an exception, Exception specifications, processing unexpected exceptions.

UNIT-V
OOPS CONCEPTS WITH PYTHON

Python Basics, Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules Sequences - Strings, Lists, and Tuples, Mapping and Set Types. Creating classes and objects, inheritance in python.

COURSE OUTCOME:

After completion of the course study, students will be able to

1. Explain the basics of Object Oriented Programming concepts.
2. Design and develop a C++ program with concept of Object Oriented Programming.
3. Apply the object initialization and destroy concept using constructors and destructors.
4. Apply the concept of polymorphism to implement compile time polymorphism in programs by using overloading methods and operators.
5. Use the concept of inheritance to reduce the length of code and evaluate the usefulness.
6. Apply the concept of run time polymorphism by using virtual functions, overriding functions and abstract class in programs.
7. Use I/O operations and file streams in programs.
8. Make an application/project using C++.

TEXT BOOKS:

1. Object Oriented Programming in C++, Robert Lafore, CourseSams Publishing.
2. Object Oriented Programming with C++, E. Balagurusamy, McGraw Hill Education.
3. Python 3 Object-Oriented Programming - Third Edition

REFERENCE BOOKS:

1. The Complete Reference C++, Herbert Schildt, McGraw Hill Education.
2. Let Us C++, YashavantKanetkar, BPB Publication.
3. Programming with C++, John R. Hubbard, Schaum's Outlines, McGraw Hill Education.
4. Programming with C++, D. Ravichandran, McGraw Hill Education.
5. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

MATS UNIVERSITY, RAIPUR (C.G.)

SCHOOL OF ENGINEERING & I.T.

Semester:II B.Tech **Branch: All Streams of Engineering**
Subject: Constitution of India, Professional Ethics and Human Rights **Code: BT 204**
Total Theory Periods: 15 **Total Tutorial Periods: 00**
Total Credits: 01

UNIT-I: CONSTITUTION OF INDIA

Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution, Preamble to the Indian Constitution Fundamental Rights & its limitations.

UNIT-II: FUNDAMENTAL DUTIES AND UNION EXECUTIVES

Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister Parliament Supreme Court of India

UNIT-III: STATE LEGISLATURE AND ELECTORAL PROCESS

State Executives – Governor Chief Minister, State Legislature High Court of State, Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th &91st Amendments.

UNIT-IV: HUMAN RIGHTS

Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India ,Powers and functions of Municipalities, Panchyats and Co - Operative Societies..

UNIT-V: PROFESIONAL ETHICS

Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering.

TEXTBOOKS:

1. Durga Das Basu: "Introduction to the Constitution on India", (Students Edn.) Prentice – Hall EEE, 19th / 20th Edn., 2001

2. Charles E. Haries, Michael S Pritchard and Michael J. Robins "Engineering Ethics" Thompson Asia, 2003-08-05.

REFERENCE BOOKS:

1. M.V.Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.

2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "Engineering Ethics", Prentice –Hall of India Pvt. Ltd. New Delhi, 2004

3. Brij Kishore Sharma,"Introduction to the Constitution of India", PHI Learning Pvt. Ltd., New Delhi, 2011.

MATS UNIVERSITY, RAIPUR (C.G.)

SCHOOL OF ENGINEERING & I.T.

Semester:II B.Tech **Branch: Aero., Civil, Mining and Mechanical Engg.**
Subject: Fundamental of Mechanical Engineering **Code: BT 2051**
Total Theory Periods: 45 **Total Tutorial Periods: 00**
Total Credits: 03

OBJECTIVES:

- To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering.

UNIT – I :

RESULTANT AND EQUILIBRIUM ANALYSIS:

Basic concepts and laws of mechanics, system of forces, free body diagram, Resultant and equilibrium of concurrent, parallel and non-concurrent co-planar force system.
General numerical applications.

UNIT – II :

(a) ANALYSIS OF PLANE TRUSSES Perfect truss, basic assumptions for perfect truss, analysis of axial forces in the members by method of joint and method of sections. General numerical applications.

(b) FRICTION Static, dynamic and limiting friction, Law of limiting friction, Angle of friction, Angle of Repose, Cone of Friction, Wedge friction. General numerical applications

UNIT –III :

PROPERTIES OF SURFACES Centre of Gravity, Second moment of area, determination of second moment of area by integration, polar moment of inertia, radius of gyration of area, Parallel axis theorem, Moment of inertia of composite areas, and determination of Product of inertia by integration.

UNIT –IV :

KINETICS OF PARTICLES

(a) D'Alembert's principle applied to bodies having rectilinear motion.

(b) Principle of work and Energy: General numerical applications

(c) Principle of Impulse and momentum: General numerical applications

UNIT – V :

LAWS OF THERMODYNAMICS

(a) Thermodynamic System, properties, process, cycle, thermodynamic equilibrium, Quasi-static Process, Zeroth Law of thermodynamics, Work and Heat transfer, flow work, general numerical application.

(b)First Law of thermodynamics, internal energy, proof of internal energy as a point function, general numerical application of first law to non-flow process and steady flow process.

OUTCOMES:

(a)Ability to explain the differential principles applies to solve engineering problems dealing with force, displacement, velocity and acceleration.
(b)Ability to analyses the forces in any structures.
(c) Ability to solve rigid body subjected to dynamic forces.

TEXT BOOKS:

1. Engineering Mechanics (Statics and Dynamics) ; A. K. Tayal ,Umesh Pub., Delhi .

2. Engineering Mechanics : S. Timoshenko and D.H. Young,TMH

3. Engineering Thermodynamics: P.K.Nag, TMH

4. Engineering Thermodynamics: C.P.Arora, TMH

REFERENCE BOOKS:

1. Engineering Mechanics (Statics and Dynamics): R.C.Hibbeler, Pearson

2. Engineering Mechanics:Meriam and Kreige ,John Wiley and sons

3. Thermodynamics: Cengel and Boles, TMH

4. Essentials of Engg Mechanics: S.Rajasekharan&G.ShankaraSubramaniyam, Vikas Publications

5. Engineering Mechanics: BasudebBhatytacharya , Oxford

MATS UNIVERSITY, RAIPUR (C.G.)

SCHOOL OF ENGINEERING & I.T.

Semester: II B.Tech **Branch : Comp. Sci. and Engg. and CSE(Hons)**
Subject: Introduction to Scripting **Code: BT 2052**
Total Theory Periods: 45 **Total Tutorial Periods: 00**
Total Credits: 03

COURSE OBJECTIVE:

1. Design and develop static and dynamic web pages.
2. Familiarize with Client-Side Programming,
3. Learn web page validations.
4. To design and implement web page scripts.
5. o learn how to build good interactive web pages using HTML and Javascript.

UNIT I – INTRODUCTION TO SCRIPTING LANGUAGES

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT II - HTML BASICS

HTML basics, Elements, Attributes and Tags, Basic Tags, Advanced Tags, Frames, Images. Cascading style sheets: Adding CSS, CSS and page layout. JavaScript: Introduction, Variables, Literals, Operators, Control structure, Conditional statements, Arrays, Functions, Objects, Predefined objects, Object hierarchy, Accessing objects.

UNIT III - JAVASCRIPT PROGRAMMING OF REACTIVE WEB PAGES ELEMENTS

Events, Event handlers, multiple windows and Frames, Form object and Element, Advanced JavaScript and HTML, Data entry and Validation, Tables and Forms. Introduction to Python Programming: History of Python, Need of Python Programming, Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation, Types - Integers, Strings, Booleans.

UNIT IV - OPERATORS AND EXPRESSIONS

Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations. Data Structures: Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences.

UNIT V - CONTROL FLOW

if, if-else, for, while, break, continue, pass Functions - Defining Functions, Calling Functions, Passing Arguments, Default Arguments, Variable-length arguments, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Development of sample scripts and web applications. Client Side Scripting, Server-

Side Scripting, Managing data with SQL, Cookies, use the cookies, advantages of the cookies and how to create cookies. Introduction to Node.js.

COURSE OUTCOME:

After completion of the course study, students will be able to

1. Explain the basics of websites and WebPages concepts.
2. Design and develop a Web Page with DOM Elements.
3. Apply the validation and verification of data at client end.

TEXT BOOKS:

1. Beginning PERL, Curtis Poe, Wrox Publication
2. Sams Teach Yourself HTML, CSS and Java Script, Julie C, Meloni.
3. Javascript by Example, Ellie Quigley, Prentice Hall.
4. Programming Python, Mark Lutz, O'Reilly.

REFERENCE BOOKS:

1. Learning Perl: Making Easy Things Easy and Hard Things Possible 7th Edition, O'Reilly
2. Mastering HTML, CSS &Javascript Web Publishing, Laura Lemay, Rafey Colburn, BPB Publications.
3. Eloquent Javascript, MarjinHaverbeke
4. Programming Javascript Applications, Eric Elliott, O'Reilly Media.

Department of Computer Science & Engineering
MATS University, Raipur (C.G.)
Syllabus for B. Tech. Computer Science and Engineering
(Scheme: 2020)

SCHOOL OF ENGINEERING & I.T.

Semester: II B.Tech **Branch : All Streams of Engineering**
Subject : Engineering Chemistry Lab **Code: BT 206**
Total Theory Periods: 30 **Total Tutorial Periods: 00**
Total Credits: 01

COURSE OBJECTIVE:
1. To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of hardness, alkalinity, metal ion content, corrosion in metals and cement analysis.

LIST OF EXPERIMENTS
1. Acid-base titration (estimation of commercial caustic soda)

2. Redox titration (estimation of iron using permanganometry)

3. Complexometric titration (estimation of hardness of water using EDTA titration).

4. Preparation and analysis of metal complex (for example thiourea/copper sulfate or nickel chloride/ammonia complexes).

5. Chemical kinetics (determination of relative rates of reaction of iodide with H2O2 at room temperature (Clock reaction).

6. Viscosity of solutions (determination of percentage composition of sugar solution from viscosity).

7. Detection of functional groups in organic compounds.

8. Utilization of paper/thin layer/column chromatographic techniques in the separation of organic compounds

9. Conduct metric titration (determination of the strength of a given HCl solution by titration against a standard NaOH solution).

10. Determine the amount of oxalic Acid and sulphuric Acid/Hydrochloric Acid in one liter of solution given standard Sodium Hydroxide and Potassium Permangate.

11. To determine the Carbonate, Bicarbonate and Chloride contents in irrigation water.

12. Determination of dissolved Oxygen in given sample of water.

13. Determination of calorific value of fuel by Bomb Calorimeter.

14. Determination of Flash Point and Fine Point of Lubricant by Abels and Pensky Martin apparatus.

COURSE OUTCOME:
1. The students will be conversant with hands-on knowledge in the quantitative chemical analysis of water quality related parameters, corrosion measurement and cement analysis.

MATS UNIVERSITY, RAIPUR (C.G.)

SCHOOL OF ENGINEERING & I.T.

Semester: II B.Tech **Branch: All Streams of Engineering**

Subject: Basic Electrical & Electronics Engineering Lab **Code: BT 207**

Total Theory Periods: 30 **Total Tutorial Periods: 00**

Total Credits: 01

List of Experiments (To perform minimum 10 experiments)

1. To verify Thevenin's theorem and Norton's theorem.
2. To verify Superposition theorem.
3. To verify Kirchhoff's Current Law and Kirchhoff's Voltage Law.
4. To verify Maximum Power Transfer theorem
5. To determine V– I characteristics of Incandescent lamp.
6. To study B-H curve.
7. To measure current, power, voltage and power factor of series RLC circuit.
8. To measure current, power, voltage of parallel RLC circuit.
9. To measure current, power, voltage of series parallel RLC circuit.
10. To measure R and L of choke coil.
11. To study construction of transformer.
12. To perform ratio test and polarity test of single phase transformer.
13. To calculate efficiency of single phase transformer by direct loading.
14. To study construction of D.C. machine.
15. To study charging and discharging of a capacitor.

16. To study the Wattmeter and Energy meter.

MATS UNIVERSITY, RAIPUR (C.G.)

SCHOOL OF ENGINEERING & I.T.

Semester:II B.Tech **Branch: All Streams of Engineering**
Subject:Advance Programming Laboratory **Code: BT 208**
Total Theory Periods: 30 **Total Tutorial Periods: 00**
Total Credits: 01

1. Write a program to check whether a given number is Prime or not.
2. Write a program to read number and to display the largest value between two, three or four numbers by using switch-Case statements.
3. Write a program to find sum of first natural numbers : sum= 1+2+3+4+……. 100 by using
   a. for loop b. while loop c. do-while loop
4. Write a program to find sum of the following series using function:
   Sum= $x-(x)^3/3!+(x)^5/5!-\ldots\ldots\ldots..(x)^n/n!$
5. Write a program to read the elements of two matrices & to perform the matrix multiplication.
6. Write a program to swap the contents of two variable by using
   a. call by value b. Call by reference
7. Write a program to perform the following arithmetic operations on complex numbers using structure

a. Addition of the two complex numbers b. Subtraction of two complex numbers

c. Multiplication of two complex numbers d. Division of two complex numbers

8 Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.

9 Write an object-oriented program (OOP) using C++ to exchange the private data members of two different functions using friend functions.

10 Write an OOP using C++ to count how many times a particular member function of a class is called by:

a. A particular object b. Any objects

11 Write an OOP using C++ to define a constructor for a "Date" class that initializes the Date objects with initial values. In case initial values are not provided, it should initialize the objects with default values.

12 Write an OOP using C++ to overload:

a. + Operator b. = operator c. >> operator d. ++ operator

13 Write a C++ program to demonstrate how ambiguity is avoided using scope resolution operator in the following:

a. Single Inheritance b. Multiple Inheritance

14 Write a C++ Program to demonstrate function overloading for swapping of two variables of the various data types (integer, floating-point number and character type).

15 Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.

16 Write a C++ program to access the private data of a class by non-member function through friend function where the friend function is declared:

a. in the location of public category b. in the location of private category

c. within the scope of a class definition itself d. defined with inline code subtraction

17 Write a C++ program to demonstrate how a pure virtual function is defined, declared and invoked from the object of derived class through the pointer of the base class.

18 Write a C++ program to open a file and count the number of characters, number of vowels and number of newline characters present in the file.

19 Write a program to copy the contents of one text file to another and display both the files using a text Menu.

20 Create a database of 10 students. The database should contain the name, marks of 5 subjects, aggregate marks, aggregate percentage and division according to the following conditions:

a. Percentage greater or equal to 60 – First division

b. Percentage between 50 and less than 60 – Second division

c. Percentage between 40 and less than 50 – Third division

d. Percentage below 40 – Improvement required

Display the above database of every student in a tabulated form. Implement the above program using Structures, Text-Menu and File I/O operations.

21 Write an OOP using a class template to read any five parameterized data type such as float and integer, and print the average.

22 Write a program for sorting of numbers with Bubble Sort using template function.

23 Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.

24 Write a C++ program to read two numbers and find the division of these two numbers using exception handling.

25 Write a C++ program to create a function which take a parameter, if the value of parameter is > 0 then throw integer type, if parameter is = 0, then throw character type, if parameter is < 0 then throws float type exception but for all design use only one catch block.

26 Write a python program for finding biggest number among 3 numbers.

27 Implement Python Script to generate prime numbers series up to n

28 Implement python script to read person's age from keyboard and display whether he is eligible for voting or not.

29 Write a python program to work with classes and objects.

30 Write a python program that makes use of function to display all such numbers, which are divisible by 7 but are not a multiple of 5, between 1000 and 2000.

LIST OF EQUIPMENT/ MACHINE REQUIRED

PCs, Turbo C++ compiler, Online C++ Compiler, Python 3/Python IDE, Online python compiler

REFERENCES:

1. Programming with C++, D. Ravichandran, McGraw Hill Education.
2. Object Oriented Programming with C++, E. Balagurusamy, McGraw Hill Education.
3. Mastering C++, K. R. Venugopal, Mcgraw Hill Education.
4. The Complete Reference C++, Herbert Schildt, McGraw Hill Education.
5. Object Oriented Programming in C++, Robert Lafore, CourseSams Publishing.
6. Let Us C++, YashavantKanetkar, BPB Publication.
7. Head-First Python: A Brain-Friendly Guide (2nd Edition), Paul Barry, Oreilly.
8. Python Programming: An Introduction to Computer Science (3rd Edition), John Zelle,

MATS UNIVERSITY, RAIPUR (C.G.)

SCHOOL OF ENGINEERING & I.T.

Semester:II B.Tech **Branch: Aero., Civil, Mining and Mechanical Engg.**

Lab: Fundamental of Mechanical Engineering Lab **Code: BT 209**

Total Practical Periods: 30 **Total Credits: 01**

Note: MINIMUM TEN NUMBERS OF EXPERIMENTS IS TO BE PERFORMED

LIST OF EXPERIMENTS

1. To verify law of triangle of forces.
2. To verify the Lami's theorem.
3. To verify the law of polygon of forces.
4. To verify the law of lever. 5. To determine the support reactions of a simply supported beam subjected to point loads.
6. To draw the variation of bending moment at a given section in a simply supported beam under a moving point load.
7. To find the coefficient of friction between surfaces of wooden plane and following blocks: i) Aluminum ii) Tin iii) Glass iv) Asbestos v) Teak ply vi) Sand paper vii) card board .
8. To determine the coefficient of friction between (i) Belt and pulley (ii) Rope and pulley.
9. To study simple jib crane and to determine the internal forces in members of jib crane.
10. To determine the stiffness of helical compression spring.
11. To study lifting machine.
12. To study the lifting machine "second order pulley system" and to draw the following characteristic diagram: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

13 To study the lifting machine "Wheel and Differential axle" and to draw the following characteristic diagram: (i). Load-effort diagram (ii) Load- ideal effort diagram (iii). Load-efficiency diagram. Also to determine the law of machine and the maximum efficiency of machine.

14. To study the lifting machine "Worm and worm wheel" and to draw the following characteristic diagram: (i). Load-effort diagram (ii). Load- ideal effort diagram (iii). Load-efficiency diagram. Also to determine the law of machine and the maximum efficiency of machine.

15. To study the lifting machine "Simple screw jack" and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii). Load- ideal effort

diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

16. To study the lifting machine “Modified screw jack” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

17. To study the lifting machine “Geared Jib crane” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

18. To study the lifting machine “Single Purchase Winch crab” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram

(iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

19. To study the lifting machine “Double Purchase Winch crab” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

MATS UNIVERSITY, RAIPUR (C.G.)

SCHOOL OF ENGINEERING & I.T.

Semester: II B.Tech **Branch: Comp. Sci. and Engg. and CSE(Hons)**
Lab: Java Script Laboratory Lab **Code: BT 210**
Total Practical Periods: 30 **Total Credits: 01**

Note: MINIMUM TEN NUMBERS OF EXPERIMENTS IS TO BE PERFORMED

1. Design a HTML page describing your profile in one paragraph. Design in such a way that it has a heading, a horizontal rule, three links and your photo also write three HTML documents for the links.
2. Design HTML page describing your academic career. The page will tell about the degrees, Institutions and your hobbies. Add some lists too**.**
3. Design HTML page demonstrating concept of Internal Hyper-link
4. Design HTML page which gives the list of grocery Items by using Ordered List , List consist of Roman no, A,B…. and so on.
5. Design HTML page which gives the list of grocery Items by using Unordered List bullets are of form disc, square and circle.
6. Design a HTML page for partitioning browser window in frames display the different pages in partitioned windows.
7. Design HTML page to partition window, Design in such a way that link clicked in on page can display the corresponding pages in other window.
8. Write a Java script to prompt for users name and display it on the screen.
9. Write a java script program to test the first character of a string is uppercase or not.
10. Write a java script program for pattern that matches e-mail addresses.
11. Write a java script program to check whether a given number is Prime or not.
12. Write a java script function to print an integer with commas as thousands separators.
13. Write a java script program to sort a list of elements using any sorting algorithm.

14 Write a java script for loop that will iterate from 0 to 15. For each iteration, it will check if the current number is odd or even, and display a message to the screen.

15 Write a java script program which compute, the average marks of the following students then this average is used to determine the corresponding grade.

16 Write a java script program to sum the multiple s of 3 and 5 under 1000.

17 To design the scientific calculator and make event for each button using java script.

18 Write a java script program to find sum of first natural numbers : sum= 1+2+3+4+……. 100 by using
a. for loop b. while loop c. do-while loop

19 Write a java script program to find sum of the following series using function:
Sum= $x-(x)^3/3!+(x)^5/5!-\ldots\ldots\ldots..(x)^n/n!$

20 Design HTML form for keeping student record and validate it using Java script.

21 Write programs using Java script for Web Page to display browsers information.

List of Equipment/ Machine Required

PCs, Java script supported Browser, Node.js

References:

1. Mastering HTML, CSS & JavaScript Web Publishing, Laura Lemay, Rafey Colburn, BPB Publications.
2. Head First JavaScript programming, Eric Pressman & Elizabeth Robson, O'Reilly.

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SCHOOL OF ENGINEERING & I.T.

Semester: II B.Tech **Branch: All Streams of Engineering**
Manufacturing Practices– II Lab **Code: BT 211**
Total Practical Periods: 60(15 Instructional Periods) **Total Credits: 02**

Note: MINIMUM TEN NUMBERS OF EXPERIMENTS IS TO BE PERFORMED

Course Objective:
1. To make the student acquire practical skills in the machining, fitting and forging operations.

Instructional Syllabus
Machining:
Introduction to machining and common machining operations. Cutting tool materials. Definition of machine tools, specification and block diagram of lathe, shaper, drilling machine

and grinder. Common lathe operations such as turning parting, chamfering and facing. Quick return mechanism of shaper. Difference between drilling and boring. Files-material and classification.

Fitting:

Need of fitting, different types of instruments used in fitting shop.

Forging:

Forging principle, materials, operations like drawing, upsetting, bending and forge welding, use of forged parts.

List of Experiments

1. Job on lathe with one step turning and chamfering operations
2. Job on shaper for finishing two sides of a job
3. (a) Drilling two holes of size 5 and 12 mm diameter on job used/to be used for shaping.

(b) Grinding a corner of above job on bench grinder

4. Finishing of two sides of a square piece of filling
5. Tin smithy for making mechanical joint and soldering of joints
6. Perform step cutting on mild steel plate.

Course Outcome:

1. The students will be conversant with hands-on knowledge in the machining, fitting and forging operations.

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SEMESTER - III

S. No.	Code	Subject	Periods per week			Scheme of marks		Total Credit
			L	T	P	ESE	IM	
1.	BT320	Advanced Engineering Mathematics	3	-	-	70	30	3
2.	BT321	Data Structures	3	1	-	70	30	4
3.	BT322	JAVA Programming	3	1	-	70	30	4
4.	BT323	Computer Organization & Design	3	-	-	70	30	3
5.	BT324	Digital Electronics and Logic Design	3	-	-	70	30	3
6.	BT305	Universal Human Values	1	-	-	70	30	1
7.	BT326	Data Structures Laboratory	-	-	2	30	20	1
8.	BT327	JAVA Programming Laboratory	-	-	2	30	20	1
9.	BT328	Digital Electronic and Logic Design Laboratory	-	-	2	30	20	1
10.	BT329	Web Technology Laboratory (HTML/ DHTML/ CSS/ XML)	-	-	2	30	20	1
Total			**16**	**2**	**8**	**540**	**260**	**22**

L – Lecture,
T – Tutorial,
P – Practical,
ESE – End Semester Examination,
IM – Internal Marks (Include Class Test & Teacher's Assessments)

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Semester	III	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Advanced Engineering Mathematics	**Practical**	00
Subject Code	BT320	**Credit**	03

Course Objective:

1. To make the scholars perceive the series analysis could be a powerful methodology wherever the formulas square measure integrals and to possess information of increasing periodic functions that explore sort of applications of Fourier series.
2. To produce information of mathematician remodel of elementary functions together with its properties and applications to solve normal differential equations.
3. To produce a sound background of advanced analysis to perform an intensive investigation of major theorems of complex analysis and to use these ideas to a large vary of issues that features the analysis of each complex line integrals and real integrals.
4. To possess intensive information of PDE those arise in mathematical descriptions of things in engineering.
5. To review a few amount which will take any of a given vary of values that will not be foreseen because it is however can be delineated in terms of their likelihood.

UNIT – I FOURIER SERIES

Periodic functions, Euler's formula, Dirichlet conditions, Change of interval, Even and Odd functions, Half range Fourier series, Perseval's identity, Practical harmonic analysis.

UNIT – II PARTIAL DIFFERENTIAL EQUATION

Formation, Solution of PDE by direct integration method, Linear PDE of first order, Homogeneous linear equations with constant coefficients, non-homogeneous linear PDE, Solution of PDE by method of separation of variables.

UNIT – III COMPLEX VARIABLES

Limit and derivative, Analytic functions, Cauchy-Riemann equations, Harmonic functions, Flow problems, Complex integration, Cauchy's theorem, Cauchy integral formula, Taylor& Laurent series, Singularities, Residues, Cauchy's residue theorem, Evaluation of real definite integrals.

UNIT – IV NUMERICAL SOLUTION OF ORDINARY & PARTIAL DIFFERENTIAL EQUATIONS

Numerical solution of ODEs by Taylor's series method, Picard's method, Euler's method, Euler's modified method, Runge–Kutta methods, Predictor-corrector methods-Milne's method, Adams-Bashforth method.

Numerical solution of PDE's, Classifications of second order PDE, Elliptic equations, solution of Laplace equations, solution of poissons equation, Solution of elliptic equation by relaxation method, Parabolic equations, Solution of one dimensional and 2-D heat equations, Hyperbolic equation, Wave equations.

UNIT – V NUMERICAL SOLUTION OF ALGEBRAIC, TRANSCENDENTAL AND SIMULTANEOUS EQUATIONS DIFFERENTIAL

Numerical solution of algebraic and transcendental equations: Newton- Raphson method, Secant method, Birge-Vieta method, Bairstow method, Numerical solution of simultaneous linear equations: Direct Methods-Gauss elimination, Gauss-Jordan & Crout's Triangularization method. Iterative methods-Jacobi's, Gauss-Siedal & Successive over Relaxation method.

Text Books:

1. Advanced Engineering Mathematics, Kreyszing Erwin; Wiley Eastern, New Delhi
2. Higher Engineering Mathematics, B. S. Grewal; Khanna Publishers, New Delhi.

Reference Books:

1. Advance Engineering Mathematics, R.K. Jain & S.R.K. Iyenger, Narosa Publication House.
2. Advanced Engineering Mathematics, E. Kreysig, John Wiley & Sons.

3. Applied Mathematics, P. N. Wartikar & J.N. Wartikar. Vol- II, Pune Vidyarthi Griha Prakashan, Pune.
4. Differential Equations, Sharma and Gupta; Krishna Prakashan Media (P) Ltd., Meerut.
5. Advance Engineering Mathematics, V. O'Neil, Thomson (Cengage) Learning.

Course Outcome:

After completion of this course the students are going to be able to

1. Apply series, transformation, and theory of advanced variable, partial differential equations and variant to technology issues and solve them. Hands on these Mathematical topics can build them equipped to organize for higher studies through competitive examinations.

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Semester	III	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	12
Subject Name	Data Structures	**Practical**	00
Subject Code	BT321	**Credit**	04

Course Objective:

1. To understand the data organization and basic concepts of data structure.
2. To study the classifications of data structures.
3. To study the memory representation of all types of data structures.
4. To develop skills to apply appropriate data structures in problem solving.

UNIT – I INTRODUCTION and ARRAY

Introduction: Basic Terminology, Elementary Data Organization, Data Structure Operations, Algorithm, Algorithmic Notations, Time and Space Complexity, Mathematical Notations and Functions. **Array:** Linear Array (LA), Representation of LA in Memory, Address calculation, Traversing, Insertion and Deletion in Array, Bubble Sort, Linear (Sequential) Search, Binary Search, Insertion Sort, Selection Sort, Merge Sort, Multidimension Array. **Application of Array:** Pointers, Record Structure, Matrices in Data Structures, Algebra in Matrices, Sparse Matrices.

UNIT – II LINKED LIST

Linked List (LL): Introduction, Representation of LL in memory, Traversing, Searching, Memory Allocation and Garbage Collection, Overflow and Underflow, Insertion into LL, Deletion from LL. **Header Linked List:** Grounded Header List and Circular Header List, Traversing a Header List, Insertion and Deletion, Polynomials. **Two-Way List:** Traversing, Searching, Insertion and Deletion, Two-Way Header List.

UNIT – III STACK, RECURSION and QUEUE

Stack: Introduction, PUSH and POP operations on Stack, Array representation of Stack, Linked representation of Stack. **Application of Stacks:** POLISH Notation, Evaluation of Postfix Notation, Transforming Infix expression into Postfix expression, Quicksort. **Recursion:** Introduction, Factorial and Fibonacci Function, Divide and Conquer Algorithms: Tower of Hanoi, Tail recursion, Removal of recursion. **Queue:** Array representation of Queues, Linked representation of queue, DEQUE, Priority Queue, Array and One way list representation of Priority queue.

UNIT – IV TREE

Binary Tree: Complete Binary Tree, Extended Binary Tree, 2-Tree, Array and Linked representation of Binary Tree in memory, **Traversing Binary Tree:** Pre-order, In-order, Post-order traversal using Stacks, Header Nodes, Threads, Binary Search Tree (BST), Searching in BST, Insertion and Deletion in BST, AVL Tree. **Heaps:** Heapsort, Max and Min Heap, Insertion and deletion in Heap, Huffman Algorithm.

UNIT – V GRAPH and HASHING

Graphs: Terminology, Multigraphs, Directed Graphs, Sequential representation of Graphs, Adjacency Matrix, Path Matrix, Warshall Algorithm for finding shortest path, Linked representation of Graph, Searching a Graph, Traversing a Graph: Depth-first and Breadth-first search, Insertion and Deletion in a Graph, POSETS, Topological Sorting, Spanning Tree, Minimum Spanning Tree. **Hashing:** Hash Functions, Hash Table, Collision Resolution, Open Addressing, Hash Table Implementation.

Text Books:

1. Data Structures using C, A. M. Tenenbaum, Prentice Hall.
2. Data Structures, Seymour Lipschutz, Schaum's Outlines, McGraw – Hill Education India Pvt. Ltd.

Reference Books:

1. Fundamentals of Data Structures in C, Horowitz, Sahni, Anderson Freed, University Press.
2. Data Structures and Program Design in C, Robert Kruse, Cl Tondo, Pearson Education India.
3. Data Structures and Algorithm Analysis in C, Mak Allen Weiss, Pearson Education India.

Course Outcome:

After completion of the course study, students will be able to

1. Have a comprehensive knowledge of the data structures and algorithms.
2. Understand the importance of data and identify the data requirements for an application.
3. Have in depth understanding and practical experience of algorithmic design and implementation.
4. Understand the issues involved in algorithm complexity and performance.

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Semester	III	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	12
Subject Name	Java Programming	**Practical**	00
Subject Code	BT322	**Credit**	04

Course Objective:

1. To learn the fundamentals of JAVA programming.
2. To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3. To learn the concepts of graphical user interfaces, basic data structures.

UNIT- I INTRODUCTION

Concept of OOPs, Introduction to Java: Data types, Variables, Literals, Expressions, Operators, Arrays and Programming Constructs, Garbage Collection, Comparison with C++, Java Virtual Machine, Java Class Libraries, JIT, Overview of Java Technology, Applets, Beans, RMI, Servlets, JSP, JSF, CORBA.

UNIT – II CLASSES AND OBJECTS

Classes and Objects, Objects and References, Method: Defining, Calling & Passing Arguments to Method, This keyword, Overloading Method, Static, Access Specifiers: Public, Default, Private & Protected, Command Line Arguments, Constructors and Finalizers, Overloading Constructors, Inner Classes. Introduction to Inheritance: Definition and Advantages, Overriding, Super, Final and Abstract Classes, Interface, Package.

UNIT- III EXCEPTIONS, STRING AND VECTOR

Exception Handling: Basics, Default Exception Handling, Try and Catch, Multiple Catch Statements, Try-Catch-Finally, Use of throw and throws.

Strings: String Constructor, String Arithmetic, String Methods, String Buffer and Methods, Introduction and Programming using Vector, Iterator and Enumeration.

UNIT -IV MULTITHREADING

Thread Concepts, Thread lifecycle, Runnable Vs Thread Class, Thread Priority, Thread Methods, Thread Synchronization, Concept of Monitor, Synchronized Methods & Synchronized Blocks. Internet Programming with Java: AWT, Applets and its Application, User Interfacing Components, Events and Event Handling, Overview of Swing Components, Java Database Connectivity: JDBC, ODBC, Executing DDL, DML Commands, Statement, Prepared Statement and Callable Statement, Java Stored Procedures.

UNIT- V INTRODUCTION TO SERVLETS

Lifecycle of a Servlet, JSDK, Servlet API, Java X Servlet Package, Reading Servlet Parameters, Reading Initialization Parameters, Java X Servlet HTTP package, Handling http Request & Response, Use of Cookies, Session Tracking, Security Issues, Java Servlet API, Some Important Servlet Method.

Text Books:

1. Java Complete Reference, Herbert Schildt, Tata McGraw Hill.
2. Java: How to Program, Dietel H. M. and Dietel P. J., Pearson Prentice Hall.

Reference Books:

1. Programming with Java, John Hubbard, Schaum's Out Line.
2. Java 2 Black Book, Steven Holzner.
3. Java Examples: In a Nutshell, David Flanagan, O'Reilly Media.
4. Core Java, Cay S. Horstmann.

Course Outcome:

After completion of the course study, students will be able to

1. Implement, compile, test and run Java programs with concept of Object-Oriented Programming.
2. Develop solutions for a range of problems using object-oriented programming.
3. Use simple data structures in a problem.
4. Develop graphical user interface using JAVA.

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Semester	III	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Computer Organization and Design	**Practical**	00
Subject Code	BT323	**Credit**	03

Course Objective:

1. The overall objective with the course is to know basic operating principles of computer hardware units and provides knowledge and insights into the design of recent computers, above all the processor design together with parallel computational pipelines and memory hierarchies.

UNIT – I CENTRAL PROCESSOR ORGANIZATIONS

Basic building blocks, Bus organized computer memory, Address structure, Memory data register, Program Counter, Accumulator, Instruction register, Instruction field, Address field, Micro-operations, Register Transfer Languages, Instruction fetch, Decoding and Execution, Instruction formats and Addressing modes.

UNIT – II CONTROL UNIT ORGANIZATION

Instruction Sequencing, Instruction interpretation, Hardwired control & micro-programmed control organization, Control memory, Address sequencing micro-instruction formats, Micro-program sequencer, Micro-programming, Bit slicing in AHPL, Emulation.

UNIT – III ARITHMETIC PROCESSOR:

Arithmetic Processor Design, Addition and Subtraction Algorithm, Multiplication algorithm, Division algorithm, Processor configuration, Design of control unit and floating-point arithmetic.

UNIT – IV INPUT-OUTPUT ORGANIZATION

Programmed I/O, I/O addressing, I/O instruction, Synchronization, I/O interfacing, Standard I/O interfaces interrupt mechanism, DMA, I/O processors and data communication.

UNIT – V MEMORY ORGANIZATION AND MULTIPROCESSING

Basic concepts and terminology, Memory hierarchy, Semiconductor memories (RAM, ROM), Virtual memory, Associative memory, Cache memory, Cache mapping techniques, Memory allocation and management policies, Structure of Multiprocessors, Parallel processing, Pipeline processing.

Text Books:

1. Computer Organization and architecture- William Stallings, Macmillan Publishing Company, Fourth Edition.
2. Computer Architecture – Morris Mano, PHI Publication.

Reference Books:

1. Computer Systems Organization & Architecture – John D Carpinelli, Addison-Wesley.
2. Computer Organization, John P. Hayes (McGraw Hill)

Course Outcome:

1. To be all set to describe the essential hardware parts of a computing system.
2. To be acquainted with the binary and hex number systems together with computer arithmetic.
3. To be acquainted with the functional units of the processor like the register file and arithmetic-logical unit.
4. Students will be accustomed to the fundamentals of systems topics: parallel, pipelined, superscalar, and RISC/CISC architectures.
5. To be acquainted with the representation of data, addressing modes, an instruction sets.

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Semester	III	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Digital Electronics and Logic Design	**Practical**	00
Subject Code	BT324	**Credit**	03

Course Objective:

1. To learn various number systems, knowledge of these number systems is necessary in foundation computer science
1. Subjects.
2. To glance at brief idea about the diverse digital circuits which are used to develop the digital devices.
3. To know the concepts of Memories, Programmable Logic Devices & Digital Integrated Circuit.
4. To stimulate the students to develop their logic to design new digital circuits utilizable for hardware design.
5. To stimulate our students to use these digital circuits in integrated circuit design using VLSI.

UNIT – I INTRODUCTION

Characteristics of digital system, Types of Digital circuits, Number system: Direct conversion between bases Negative numbers & BCD and their arithmetic's, Boolean algebra, Minimization of Boolean Functions: K Map up to 6 variable and multiple output circuits Error Detecting & Correcting codes, Hamming & Cyclic codes.

UNIT – II COMBINATIONAL LOGIC CIRCUITS

Design Procedure, Adders, Subtractors & Code conversion, Multiplexers/ Demultiplexers, Encoder / Decoders, Decimal Adders & Amplitude Comparators, ROM as Decoder, PLA & PAL.

UNIT – III SEQUENTIAL LOGIC CIRCUITS

Flip –Flops and their conversions, Analysis and Synthesis of synchronous sequential circuit, Excitation table, State table & State diagram, Design of Synchronous Counters, Shift Registers and their Application.

UNIT – IV LOGIC FAMILIES

Diode, BJT & MOS as a switching element concept of transfer characteristics, Input characteristics and Output characteristics of logic gates, Fan-in, Fan-out, Noise margin, Circuit concept and comparison of various logic families: TTL, IIL, ECL, NMOS, CMOS Tri-state logic, Open collector output, Interfacing Between logic families, Packing density, Power consumption & Gate delay.

UNIT – V MEMORIES

Sequential & Random Access, NMOS & CMOS Static and Dynamic Memory Elements, One and Multi-Dimensional selection arrangement, Read only memories, Formation of Memory banks. Static and dynamic Hazard: Gate delay, Generation of spikes, Determination of Hazard in Combinational circuits, Fault detection methods: Fault Table & Path sensitizing methods.

Text Books:

1. Digital Design, M. Morris Mano, 2nd Edition, PHI.
2. Introduction to Digital Microelectronic Circuits, Gopalan, TMH

Reference Books:

1. Switching Circuit & Logic Design, Hill & Peterson, Wiley
2. Digital Circuit & Logic Design, Holsworth.

Course Outcome:

After finishing of this course, students will be capable to -

1. Acknowledge about the basics of digital circuit design.
2. To realize the operation of Latch circuits & Flip flops.
3. Take curiosity to designing & build up ICs in VLSI industries.
4. To become skilled at operation of different Semiconductor Memories.

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Semester	III	**Lecture**	14
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Universal Human Values	**Practical**	00
Subject Code	BT305	**Credit**	01

Course Objective:

1. Development of a holistic perspective based on self- exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

Unit 1: Course Introduction: Need, Basic Guidelines, Content and Process for Value Education

Purpose and motivation for the course, recapitulation from Universal Human Values-I, Self-Exploration what is it? - and Experiential Validation- as the process for self-exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfil the above human aspirations: understanding and living in harmony at various levels, Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

Unit 2: Understanding Harmony in the Human being: Harmony in Myself

Understanding human being as a co-existence of the sentient 'I' and the material 'body', Understanding the needs of Self ('I') and 'Body': Happiness and Physical facility, Understanding the body as an instrument of 'I' (I being the doer, seer and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of 'I' with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Health, Include practice sessions to discuss the role others have played in making, Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.

Unit 3: Understanding Harmony in the Family and Society: Harmony in Human-Human relationship

Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship, Understanding the meaning of Trust; Difference between intention and competence, Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships, Discussion.

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Unit 4: Understanding Harmony in the Nature and Existence: Whole existence as coexistence

Understanding the harmony in the Nature, Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence, Include practice sessions to discuss human being as cause of imbalance and role of technology etc.

Unit 5: Implications of Holistic understanding of Harmony on Professional Ethics
Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. **Competence in professional ethics:** Ability to utilize the professional competence for augmenting universal human order, Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, Ability to identify and develop appropriate technologies and management patterns for above production systems, Case studies of typical holistic technologies, management models and production systems. **Strategy for transition from the present state to Universal Human Order: At the level of individual:** as socially and ecologically responsible engineers, technologists and managers, **At the level of society:** as mutually enriching institutions and organizations, Summary, include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions e.g., to discuss the conduct as an engineer or scientist etc.

Text Book:

1. Human Values and Professional Ethics by R. R. Gaur, R. Sangal, G. P. Bagaria, Excel Books, New Delhi, 2010

Reference Books:

1. Jeevan Vidya: Ek Parichaya, A. Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A. N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi.
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj - PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

Course Outcome:

1. By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
2. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to- day settings in real life, at least a beginning would be made in this direction.

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Semester	III	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Data Structures Laboratory	**Practical**	28
Subject Code	BT326	**Credit**	01

List of Practical:

1 Write a program to perform following operations in one dimensional array:
   a. Insertion b. Deletion c. Searching (Linear & Binary)
2 Write a program to implement push and pop operations in a stack.
3 Write a program to convert infix to postfix expression using stack.
4 Write a program to perform following operations in a linear queue:
   a. Addition b. Deletion c. Traversing
5 Write a program to perform following operations on circular queue:
   a. Addition b. Deletion c. Traversing
6 Write a program to perform following operations on double ended queue:
   a. Addition b. Deletion c. Traversing
1. Write a program to perform following operation on single link list
   a. Creation b. Inversion c. Deletion
7 Write a program to perform following operation on doubly linked list:
   a. Creation b. Insertion c. Deletion
8 Write a program to implement polynomial in linked list and perform following:
   a. Polynomial arithmetic b. Evaluation of polynomial
9 Write programs to implement linked stack and linked queue.
10 Write programs to perform Insertion, Selection, and Bubble Sort.
11 Write a program to perform quick sort.
12 Write a program to perform merge sort.
13 Write a program to perform heap sort.
14 Write a program to create a Binary search tree and perform following operations:
   a. Insertion b. Deletion c. Traversal.
15 Write a program for traversal of graph (B.F.S, D.F.S)

List of Equipment/ Machine Required

PCs, Turbo C/C++ compiler

References:

1. Data Structures using C, A. M. Tenenbaum, Prentice Hall.
2. Data Structures, Seymour Lipschutz, Schaum's Outlines, McGraw – Hill Education India Pvt. Ltd.
3. Fundamentals of Data Structures in C, Horowitz, Sahni, Anderson Freed, University Press.
4. Data Structures and Program Design in C, Robert Kruse, Cl Tondo, Pearson Education India.
5. Data Structures and Algorithm Analysis in C, Mak Allen Weiss, Pearson Education India.

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Semester	III	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Java Programming Laboratory	**Practical**	28
Subject Code	BT327	**Credit**	01

List of Practical:

1. Write a program to perform multiplication of two matrices.
2. Develop a program to illustrate a copy constructor so that a string may be duplicated into another variable either by assignment or copying.
3. Write a program to demonstrate concept of abstract class.
4. Write a program to implement concept of overloading.
5. Write a program to implement concept of overriding.
6. Write a program to implement concept of
   i. Packages
   ii. Inheritance
   iii. Interfaces
7. Write a program, which throws Arithmetic Exception. Write another class that handles the Exception.
8. Create an applet with a button and a text field. Write a Focus Event ( ) so that if the button has the focus, characters typed into it will appear in the text field.
9. Write a program to implement multithreading.
10. Write a program which illustrates the concept of Synchronization.
11. Create an applet with a text field and three buttons. When you press each button, make some different text appear in the text field. Add a check box to the applet created, capture the event and insert different text in the text field.
12. Write a program to implement JDBC/ODBC connectivity to data base using java program.
13. Write a program to connect MYSQL database to a java program.
14. Write a program to create a socket for client and server.
15. Write a program to set a connection between client and server using TCP/UDP.
16. Develop a servlet that gets invoked when a form on a web page in HTML is submitted. Create a cookie object and enter/display value for that cookie.
17. Write a Program to demonstrate various methods to input from keyboard.
18. Write a program, which illustrates capturing of Mouse Events. Use Applet class for this.
19. Design a text editor, which is having some of the features of notepad.
20. Develop a front end for a contact management program using a flat file database. DB needs to be distributed or centralized.

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Semester	III	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Digital Electronics and Logic Design Laboratory	**Practical**	28
Subject Code	BT328	**Credit**	01

List of Practical:

1. Bread-board implementation of various flip-flops.
2. Bread-board implementation of counters & shift registers.
3. Determination of Delay time and NAND, NOR, Ex-OR, AND & OR Gates.
4. Transfer characteristics of TTL inverters & TTL Schmitt Trigger inverter.
5. Transfer characteristics of CMOS inverters series.
6. Monoshot multivibrators using 74121 and 74123.
7. Clock circuit realization using 555 and CMOS inverter and quartz crystal.
8. Adder/ subtractor operation using IC7483 4 bit/ 8 bit.
9. Demultiplexer / Decoder operation using IC-74138.
10. Modulo N counter using programmable counter 74190.

Equipment required:

1. Logic gate trainer
2. Digital ICs Trainer
3. Various ICs 7400, 7402, 7404, 7408, 7432, 7486, 74138, 74151, 74155 etc.

References:

1. Digital Logic and Computer Design, M.M. Mano, PHI.
2. Digital Fundamentals, Floyd, UBS.

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Semester	III	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Web Technology Lab (HTML/ DHTML/ CSS/ XML)	**Practical**	28
Subject Code	BT329	**Credit**	01

List of Practical:

1. Design a HTML page describing your profile in one paragraph. Design in such a way that it has a heading, a horizontal rule, three links and your photo also write three HTML documents for the links.
2. Design HTML page describing your academic career. The page will tell about the degrees, Institutions and your hobbies. Add some lists too**.**
3. Design HTML page demonstrating Concept of Internal Hyper-link
4. Design HTML page which gives the list of grocery Items by using Ordered List, List consist of Roman no, A, B…. and so on.
5. Design HTML page which gives the list of grocery Items by using Unordered List bullets are of form disc, square and circle.
6. Design a HTML page for partitioning browser window in frames display the different pages in partitioned windows.
7. Design HTML page to partition window, Design in such a way that link clicked in on page can display the corresponding pages in other window.
8. Design a HTML page on your native place.
9. Design a HTML page on your friends. List your friends; each friend's name is a link. Prepare separate HTML document on each friend and call them in appropriate link.
10. Design HTML page listing popular car companies. For each company prepare a sub list showing various brands of cars it offers.
11. Design a HTML page for reserving a room in a hotel.
12. Design a HTML form to reserve a Railway ticket.
13. Design a HTML form to see the result for a candidate when the results are published on the web.
14. Design a HTML form to find the railway fare from one place to another.
15. Design a HTML form to find out the balance for a mobile phone customer as on today.

References:

1. HTML Complete Reference- Tata McGraw hill
2. HTML and XML: An Introduction NIIT, Prentice-Hall of India
3. Building Enhanced HTML Help with DHTML and CSS by Jeannine M. E. Klien. Pearson Education
4. HTML for the World Wide Web, Fifth Edition, with XHTML and CSS
5. Visual QuickStart Guide 5th Edition Elizabeth Castro, Pearson Education, Sam's Teach Yourself HTML & XHTML in 24 Hours 6th Edition Dick Oliver, Michael Morrison, Pearson Education.

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Semester - IV

S. No.	Code	Subject	Periods per Week			Scheme of Marks		Total Credit
			L	T	P	ESE	IM	
1.	BT420	Discrete Mathematics	3	-	-	70	30	3
2.	BT421	Operating System	3	-	-	70	30	3
3.	BT422	Analysis and Design of Algorithms	3	-	-	70	30	3
4.	BT423	Database Management System	3	-	-	70	30	3
5.	BT424	Database Management System Laboratory	-	-	2	30	20	1
6.	BT425	Analysis and Design of Algorithms Laboratory	-	-	2	30	20	1
7.	BT426	Unix & Shell Programming Laboratory	-	-	2	30	20	1
8.	BT427	GUI (Graphical User Interface) Laboratory	-	-	2	30	20	1
9.	BTP2XX	Professional Elective I	3	-	-	70	30	3
10.	BTOXX	Open Elective I	3	-	-	70	30	3
		Total	**18**	**0**	**8**	**540**	**260**	**22**

L – Lecture,
T – Tutorial,
P – Practical,
ESE – End Semester Examination,
IM – Internal Marks (Include Class Test & Teacher's Assessments)

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Semester	IV	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Discrete Structures	**Practical**	00
Subject Code	BT420	**Credit**	03

Course Objective:

1. To study discrete mathematical structures as tools in the development of theoretical computer science.
2. To study how discrete structures actually helped computer engineers to solve problems occurred in the development of programming languages.

UNIT – I SET THEORY, RELATIONS & FUNCTIONS

Basic concept of set theory, Combination of sets, Finite and Infinite sets, Uncountable infinite sets, Principles of inclusion and exclusion, multi-sets. Introduction to Relations and Functions, Properties of Binary Relation, Equivalence relation and partitions, Partial ordering and total ordering, lattices, Chains and anti-chains, Functions & composition of function, pigeonhole Principle, Mathematical induction.

UNIT – II COMBINATORICS

Introduction to discrete numeric functions and generating functions, Manipulation of Numeric functions, asymptotic behavior of numeric function, combinatorial problems, Introduction to recurrence relation and recursive algorithm, Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solution, Solution by method of generating functions.

UNIT – III MATHEMATICAL LOGIC & BOOLEAN ALGEBRA

Basic concept of mathematical logic, statements, connectives, conditional & biconditional statements, logical equivalence logical implication & quantifiers. Introduction to Boolean algebra, Lattices and Algebraic systems, Principles of Duality, Relation between Algebraic system and Lattices, Distributive and Complemented lattices, Boolean lattices and Boolean algebra, Uniqueness of finite Boolean algebra's, application of Boolean algebra in switching circuits and logic circuits.

UNIT – IV ALGEBRAIC STRUCTURES

Introduction to groups and rings, Subgroups, Generators and Evaluation of powers, Cosets and Lagrange's theorem, Permutation Groups and Burnicide's theorem, Codes and Group codes, Isomorphism and Automorphism, Homomorphism and Normal subgroups, Rings, Internal Domains and fields, Ring homomorphism, Polynomial Rings and Cyclic codes.

UNIT – V GRAPH THEORY

Introduction to graph theory, Walks, Paths & Circuits, Types of graphs, Eulerian and Hamiltonian graphs, Basic concept of tree, spanning tree, search tree, rooted tree, binary tree, Cut sets, Network flow, Matrix representation of graphs.

Text Books:

1. Discrete Mathematical Structure, Dr. H. K. Pathak
2. Discrete Mathematical Structure, Swapan Kumar Sarkar
3. Discrete Mathematical Structure, Tremblay & Manohar

Reference Books:

1. Element of Discrete Mathematics, C. L. Liu
2. Discrete Mathematics and its Application, Rosen, TMH
3. Graph Theory, N. Deo

Course Outcome:

After completion of the course study, students will be

1. Able to apply mathematical logic and Boolean algebra in switching circuits & logic circuits.
2. Familiar with set theory, relation and functions related to theoretical computer science.
3. Familiar with algebraic structures, graph theory and combinatorics.
4. Able to solve problems in various fields in computer science.

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Semester	IV	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Operating System	**Practical**	00
Subject Code	BT421	**Credit**	03

Course Objective:

1. To study the fundamental concepts related to operating systems.
2. To study and apply concepts related concurrency control of asynchronous processes, deadlocks, memory management, processor and disk scheduling, parallel processing, and file system organization.

UNIT – I INTRODUCTION

Operation System Overview: Objectives, Services and Functions, System Components, Operating System Structure, Evolution of Operating Systems: Batch, Interactive, Multi-Programming, Time Sharing and Real Time Systems, Distributed Computing, Key Architecture Trends, Parallel Computation, Input-Output Trends, Operating system Design issues.

UNIT – II PROCESS MANAGEMENT

Process concept: Introduction, Process States, Process State Transitions, Process Control Block, Process Scheduling, Operations on Processes, Interrupt Handling, Inter Process Communication, Process Synchronization: Introduction, Mutual Exclusion, Producer/Consumer Problem, Critical section problem, Semaphores, Classical problems in concurrency, Asynchronous Concurrent Process: Introduction, Parallel Processing, Control Structure for indicating Parallelism, CPU scheduling: Concepts, Performance Criteria, Scheduling Algorithms: FCFS, SJF, Priority, RR, Algorithm evaluation, Multiprocessor Scheduling.

UNIT – III DEADLOCKS

System Model, Deadlock Characterization, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlocks, Combined Approach.

UNIT – IV MEMORY MANAGEMENT

Base Machine, Resident Monitor, Multiprogramming with Fixed Partition, Multiprogramming with Variable Partitions, Paging, Thrashing, Segmentation, Paged - Segmentation, Segmented Paging, Virtual Memory Concepts: Demand Paging, Performance, Page Replacement Algorithms, Allocation of frames, Cache memory organization impact on performance.

UNIT – V I/O MANAGEMENT & DISK SCHEDULING

I/O Device and the organization of the I/O function, I/O Buffering, Disk I/O, File system: Concepts of File, File organization and Access mechanism, File Directories, File sharing, Implementation issues. Case Studies: UNIX system, A Virtual Machine Operating Systems.

Text Books:

1. Operating System concepts, Silberschatz, Galvin, Gagne, Wiley Publication.
2. Operating System Concepts, James L. Peterson, Abraham Silberschatz, Addison Wesley Publication.

Reference Books:

1. Operating System Design and Implementation, Andrew S. Tanenbaum, PHI.
2. Operating Systems, H. M. Deitel, Paul J. Deitel, David R. Choffnes.
3. Operating Systems, J. Archer Harris, John Cordani, Schaum's Outline, McGraw Hill Education.
4. Operating Systems: Internals 7 Design Principles, William Stallings, Pearson Education.

Course Outcome:

After completion of the course study, students will be able to

1. Analyze the structure of Operating System and basic architectural components involved in Operating System design.
2. Analyze and design the applications to run in an Operating System.
3. Analyze the various device and resource management techniques.
4. Understand the Mutual exclusion, Deadlock detection and agreement protocols.
5. Interpret the mechanisms adopted for file sharing in distributed applications.

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Semester	IV	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Analysis and Design of Algorithms	**Practical**	00
Subject Code	BT422	**Credit**	03

Course Objective:

1. To give idea of mathematical preliminaries required to analyze and design computer algorithms.
2. To introduce general tools and techniques for analyzing computer algorithms.
3. To introduce the classic algorithms in various domains, and techniques for designing efficient algorithms.

UNIT – I INTRODUCTION & ANALYSIS

Analyzing Algorithms, Algorithm Types, Recurrence Equations, Growth Function: Asymptotic Notation, Standard Notation and Common Functions, Recurrence Relation, Different Methods of Solution of Recurrence Equations with Examples.

UNIT – II DIVIDE AND CONQUER

Introduction to Divide and Conquer Paradigm, Quick and Merge Sorting Techniques, The Basic Divide and Conquer Algorithm for Matrix Multiplication, Heaps and Introduction to 2-3 Trees, Algorithms for manipulating 2-3 Trees, Representation of Heaps using 2-3 Trees, Red Black Tree, Heap Sort, Shell Sort & Bucket Sort, Amortized Analysis.

UNIT – III DYNAMIC PROGRAMMING & GREEDY PARADIGM

The Basic Dynamic Programming Paradigm, Dynamic Programming Solution To The Optimal Matrix Chain Multiplication and the Longest Common Subsequence Problems, Greedy Paradigm: The Basic Greedy Strategy and Computing Minimum Spanning Trees, Algorithms of Kruskal and Prim, Huffman Trees.

UNIT – IV GRAPH ALGORITHMS

Depth First Search and Breadth First Search on Graphs, Computation of Biconnected Components and Strongly Connected Components using DFS, Topological Sorting of Nodes of an Acyclic Graph and Applications, Shortest Path Algorithms on Graphs: Bellman-Ford Algorithm, Dijkstra's Algorithm and Analysis of Dijkstra's Algorithm using Heaps, Floyd-Warshall's All Pairs Shortest Path Algorithm.

UNIT – V BACKTRACKING & NP-COMPLETE PROBLEMS

Backtracking and Recursive Backtracking, Applications of Backtracking Paradigm ,8-Queens Problem, Sum Of Subsets, Graph Coloring, Hamiltonian Cycle ,0/1 Knapsack Problem, Travelling Salesman Problem, Introduction To NP-Hard and NP-Completeness, Cook's Theorem.

Text Book:

1. Introduction to Algorithms; Cormen, Lelserson, Rivert; Prentice Hall of India.

Reference Books:

1. The Design & Analysis of Computer Algorithms, Hopcroft – Aho – Ullman, AWL.
2. Fundamentals of Computer Algorithms; Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran; Galgotia Publications Pvt. Ltd.
3. Design and Analysis of Algorithms; Paneerselvam; Prentice-Hall of India.

Course Outcome:

After completion of the course study, students will be able to

1. Analyze and design computer algorithms.
2. Analyze the complexities of various problems in different domains.
3. Apply the algorithms and design techniques to solve problems.

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Semester	IV	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Database Management System	**Practical**	00
Subject Code	BT423	**Credit**	03

Course Objective:

1. To study the basic concept of Database Management System.
2. To construct simple and moderately advanced database queries using Structured Query Language (SQL).
3. To study data representation technique and database normalization.
4. To understand database concepts, including the structure and operation of the relational data model.
5. To understand the role of a database management system and its users in an organization.

UNIT I – INTRODUCTION TO DATA BASE

File System Vs. Database System, Advantages of DBMS, DBMS Applications, View of Data, Data Abstraction, Schema and Instances, DBMS Architecture and Data Independence, Data Models: Entity- Relationship Model, Relational Data Model, Other Models, Enhanced E–R Modeling, Specialization and Generalization, Database Users and Administrator. Record Storage and Primary File Organizations: Introduction, Secondary Storage Devices, Buffering of Blocks, Structure of Files: Types of Single Level ordered indexes, Multilevel indexes, Dynamics Multilevel indexes using B-trees and B+- Trees.

UNIT II – RELATIONAL DATA MODEL

Relational data model: Concept, Constraints and its types, Relational Algebra: Unary and Binary Operations (select, project, rename, union, intersection, minus, join & division etc.), Relational Calculus: Tuple Relational Calculus, Domain Relational Calculus, SQL: DDL, DML, DCL, DQL etc., Defining different constraints on a table, Defining & Dropping integrity constraints in the alter table command, View, Index.

UNIT III – DATABASE DESIGN

Functional Dependencies: Informal design guidelines for relation schemes, Functional Dependencies, Inference Rule, Equivalence Set, Minimal Set, Normalization: 1NF, 2NF, 3NF, BCNF, Problem related with normal forms & solutions, Multivalued & Join Dependencies, 4NF & 5NF.

UNIT IV – QUERY & TRANSACTION PROCESSING

Query Processing: Query processing stages, Query interpretation, Query execution plan, Table scans, Fill factor, Multiple index access, Methods for join tables scans, Structure of a query optimizer. Transaction Processing**:** Types of failures, ACID Property, Schedules and Recoverability, Serializability & its Types, Levels of Transaction Consistency, Deadlocks, Nested transaction, Transaction benchmarking.

UNIT V – CRASH RECOVERY

Failure classification, Different type of Recovery techniques & their comparative analysis, Deferred update, Immediate update, Shadow paging, Check points, On-line backup during Database updates, Concurrency Control: Different type of concurrency control techniques & their comparative analysis, Locking techniques, Time- stamp ordering, Multi-version techniques, Optimistic techniques, Multiple granularity.

Text Books:

1. Database System Concepts, A. Silberschatz, Henry F. Korth & S. Sudarshan, McGraw Hill Education.
2. Fundamentals of Database Systems, Ramez Elmasri, Shamkant B. Navathe, Pearson Education.

Reference Books:

1. Introduction to Database Systems, C. J. Date, Addison Wesley Publication Company.
2. Fundamentals of Relational Databases, Ramon A., Pauline K. Cushman, Schaum's Outlines, Mcgraw Hill.
3. Principles of Database Systems, Jeffrey D. Ullman, Galgotia Publications.

Course Outcome:

After completion of the course study, students will be able to

2. Explain relational database theory, RDMBS and relational data model.
3. Implement queries by using SQL.
4. Write relational algebra expressions for queries.
5. Familiar with the basic issues of transaction, its processing and concurrency control.

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Semester	IV	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Database Management System Laboratory	**Practical**	28
Subject Code	BT424	**Credit**	01

List of Practical:

1. Creating and renaming tables.
2. Data constraints (Primary key, Foreign key, Not Null), Data insertion into a table.
3. Viewing data from tables.
4. Filtering table data.
5. Creating table from another table.
6. Inserting data into a table from another table.
7. Delete, alter, and update operations.
8. Grouping data, aggregate functions
9. Oracle functions (mathematical, character functions)
10. Sub-queries.
11. Set operations.
12. Joins.
13. PL/SQL (Anonymous block, control structure)
14. PL/SQL (Procedures)
15. Triggers
16. Cursors

Note: Student can consider the schema of student relation or employee relation for implementing above commands.

References:

1. SQL & PL/SQL, Ivan Bayross, SPD.
2. Database Design Fundamentals, Rishe, PHI.
3. Principles of Database Systems", 2nd Edn., Ullman, J.O, Galgotia Publications.
4. Introduction to Database Systems, C.J.Date, Pearson Education.
5. Fundamentals of Database Systems, Elmasri & Navathe, Pearson Education.

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Semester	IV	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Analysis and Design of Algorithms Laboratory	**Practical**	28
Subject Code	BT425	**Credit**	01

List of Practical:

1. Write a program to perform Bubble sort for any given list of numbers.
2. Write a program to perform Insertion sort for any given list of numbers.
3. Write a program to perform Selection sort for any given list of numbers.
4. Sort a given set of elements using the Quicksort method 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.
5. 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.
6. Write a program to find Maximum and Minimum Heap Sort of the given set of integer values.
7. Write a program to perform Sequential or linear Search technique for any given list of numbers.
8. Write a program to perform Binary Search technique for any given list of numbers.
9. Obtain the Topological ordering of vertices in a given digraph.
10. Print all the nodes reachable from a given starting node in a digraph using BFS method.
11. Check whether a given graph is connected or not using DFS method.
12. Find Minimum Cost Spanning Tree of a given undirected graph using Prim’s algorithm.
13. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
14. Write a program to find solution for knapsack problem using greedy method.
15. Implement N Queen's problem using Back Tracking.

References:

1. Data Structures and Algorithms by G.A.V. Pai, 2017, TMH.
2. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, 2nd edition, University Press

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Semester	IV	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Unix & Shell Programming Laboratory	**Practical**	28
Subject Code	BT426	**Credit**	01

List of Practical:

1. a) Write a shell script to list all of the directory files in a directory.
   b) Write a shell script to find the number of files in a directory.

2. a) Write a shell script to check whether a file exists or not.
   b) Write a shell script to find the mode of a file in a directory.
   c) Write a shell script to copy the source file to the target file.
3. a) Write a shell script to accept three numbers and display the largest.
   b) Write a shell script to display first ten positive numbers using until loop.
   c) Write a shell script to print the first 10 odd numbers using the while loop.
   d) Write a shell script which will accept different numbers and find their sum.
4. a) Write a shell script to find factorial of a given integer.
   b) Write a shell script to generate Fibonacci series.
5. a) Write a shell script to reverse the digits of a given number.
   b) A five digit number is input through the keyboard. Write a shell script to calculate the sum of its digits.
6. a) Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
   b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
7. a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
   b) Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
8. a) Write an awk script to count the number of lines in a file that do not contain vowels.
   b) Write an awk script to find the number of characters, words, and lines in a file.
9. Write a shell script to check if a particular user has logged in or not. If not, continue the loop till he/she logins. Once the required user logins display a message.
10. Write a program that takes one or more file/directory names as command line input and reports the following information on the file:
    a) File type
    b) Number of links
    c) Time of last access

d) Read, write, and execute permissions.

11. a) Write a shell script to accept the name, grade, and basic salary from the user. Write the details into a file called employee, separating the fields with a colon (,) continue the process till the user wants.
    b) Write a menu driven program to display a menu of options and depending upon the user's choice executes the associated command.
    c) Write a shell script to calculate the total salary payable to all the employees from the employee file. The salary should be taken from the 8th field of the employee file.
12. a) Write a C program that makes a copy of a file using standard I/O and system calls.
    b) Write a C program to emulate the UNIX ls –l command.
13. a) Write a C program to list for every file in a directory, its inode number and file name.
    c) Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
14. a) Write a C program that demonstrates redirection of standard output to a file. E.g. ls –l > out.
    b) Write a C program that illustrates how to execute two commands concurrently with a command pipe. E.g.: ls –l | sort.
15. a) Write a C program to create a Zombie process.
    b) Write a C program that illustrates how an orphan is created.
16. a) Write a C program that illustrate communication between two unrelated processes using named pipe.
    b) Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
    c) Write a C program (receiver.c) that receives the messages (from the above message queue) and displays them.

References:

1. Unix Shell programming, Yashwanth Kanitkar, 1st Edition, BPB Publisher
2. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson education.
3. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
4. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH.
5. Unix Concepts and Applications, Sumitabha Das.

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Semester	IV	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	GUI (Graphical User Interface) Laboratory	**Practical**	28
Subject Code	BT427	**Credit**	01

List of Practical:

1. Gambas/ .NET/ Other Integrated Development Environment (IDE): An introduction, New Project Window, Property Window, Project Explorer Window, Watch Window etc.
2. Design an identity card containing information regarding students such as Name, Roll No., Address, Class/ Semester, Date of Birth, Blood Group, Phone No., etc. Add an Exit Button.
3. Develop an application to calculate Interest. It should accept rate of interest, period for calculation of interest (years), amount on which interest is to be calculated (Rs.). After clicking on compute, investment amount (Principal + Interest) should be displayed in separate text box. Add Exit button and proper text box controls and labels to be used. Provide two options simple interest, compound interest. Provide Picture and Radio Button control.
4. Design a Simple Calculator to implement addition, subtraction, multiplication, division, and remainder operations on two given numbers (include validation of input & proper message).
5. Create a form using check box & option box to give effect for fonts such as bold, italic, underline, strike through respectively for the text entered in the Rich Text Box (add status bar control).
6. Create a form to access drive list, directory list, and files within a directory of the computer you are using (use tree structure, menus & toolbars).
7. Design a form for demonstration of print method (Error code, Error message display). Use print control box. Log the status of each message in a log file.
8. Demonstrate use of Date Environment; add tables and queries, place fields on form, report etc. Generate single table report & two table grouped report outputs.
9. Design a program to display regional languages of different states in India. Take many names of states of India in one list box control and other text box control should display their languages e. g. Maharashtra – Marathi etc.
10. CASE STUDY (Design and develop one of the following three case studies):
11. Create a Scientific Calculator (add minimum 15 functions).
12. Develop a program for Online Examination system, which includes database and recordkeeping facility.
13. Develop a program for Payroll System, which can handle database as well as can print the pay slips of employees. In this system provide a Login Window, which will accept the User Name and Password. After verifying the user information, the user should get the access to Payroll System.
14. Create a Simple Notepad application, which contains Menus, Rich Text Box, Common Dialog box, formatted text using Toolbar, and Replace text, Windows (Tile / Cascade), Status bar and scroll bar.
15. Modify the practical No. 7 to add following buttons: FIND, ADD, DELETE, UPDATE, and CANCEL. Give proper code to perform the activity described by these buttons.

16. Display the Table Data using Data Control/ADODC. Add Find, Delete, Update, and Cancel Buttons on the form.
17. Display the data from two different tables having common keys using Visual data manager. Use Flex Gride control to display data.
18. Use Active –X control in the form which is created in previous practical.

List of Equipment / Machine/ Software Required:

Dual Core of Core –I3 Computing System.
Gambas/Visual Studio
Database (PostgreSQL/ MySQL/others …)

Reference:

1. A Beginners Guide to Gambas – John W Rittinghouse

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Semester - V

S. No.	Code	Subject	Periods per Week			Scheme of Marks		Total Credit
			L	T	P	ESE	IM	
1.	BT520	Theory of Computation	3	1	-	70	30	4
2.	BT521	Computer Graphics	3	-	-	70	30	3
3.	BT522	Microprocessor and Interfacing	3	-	-	70	30	3
4.	BT523	Artificial Intelligence and Expert System	3	-	-	70	30	3
5.	BT524	Computer Graphics Laboratory	-	-	2	30	20	1
6.	BT525	Microprocessor Laboratory	-	-	2	30	20	1
8.	BT526	Artificial Intelligence and Expert System Laboratory	-	-	2	30	20	1
9.	BT527	Vocational Training/ Internship - 1	-	-	-	0	50	3
10.	BTP2XX	Professional Elective II	3	-	-	70	30	3
		Total	**15**	**1**	**6**	**440**	**260**	**22**

L – Lecture,
T – Tutorial,
P – Practical,
ESE – End Semester Examination,
IM – Internal Marks (Include Class Test & Teacher's Assessments)

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Semester	V	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	12
Subject Name	Theory of Computation	**Practical**	00
Subject Code	BT520	**Credit**	04

Course Objective:

1. To study mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.
2. To enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms.

UNIT – I FINITE AUTOMATA

Introduction to Automata Theory, Examples of Automata Machine, Finite Automata as a Language Acceptor and Translator, Deterministic Finite Automata, Non-Deterministic Finite Automata, Finite Automata with Output (Mealy Machine, Moore machine). Finite Automata with Epsilon moves, Conversion of NFA to DFA by Arden's method, minimizing number of states of a DFA, My-hill Nerode theorem Properties and Limitation of FSM, Two Way Finite Automata, Application of Finite Automata.

UNIT – II REGULAR EXPRESSIONS

Regular Expression, Properties of Regular Expression, Finite Automata and Regular Expressions, Regular Expression to DFA conversion & vice versa, Pumping Lemma for Regular Sets, Application of Pumping Lemma, Regular Sets and Regular Grammar, Closure Properties of Regular Sets, Decision Algorithm for Regular Sets and Regular Grammar.

UNIT – III GRAMMARS

Definition and types of Grammar, Chomsky hierarchy of Grammar, Relation between types of Grammars, Role and application areas of Grammars, Context Free Grammar, Left most linear & right most derivation trees, Ambiguity in Grammar, Simplification of Context Free Grammar, Chomsky Normal From, Greibach Normal Form, Properties of Context Free Language, Pumping Lemma from Context Free Language, Decision Algorithm for Context Free Language.

UNIT – IV PUSH DOWN AUTOMATA AND TURING MACHINE

Basic definitions, Deterministic Push Down Automata and Non-Deterministic Push Down Automata, Acceptance of Push Down Automata, Push Down Automata and Context Free Language, Turing Machine Model, Representation of Turing Machine, Construction of Turing Machine for simple problems, Universal Turing Machine and other modifications.

UNIT – V COMPUTABILITY

Introduction and Basic concepts, Recursive function, Partial Recursive Function, Initial Functions, Computability, A Turing Model for Computation, Turing Computable Functions, Construction of Turing machine for computation, space and time complexity, Recursive Enumerable Language and Sets, Church's Hypothesis, Post correspondence problem, Halting problem of Turing Machine.

Text Books:

1. Introduction to Automata theory, Language and Computation; John E. Hopcropt & J. D. Ullman, Pearson.
2. Theory of Computer Science (Automata, Languages & Computation), K.L.P. Mishra and N. Chandrasekaran, PHI.

Reference Books:

1. Theory of Automata and Formal Language, R.B. Patel & Prem Nath, Umesh Publication.
2. An Introduction to Automata Theory and Formal Languages, Adesh K. Pandey, S. K. Kataria & Sons.

3. Theory of Computation, A. M. Natrajan, A. Tamilarasi, P. Balasubramani, New Age International.

Course Outcome:

After completion of the course study, students will be able to

1. Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
2. Demonstrate algorithm, computability, decidability, and complexity through problem solving.
3. Prove the basic results of the Theory of Computation.

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Semester	V	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Computer Graphics	**Practical**	00
Subject Code	BT521	**Credit**	03

Course Objective:

1. To learn basic principles of Computer Graphics.
2. To learn how various objects can be created by using Computer Graphics.
3. To study color and shading in created computer objects.
4. To study basics of animation.

UNIT – I OVERVIEW OF GRAPHICS SYSTEM

Introduction, Video display devices, Input devices, Raster scan & Random scan system, Line-Circle-Ellipse generating algorithms, Filled area primitives, 2-D & 3-D transformation, Clipping: Point Clipping, Line Clipping: 2-D Cyrus Beck line clipping, Liang Barsky line clipping, Cohen Sutherland, Polygon clipping: Sutherland Hodgeman & Weiler-Atherton polygon clipping.

UNIT – II CURVES & SURFACES

Conics-Parametric forms for Circle, Ellipse, Parabola, Bezier Curves-Need for cubic parametric curves C^0, C^1, and C^2 continuity, Generation though Bernstein polynomials, Condition for smooth joining of 2 segments, Convex Hull property, B-Spline Curves: Knot vectors-uniform and open uniform curves, Uniform, Periodic B-splines, Open, Uniform B-splines, Non-uniform, rational B-splines, Beta splines, Subdividing curves, Drawing curves using forward differences.

UNIT – III PROJECTIONS & HIDDEN SURFACE REMOVAL

3-D Transformation for right handed co-ordinate system (Z-axis towards viewer), Parallel projection on xy-plane (including oblique view), Perspective projection-1, 2, and 3 Vanishing points, Handling points at infinity, Reconstruction of 3-D images. Hidden Surface Removal: Back face removal, Floating Horizon method for curved objects, Z-Buffer or depth buffer algorithm, Painter's algorithm (Depth sorting method), Binary Space Partitioning trees, Scanline algorithm, Warnock's algorithm.

UNIT – IV SHADING & COLOR ISSUES

Illumination model for Diffused & Specular reflection, Computing reflection vector, Gouraud and Phong shading, Band Illusion, Lateral inhibition, Texture mapping & their characteristics, Parametric Texture mapping, 2D Texture mapping and Bump mapping, Handling shadows, Radiosity: Lambert's Law, Basic element, Recapitulation, Modeling transparency, Visualization of data sets, Volume rendering, Color issues: Additive, Subtractive primaries, Wavelength spectrum, JCM color. .

UNIT – V FRACTALS & ANIMATION

Fractals: Self similar fractals, fractal dimension, Generation of Terrain-random midpoint displacement, Grammar based models, Self-squaring fractals. Soild Modeling: Generation through sweep techniques, Constructive solid geometry, B representations, Octrees, Ray Tracing & their Theory, Animation: In-between using rotation and translation, Procedural animation, Image Transformation: Translation and rotation, Morphing, Motion Control (Key framing), Spline Driven animation, Arc length parameterization, Velocity curves, Euler angles and use of quaternion.

Text Books:

1. Computer graphics, Hearn and Baker, PHI
2. Computer Graphics, Foley, PE-LPE,

Reference Books:

1. Procedural Elements of Computer graphics, Rogers, McGraw Hill

2. Computer graphics, Harringtons S., McGraw Hill.
3. Computer Graphics, Schaum's Outline, McGraw Hill.

Course Outcome:

After completion of the course study, students will be able to

1. Describe the general software architecture of programs that use 2D/3D computer graphics.
2. Discuss hardware system architecture for computer graphics.
3. Use the underlying algorithms, mathematical concepts, supporting computer graphics.

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Semester	V	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Microprocessor and Interfacing	**Practical**	00
Subject Code	BT522	**Credit**	03

Course Objective:

1. To introduce 8085 architecture and programming in assembly language/C/C++.
2. To introduce basic concepts of interfacing memory and peripheral devices to a microprocessor.
3. To introduce various advanced processor architectures.

UNIT – I MICROPROCESSOR ARCHITECTURE

Introduction to Microprocessors, Architecture of 8085, Pin Configuration and Function; internal register & flag register, Generation of Control Signals: Bus Timings: Demultiplexing of address / data bus; Fetch Cycle, Execute Cycle, Instruction Cycle, Instruction Timings and Operation Status, Timing Diagram.

UNIT – II INSTRUCTION SET AND PROGRAMMING WITH 8085

Instruction for Data Transfer, Arithmetic & Logical Operations, Branching Operation: Machine Cycle Concept; Addressing Modes; Instructions Format: Stacks. Subroutine & related Instructions. Elementary Concepts of Assemblers, Assembler Directives, Looping and Counting: Software Counters with Time Delays: Simple Programs using Instruction Set of 8085: Debugging: Programs Involving Subroutines. Programs for Code Conversion e.g. BCD to Binary, Binary to BCD. Binary to Seven-Segment LED Display. Binary to ASCII. ASCII to Binary: Program for Addition Subtraction: Programs for Multiplication and Division of Unsigned Binary Numbers.

UNIT – III ASSEMBLY LANGUAGE PROGRAMMING WITH C/C++, INTERFACING AND TIMING DIAGRAMS

Using Assembly Language with C/C++ for linking C/C++ into assembly language, Basic Programs - Use of BIOS and DOS Interrupts in assembly & C/C++, Memory Interface of 8085 microprocessor, Basic I/O Interface, Introduction to I/O Interface, Timing diagram of 8085 microprocessor.Direct Memory Access: Basic DMA Operation and Definition.

UNIT – IV INTERRUPTS AND PERIPHERAL INTERFACING DEVICES

Hardware and software Interrupts, Interrupt Processing; Multiple Interrupts and Priority Concepts, Interrupt Structure of 8085, Instructions related to interrupts, Application of Interrupts and Illustrative Programs,Architecture, Pin Diagram and functioning of 8155/8156 (RAM), 8355/8755 (ROM), 8255 (PPI),USART (8251)

UNIT – V ADVANCED MICROPROCESSORS

80386- Features, block diagram, data types, supported registers, memory system, real mode and protected mode operation, descriptors, cache register, control register, Comparative Study of Modern Microprocessor(Web based Reference for study): Pentium Pro(Pentium II,Pentium III,PentiumIV),Corei3,i5,i7and Atomprocessors.

Text Books:

1. Microprocessor Architecture, Programming and Application, R. S. Gaonkar, Wiley Eastern
2. Digital Systems – From Gates to Microprocessors, Sanjay K. Bose, New Age International Publishers.

Reference Books:

1. 8085 Microprocessor Programming & Interfacing, N.K. Srinath, PHI
2. Digital Computer Electronics, Malvino, TMH
3. Microprocessors: Theory and Applications, Intel and Motorolla, Rafiquuzzaman, PHI.
4. 0000 to 8085: Introduction to Microprocessor for Engineers and Scientists, Ghosh & Sridhar, PHI

5. Advanced Microprocessors & IBM-PC Assembly Language Programming, K. Udaya Kumar & B. S. Umashankar, TMH2003.
6. Microprocessor: Theory and Applications-Intel and Motorolla, Rafiquuzzaman, PHI.

Course Outcome:

After completion of the course study, students will be able to

1. Analyze, specify, design, write and test assembly language/C/C++ programs of moderate complexity.
2. Select an appropriate architecture or program design to apply to a particular situation.
4. Design and build the necessary program for microprocessor. Apply the algorithms and design techniques to solve problems.

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Semester	V	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Artificial Intelligence and Expert System	**Practical**	00
Subject Code	BT523	**Credit**	03

Course Objective:

1. To give basic concepts of AI towards problem solving, inference, perception, knowledge representation and learning.
2. To investigate applications of AI techniques in Intelligent Agents, Expert Systems, Artificial Neural Networks and other machine learning models.
3. To explore the current scope, potential, limitations, and implications of intelligent systems.

UNIT – I INTRODUCTION TO AI & SEARCH TECHNIQUES

Introduction to AI, Problem Solving, State space search, Blind search: Depth first search, Breadth first search, Informed search: Heuristic function, Hill climbing search, Best first search, A* & AO* Search, Constraint satisfaction. Game tree, Evaluation function, Mini-Max search, Alpha-beta pruning, Games of chance.

UNIT – II KNOWLEDGE REPRESENTATION

Introduction to KR, Knowledge agent, Predicate logic, WFF, Inference rule & theorem proving: forward chaining, backward chaining, resolution; Propositional knowledge, Boolean circuit agents. Rule Based Systems, Forward reasoning: Conflict resolution, backward reasoning, Use of backtracking. Structured KR: Semantic Net-slots, Inheritance, Frames-exceptions and default attached predicates, Conceptual Dependency formalism, Other knowledge representations.

UNIT – III HANDLING UNCERTAINTY & LEARNING

Source of uncertainty, Probabilistic inference, Bayes' theorem, Limitation of naïve Bayesian system, Bayesian Belief Network (BBN), Inference with BBN, Dempster-Shafer Theory, Fuzzy Logic, Fuzzy function, Fuzzy measure, Non monotonic reasoning: Dependency directed backtracking, Truth maintenance systems. Learning: Concept of learning, Learning model, learning decision tree, Paradigms of machine learning, Supervised & Unsupervised learning, Example of learning, Learning by induction, Learning using Neural Networks.

UNIT – IV NATURAL LANGUAGE PROCESSING & PLANNING

Overview of NLP tasks, Parsing, Machine translation, Components of Planning System, Planning agent, State-Goal & Action Representation, Forward planning, Backward chaining, Planning example: partial-order planner, Block world.

UNIT – V EXPERT SYSTEM & AI LANGUAGES

Need & Justification for expert systems, Cognitive problems, Expert System Architectures, Rule based systems, Non production system, Knowledge acquisition, Case studies of expert system. AI language: Prolog syntax, Programming with prolog, Back tracking in prolog, Lisp syntax, Lisp programming.

Text Books:

1. Elaine Rich and Kevin Knight: Artificial Intelligence- Tata MeGraw Hill.
2. Dan W.Patterson Introduction to Artificial Intelligence and Expert Systems- Prentice Hall of India.

Reference Books:

1. Nils J.Nilsson: Principles of Artificial Intelligence- Narosa Publishing house.
2. Clocksin& C.S. Melish; Programming in PROLOG- Narosa Publishing house.
3. M. Sasikumar, S.Ramani, et. al.: Rule based Expert Systems (A practical Introduction) Narosa Publishing House.

Course Outcome:

After completion of the course study, students will be able to

1. Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems.

2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
3. Demonstrate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

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Semester	V	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Computer Graphics Laboratory	**Practical**	28
Subject Code	BT524	**Credit**	01

List of Practical:

1. Write a program to draw a line using DDA algorithm.
2. Write a program to draw the line using Bresenham's algorithm
3. Write a program to draw the circle using Bresenham's algorithm.
4. Write a program to draw the circle using Mid Point algorithm.
5. Write a program to draw ellipse using Mid Point algorithm.
6. Write a program for translation of a line.
7. Write a program for rotation of a triangle.
8. Write a program for scaling of a rectangle.
9. Write a program for shearing of a rectangle.
10. Write a program to implement Boundary Fill algorithm.
11. Write a program to implement Flood Fill algorithm.
12. Write a program to implement Bezier curve having four control points.
13. Write a program to implement Cohen Sutherland line clipping algorithm.
14. Write a program to implement Liang Barsky line clipping algorithm.
15. Write a program to implement face of a cartoon.

References:

1. Computer Graphics, Schaum Outlines, McGraw Hill.
2. Computer Graphics & Multimedia, G. S. Baluja –Dhanpat Rai & CO.
3. Computer Graphics, Donald Hearn & M Pauline Baker-Pearson Pvt. Ltd.

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Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Microprocessor Laboratory	**Practical**	28
Subject Code	BT525	**Credit**	01

List of Practical:

1. **REVERSING AN ARRAY:** A Block of 16 bytes is residing at locations starting from BLOCK 1. Write a program to transfer the block in reverse order at locations starting from BLOCK 2.
2. **SORTING IN ASCENDING ORDER:** A block (16 bytes are residing at locations starting from DATA: Write a program to arrange the word in the same location in ascending order.
3. **BINARY ADDITION:** 16 bytes are residing at location starting from DATA. WAP to add all bytes and store the result location SUM and SUM + 1
4. **BCD ADDITION:** 16 BCD NUMBER are residing at location starting from DATA. WAP to add all bytes and store the result location SUM and SUM + 1
5. **MULTIPLICATION:** Two bytes are residing at location DATA 1 and DATA 2. Write a program to multiply the two bytes and store the result at location PROD 1 and PROD 2.
6. **BINARY TO BCD:** A binary number is residing at location BIN > WAP to convert the binary number in to its equivalent BCD and store the result at BCD and BCD + 1
7. **BCD TO BINARY:** A BCD number is residing at location BCD; Write a program to convert the BCD number into its equivalent binary and store the result at BIN
8. **MULTIBYTE ADDITION:** Two 10 bytes are residing at location starting from DATA 1 and DATA 2 respectively. Write a program two add them up and store the result at location starting from RESULT (result space 11 bytes)
9. **MULTIBYTE BCD ADDTION:** Two 6 digits BCD numbers are residing at location starting from DATA 1 and DATA 2 respectively. Write a program to add them up and store the result at locations starting from RESULT (Result space 7 bytes)
10. **RST 6.5:** A block of 16 bytes is residing at location starting from; DATA Reverse the block and store the bytes at REVERSE whenever the RST 6.5 key is pressed.
11. **EDITING OF ASCII STRING:** A string of ASCII characters is residing at locations starting from READ which contain "I $ WILL $ BE $ AN $ ENGINEER ". Edit string in such a way that it should contain "I $ will $ be $ Engineer ". Keep the edited string in the same locations. Product the string from further editing. ($ stands for a blank)
12. **SIGNED BINARY ADDITION:** A block of 16-signed binary numbers is residing at locations NUMBERS. Add them up and store the result (in signed binary) at locations from RESULT.
13. **ASCII CODE CONVERSION:** A string of 16 ASCII characters is residing at locations starting from DATA. The string consists of codes for capital letters, small letters and BCD digits (0-9). Convert the ASCII characters. In such a way that the codes for capital letters be converted into corresponding codes for small letters, codes for small letters into that of capital letters and codes for BCD digits into that of BCD numbers and store them at the same locations.

14. **PARITY CHECK:** A block of 32 bytes is residing at DATA count the number (BCD) of times even and odd PARITY bytes are appearing consecutive memory locations. Keep the count at MATCH.
15. **SERIES GENERATION:** Two BCD numbers a and b are residing at locations DATA 1 and DATA 2 respectively. Write a program to form a series in BCD with the elements of a. a + 2b, a + 4b, a + 6b, ……. Stop the generation of the series whenever any element of the series in BCD with the elements of the series exceeds (99). Store the result at locations starting from RESULT. Count the number (BCD) of elements in the series and store it at NUMBER.

List of Equipment/ Machine Required:
8085 based microprocessor kit, MASM assembler, 8085 Simulator, PCs.

Recommended Books:
1. 8085 Microprocessor Programming & Interfacing – N.K. Srinath, PHI.

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Semester	V	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Artificial Intelligence and Expert System Laboratory	**Practical**	28
Subject Code	BT526	**Credit**	01

List of Practical:

1. Write a Prolog program to find the rules for parent, child, male, female, son, daughter, brother, sister, uncle, aunt, ancestor given the facts about father and wife only.
2. Write a program to find the length of a given list.
3. Write a program to find the last element of a given list.
4. Write a program to delete the first occurrence and also all occurrences of a particular element in a given list.
5. Write a program to find union and intersection of two given sets represented as lists.
6. Write a program to read a list at a time and write a list at a time using the well-defined read & write functions.
7. Write a program for the given knowledge base:
   If x is on the top of y, y supports x. If x is above y and they are touching each other, x is on top of y.
   A cup is above a book. The cup is touching that book.
   Convert the above into wffs, clausal form. Is it possible to deduce that "The book supports the cup"?
8. Write a program for given knowledge base:
   If Town x is connected to Town y by highway z and bikes are allowed on z, you can get to y from x by bike.
   If Town x is connected to y by z then y is also connected to x by z. If you can get to town q from p and also to town r from town q, you can get to town r from town p.
   Town A is connected to Town B by Road 1. Town B is connected to Town C by Road 2.
   Town A is connected to Town C by Road 3. Town D is connected to Town E by Road 4.
   Town D is connected to Town B by Road 5. Bikes are allowed on roads 3, 4, 5.
   Bikes are only either allowed on Road 1 or on Road 2 every day. Convert the following in to wff's, clausal form and deduce that "One can get to town B from town D".
9. Solve the classical Water Jug problem of AI.
10. Solve the classical Monkey Banana problem of AI.
11. Solve the classical Crypt arithmetic problems such as DONALD + GERALD = ROBERT of AI.
12. Solve the classical Missionary Cannibals problem of AI.
13. Solve the classical Travelling Salesman Problem of AI.
14. Solve the classical Blocks World Problem of AI.
15. Write a program to search any goal given an input graph using AO* algorithm.

List of Equipments/Machine required:

1. PC with Windows.
2. Visual prolog compiler.

Recommended Books:

1. Ivan Bratko : Logic & Prolog programming.
2. Carl Townsend: Introduction to Turbo Prolog, (BPB, Publication).
3. W.F. Clocksin&Mellish : Programming in PRLOG (Narosa Publication House)

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Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Vocational Training/ Internship - 1	**Practical**	28
Subject Code	BT527	**Credit**	01

Each student has to undergo Vocational Training/ Internship - I using any language platform based on Summer Internship and / or Industrial Training)

Guidelines for Pursual / Assessment of Project I Laboratory:

1. Students are encouraged to pursue live / research based / survey based / case study-based projects under this Laboratory post summer internship or Industrial Training period;
2. Students are encouraged to work individually for a single project title but group of maximum 04 students is allowed only after permission from the department;
3. Students are initially advised to get approval of their project titles and mentorship consent under any faculty from own discipline and training supervisor in the prescribed format provided;
4. Student groups can be of inter-disciplinary nature;
5. Students are required to submit weekly progress report with due approval signature(s) of their project mentors till the completion of that project;
6. At the end, the students must submit the project reports with due signature(s) of project mentor (in-house, Teaching Faculty from relevant discipline) and training supervisor (representing the organization of training) in the following format.

Vocational / Industrial Training Report Format:

- Cover Page (1 page)
- Inner Pages (3 pages)
- Certificate by Company/Industry/Institute
- Declaration by student
- About Company/Industry/Institute (1 page)
- Table of Contents (1 page)
- List of Tables (1 page)
- List of Figures (1 page)
- Abbreviations and Nomenclature (If any)
- Chapters (1-2 page each)
- Introduction to Project
- Tools & Technology Used
- Snapshots
- Task Deliverables / Project Outcome
- Conclusions and Future Scope
- Bibliography / Webliography / References (1page)
- Weekly Progress Sheets (4 pages)
- Feedback Report by Company/Industry/Institute (1 page)

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Semester - VI

S. No.	Code	Subject	Periods per Week			Scheme of Marks		Total Credit
			L	T	P	ESE	IM	
1.	BT620	Compiler Design	3	1	-	70	30	4
2.	BT621	Computer Network	3	1	-	70	30	4
3.	BT622	Software Engineering and Project Management	3	-	-	70	30	3
4.	BT623	Computer Network Laboratory	-	-	2	30	20	1
5.	BT624	Web Application Development Laboratory (PHP & My SQL)	-	-	2	30	20	1
6.	BT625	Android Application Development Laboratory	-	-	2	30	20	1
7.	BT626	PROJECT I	-	-	4	70	30	2
8.	BTP2XX	Professional Elective III	3	-	-	70	30	3
9.	BTOXX	Open Elective II	3	-	-	70	30	3
		Total	**15**	**2**	**10**	**510**	**240**	**22**

L – Lecture,
T – Tutorial,
P – Practical,
ESE – End Semester Examination,
IM – Internal Marks (Include Class Test & Teacher's Assessments)

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Semester	VI	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	12
Subject Name	Compiler Design	**Practical**	00
Subject Code	BT620	**Credit**	04

Course Objective:

1. To understand the fundamental principles of Compiler Design.
2. To provide the concepts required for building compilers.

UNIT – I INTRODUCTION

Introduction to Compiler, Translators, Interpreter, Cousins of Compiler, Single and Multi-Pass Compilers, Phases of Compilers, Compiler Construction Tools, Bootstrapping, Cross Compilers Lexical Analyzer: Role of Lexical Analyzer, Specification of Tokens, Recognition of Tokens, Regular Expression, Finite Automata, Regular Expression to Finite Automata Transition Diagrams, Tool for Lexical Analyzer LEX. Context Free Grammars (CFG), Simplification of CFGs, Ambiguity, Left Factoring, Left Recursion.

UNIT – II SYNTAX ANALYSIS AND PARSING TECHNIQUES

Introduction to Parsing Techniques, Bottom-Up Parsing and Top Down Parsing, Top Down Parsing: Recursive Descent Parsing, Predicative Parsing ,Bottom Up Parsing : Operator Precedence Parsing, LR Parsers, Construction of SLR, Canonical LR and LALR Parsing Tables, Construction of SLR Parse Tables For Ambiguous Grammar, The Parser Generator Tools – YACC, Error Recovery in Top Down and Bottom Up Parsing.

UNIT – III SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION

Syntax Directed Definitions, Synthesized and Inherited Attributes, Dependency Graph, Construction of Syntax Trees, Bottom Up and Top Down Evaluation of Attributes, S-Attributed And L-Attributed Definitions, Postfix Notation, Three Address Codes, Quadruples, Triples And Indirect Triples, Translation of Assignment Statements, Control Flow, Boolean Expression, Case Statements And Procedure Calls.

UNIT – IV TYPE CHEKING AND RUNTIME ENVIRONMENTS

Introduction, Simple Type Checker, Type Conversions, Overloading of Functions and Operators, Source Language Issues, Storage Organization, Storage Allocation Strategies, Parameter Passing, Symbol Tables, Dynamic Storage Allocation Techniques,

UNIT – V CODE OPTIMIZATION & CODE GENERATION

Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Loop Optimization, Global Data Flow Analysis, Loop Invariant Computations, DAG Representation of Basic Blocks, Peephole Optimization, Issue in the Design of Code Generator, Register Allocation, The Target Machine, and Simple Code Generator.

Text Books:

1. Compilers-Principles, Techniques and Tools, Alfred V. Aho, Ravi Sethi and Ullman J.D.,Addison Wesley.
2. Principle of Compiler Design, Alfred V. Aho, and J.D. Ullman, Narosa Publication.

Reference Books:

1. Compiler design in C, A.C. Holub, PHI.
2. Compiler construction (Theory and Practice), A.Barret William and R.M. Bates, Galgotia Publication.
3. Compiler Design-Principles and Practice by Kenneth C. Louden

Course Outcome:

After completion of the course study, students will be able to

1. Have knowledge of the underlying machine architecture.
2. Design a compiler.

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Semester	VI	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	12
Subject Name	Computer Network	**Practical**	00
Subject Code	BT621	**Credit**	04

Course Objective:

1. To study advanced background on computer networking topics.
2. To learn about high speed networks.
3. To get idea of congestion control in networks.
4. To study integrated and differentiated services.

UNIT – I HIGH SPEED NETWORKS

Frame Relay Networks, Asynchronous transfer mode, ATM Protocol Architecture, ATM Logical Connection, ATM Cell, ATM Service Categories, AAL, High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fiber Channel, and Wireless LAN.

UNIT – II CONGESTION AND TRAFFIC MANAGEMENT

Queuing Analysis, Queuing Models, Single Server Queues, Effects of Congestion, Congestion Control, Traffic Management, Congestion Control in Packet Switching Networks, Frame Relay Congestion Control.

UNIT – III TCP AND ATM CONGESTION CONTROL

TCP Flow control, TCP Congestion Control, Retransmission, Timer Management, Exponential RTO back off, KARN's Algorithm, Window Management, Performance of TCP over ATM, Traffic and Congestion Control in ATM, Requirements, Attributes, Traffic Management Frame Work, Traffic Control, ABR traffic Management, ABR rate control, RM Cell Formats, ABR Capacity Allocations, GFR Traffic Management.

UNIT – IV INTEGRATED AND DIFFERENTIATED SERVICES

Integrated Service Architecture, Approach, Components, Services Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ, Random Early Detection, Differentiated Services.

UNIT – V PROTOCOLS FOR QoS SUPPORT

RSVP, Goals & Characteristics, Data Flow, RSVP Operations, Protocol Mechanisms, Multiprotocol Label Switching, Operations, Label Stacking, Protocol Details, RTP, Protocol Architecture, Data Transfer Protocol, RTCP.

Text Book:

1. High Speed Networks and Internet, William Stallings, Pearson Education, Second Edition, 2002.

Reference Books:

1. High Performance Communication Networks, Warland & Pravin Varaiya, Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
2. MPLS and VPN Architecture,Irvan Pepelnjk, Jim Guichard and Jeff Apcar, Cisco Press, Volume 1 and 2, 2003.

Course Outcome:

After completion of the course study, students will be able to

1. Explain advanced networking topics.
2. Implement congestion control while deploying a network.
3. Explain integrated and differentiated services.

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Semester	VI	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Software Engineering and Project Management	**Practical**	00
Subject Code	BT622	**Credit**	03

Course Objective:

1. To introduce concept of software project
2. To learn the different software processes & their uses.
3. To understand good coding practices, documentation, contracts, regression tests and daily builds.
4. To study ethical and professional issues and its concern to software engineers.
5. To understand how Software Engineering & Project Management is concerned with theories, methods and tools for professional software development.

UNIT – I SOFTWARE PROCESS

Introduction: S/W Engineering Paradigm, Life Models: Water Fall, Incremental, Spiral, WINWIN Spiral, Evolutionary, Prototyping, Object Oriented System, Computer Based System, Verification, Validation, Life Cycle Process, Development Process, System Engineering Hierarchy.

UNIT – II SOFTWARE REQUIREMENTS

Functional and Non-functional, User System Requirement, Engineering process, Feasibility studies: Requirements, Elicitation, Validation and Management, Software prototyping: Prototyping in the software Process, Rapid prototyping techniques, User interface prototyping, S/W document. Analysis and modeling: Data, Functional and Behavioral models structured analysis and data dictionary.

UNIT – III DESIGN CONCEPTS AND PRINCIPLES

Design Process and Concepts: Modular Design, Design Heuristic, Design Model and Document, Architectural Design, Software Architecture Data Design, Architectural Design Transform and Transaction Marring, User Interface Design, User Interface Design Principles Acquisitions System, Monitoring and Control System. SCM: Need for SCM, Version Control, Introduction to SCM Process, Software Configuration Items.

UNIT – IV TESTING & MAINTENANCE

Taxonomy of Software Testing: Levels, Test Activities, Types of S/W Testing: Black Box Testing, Testing Boundary Condition, Structural Testing: Test Coverage Criteria Based on Data Flow Mechanisms, Regression Testing: Testing in the large S/W, Testing Strategies, Strategic Approach and Issue, Unit Testing, Integration Testing, Validation Testing, System Testing and Debugging.

UNIT – V SOFTWARE PROJECT MANAGEMENT

Measures and Measurements: S/W Complexity And Science Measure, Size Measure, Data And Logic Structure Measure, Information Flow Measure, Software Cost Estimation, Function Oriented Model, COCOMO Model, Delphi Method, Defining a Task Network, Scheduling Earned Value Analysis, Error Tracking, Software Changes, Program Evolution Dynamics Software Maintenance, Architectural Evolution, Taxonomy Of CASE Tools.

Text Books:

1. Software Engineering: A practitioner's Approach, Roger S Pressman, sixth edition. McGrawHill International Edition, 2005.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education, 2004.

Reference Books:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008.
3. Fundamentals of Software Engineering, Rajib Mall,PHI, 2005.
4. Software Engineering, Principles and Practices,Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

Course Outcome:

After completion of the course study, students will be able to

1. Select and implement different software development process models.

2. Extract and analyze software requirements specifications for different projects.
3. Define the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.
4. Apply different testing and debugging techniques and analyze their effectiveness.
5. Analyze software risks and risk management strategies.

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Semester	VI	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Computer Network Laboratory	**Practical**	28
Subject Code	BT623	**Credit**	01

List of Practical:

1. Introduction to Local Area Network with its cables, connectors and topologies.
2. Installation of Switch, Hub their cascading and network mapping.
3. Installation of UTP, Co-axial cable, Cross cable, parallel cable NIC and LAN card.
4. Case Study of Ethernet (10 base 5,10 base 2,10 base T)
5. Installation and working of Net meeting and Remote Desktop.
6. Installation and working with Telnet (Terminal Network).
7. Installation and working with FTP (File Transfer Protocol).
8. Installation and Computers via serial or Parallel ports and enable the computers to share disk and printer port.
9. To connect two Personal Computer with Telephone line.
10. Installation of Modem and Proxy Server.
11. Working with Null Modem.
12. Installation of Windows 2003 server/ Windows 200 server.
13. Configuration of DHCP.
14. Introduction to Server administration.

Recommended Book:

Computer Network and internet by Dougles E. Comer (Pearson Education)

List of Software required:

Windows 2003 server/ Windows 2000 server.

List of Hardware required:

LAN Trainer Kit LAN Card Cable, Connectors, HUB, Switch, Crimping Tools.

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Semester	VI	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Web Application Development Laboratory (PHP & My SQL)	**Practical**	28
Subject Code	BT624	**Credit**	01

List of Practical:

1. Introduction to PHP: History, syntax, comments, Variable, data type, operators, exception.
2. Write a program in PHP to print the current date.
3. Write a program in PHP to explain how data are stored in variables.
4. Write a program in PHP to print a pattern using loop.
5. Write a program to insert values in 1-D array and print it in increasing and decreasing order.
6. Write a program to explain if…else and switch statement.
7. Write a program to explain GET and POST method.
8. Design a form containing buttons, drop down list, check box and various other tools.
9. Design a form displaying student mark sheet.
10. Design a railway reservation form.
11. Write a program which has a data base connectivity and contain all following Button FIND, ADD, DELETE, MODIFY,CANCEL. Give proper code to perform the activity described by the buttons.
12. Write a program to explain file handling : open, read , write , append , truncate , delete

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Semester	VI	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Android Application Development Laboratory	**Practical**	28
Subject Code	BT625	**Credit**	01

List of Practical:

1. Develop an application that uses GUI components, Font, and Colours.
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements multi-threading.
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Write a mobile application that creates alarm clock.

Reference Books:

1. Head First Android- By Jonathan Simon

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Semester	VI	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	PROJECT I	**Practical**	60
Subject Code	BT626	**Credit**	01

Allocation of project:

1. Information regarding broad area must be made available to the students well in advance.
2. Information must cover following parameters.
   i. **Broad Area**: Subject or expertise/application area.
   ii. **Required skills**: Knowledge of subject(s), software, tools & other characteristics.
   iii. **Type of project**: Hardware, Software, Design, Survey, Study Based etc.
   iv. **Guide Available**: Name of Guide (S) from Department & Institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students and department faculty (HOD) concern.
5. One project group must contain maximum three students.

Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outside person/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students.

Internal Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority. However, printing and binding would be as per the conventional format.
3. Evaluation will be based on live demonstration / presentation and Viva.
4. Final submission of project is expected as:
   i. One copy to the Institution central library,
   ii. One copy to the department.

External Evaluation:

External assessment of project would be like conduction of practical exams of university, and must be executed as per the norms of practical exams.

Semester - VII

S. No.	Code	Subject	Periods per Week			Scheme of Marks		Total Credit
			L	T	P	ESE	IM	
1.	BT720	Internet of Things	3	-	-	70	30	3
2.	BT721	Network Security	3	-	-	70	30	3
3.	BT722	Soft Computing	3	-	-	70	30	3
4.	BT723	Internet of Things Laboratory	-	-	2	30	20	1
5.	BT724	Python Laboratory	-	-	2	30	20	1
6.	BT725	Internship II	-	-	-	0	50	3
7.	BT726	PROJECT II	-	-	4	70	30	2
8.	BTP2XX	Professional Elective IV	3	-	-	70	30	3
9.	BTOXX	Open Elective III	3	-	-	70	30	3
		Total	**15**	**0**	**8**	**480**	**270**	**22**

L – Lecture,
T – Tutorial,
P – Practical,
ESE – End Semester Examination,
IM – Internal Marks (Include Class Test & Teacher's Assessments)

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Semester	VII	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Internet of Things	**Practical**	00
Subject Code	BT720	**Credit**	03

Course Objective:

1. Vision and Introduction to IoT.
2. Understand IoT Market perspective.
3. Data and Knowledge Management and use of Devices in IoT Technology.
4. Understand State of the Art – IoT Architecture.
5. Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

UNIT- I VISION AND INTRODUCTION TO IOT.

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics.

UNIT –II UNDERSTAND IOT MARKET PERSPECTIVE.

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.

UNIT-III DATA AND KNOWLEDGE MANAGEMENT AND USE OF DEVICES IN IOT TECHNOLOGY.

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, Understand State of the Art – IoT Architecture, IoT Architecture-State of the Art – Introduction, State of the art, Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model

UNIT-IV REAL WORLD IOT DESIGN CONSTRAINTS,

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.

UNIT-V INDUSTRIAL AUTOMATION AND COMMERCIAL BUILDING AUTOMATION IN IOT.

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.

Text Book:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014.

Reference Books:

1. Vijay Madisetti and Arshdeep Bahga, “Internet of Things (A Hands-on-Approach)”, 1stEdition, VPT, 2014.
2. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, Apress Publications, 2013

Course Outcome:

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

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

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Semester	VII	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Network Security	**Practical**	00
Subject Code	BT721	**Credit**	03

Course Objective:

1. To understand the principles and practices of cryptography and network security.
2. To understand the practical applications that has been implemented and is in use to provide network security.

UNIT – I INTRODUCTION

Security Trends, OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security. Symmetric (Private Key) Ciphers: Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. Block Ciphers And The Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard (DES), The Strength Of DES, Differential And Linear Cryptanalysis, Block Cipher Design Principles.

UNIT – II SYMMETRIC CIPHERS

Basic Concepts in Number Theory and Finite Fields: Groups, Rings, and Fields, Modular Arithmetic, The Euclidian Algorithm, Finite Fields of the Form GF(P), Polynomial Arithmetic, Finite Fields of the Form GF(2^n). Advanced Encryption Standard: The Origins AES, Evaluation Criteria for AES, the AES Cipher. Stream Cipher: Stream Ciphers and RC4. Confidentiality using Symmetric Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution.

UNIT – III ASYMMETRIC (PUBLIC KEY) CIPHERS: INTRODUCTION TO NUMBER THEORY

Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms. Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems. Key Management-Other Public-Key Cryptosystems: Key management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

UNIT – IVASYMMETRIC CIPHERS (CONTINUED): MESSAGE AUTHENTICATION AND HASH FUNCTIONS

Message Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MAC, SHA, HMAC, CMAC. Digital Signatures and Authentication protocols: Digital Signature, Authentication Protocols, Digital Signature Standards.

UNIT – V NETWORK SECURITY APPLICATIONS

Authentication Applications: Kerberos, X.509 Authentication Services, Public key infrastructure. Electronic mail security: PGP, S/MIME. Overview of IP Security. Web Security: Web security considerations, SSL and TLS, Secure electronic transaction. System Security:Intruders, Intrusion detection, password management, viruses and related threats, virus counter measures, Firewall design principles, and trusted systems.

Text Book:

1. Cryptography and Network Security, Principles and Practices, William Stallings, Pearson Education Prentice Hall, 4th Edition.
2. Cryptography and Network Security, Atul Kahate, McGraw Hill Education (India) Private Limited.

Reference Books:

1. Applied Cryptography: Protocols & Algorithms, Schneier & Bruce, MGH International.
2. Cryptography and Security – by Dr T R Padmanabhan N Harini ,Wiley India Pvt Ltd, 2011.

Course Outcome:

After completion of the course study, students will be able to

1. Explain conventional encryption algorithms.
2. Explain public key encryption algorithms and their design principles.
3. Use message authentication codes, hash functions, digital signature and public key certificates.
4. Explain network security tools and applications.
5. Explain system level security issues like threat of and countermeasures for intruders and viruses, and the use of firewalls and trusted systems.

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Semester	VII	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Soft Computing	**Practical**	00
Subject Code	BT722	**Credit**	03

Course Objective:

1. To introduce basics of soft computing (neural networks, fuzzy system).
2. To give idea of genetic algorithm and its applications.

UNIT – I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS

Evolution of Computing, Soft Computing Constituents, From Conventional AI to Computational Intelligence, Machine Learning Basics.

UNIT – II GENETIC ALGORITHMS

Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning, Machine Learning Approach to Knowledge Acquisition, Chromosome representation, Encoding, Decoding, Genetic Operators, Selection, Crossover, Mutation, Elitism, Schema Theorem, EGA, Convergence Theorem, Real-Coded GA, Ordered GA, Steady-State GA, Multi-Objective Evolutionary Algorithms, Applications in Search and Optimization, Recent Advances in Evolutionary Computing (Particle Swarm Optimization, Ant Colony Optimization).

UNIT – III NEURAL NETWORKS

Machine Learning using Neural Network, Adaptive Networks, Feed Forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks, Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance Architectures, Advances in Neural networks.

UNIT – IV FUZZY LOGIC

Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions, Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.

UNIT – V NEURO-FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems, Coactive Neuro-Fuzzy Modelling, Classification and Regression Trees, Data Clustering Algorithms, Rule base Structure Identification, Neuro Fuzzy Control, Case studies.

Text Books:

1. Neuro-Fuzzy and Soft Computing, Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, Prentice-Hall of India, 2003.
2. Fuzzy Sets and Fuzzy Logic-Theory and Applications, George J. Klir and Bo Yuan, Prentice Hall, 1995.
3. Neural Networks Algorithms, Applications, and Programming Techniques, James A. Freeman and David M. Skapura, Pearson Edn., 2003.

Reference Books:

1. An Introduction to Genetic Algorithm, Mitchell Melanie, Prentice Hall, 1998.
2. Genetic Algorithms in Search, Optimization and Machine Learning, David E. Goldberg, Addison Wesley, 1997.
3. Introduction to Fuzzy Logic using MATLAB, S. N. Sivanandam, S. Sumathi and S. N. Deepa, Springer, 2007.
4. Introduction to Genetic Algorithms, S.N.Sivanandam · S.N.Deepa, Springer, 2007.
5. Introduction to Artificial Neural Systems, Jacek M. Zurada, PWS Publishers, 1992.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the neural network, fuzzy set theory.
2. Implement numerical methods in soft computing
3. Apply genetic algorithm in real time applications.

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Semester	VII	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Internet of Things Laboratory	**Practical**	28
Subject Code	BT723	**Credit**	01

List of Practical:

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Semester	VII	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Python Laboratory	**Practical**	28
Subject Code	BT724	**Credit**	01

Course Objectives:

1. To be able to introduce core programming basics and program design with functions using Python programming language.
2. To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
3. To understand the high-performance programs designed to strengthen the practical expertise.

List of Practical:

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format “Sun May 29 02:26:23 IST 2017”
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9]
10. Write a Python program to construct the following pattern, using a nested for loop

    *
    * *
    * * *
    * * * *
    * * *
    * *
    *
    *
11. Write a Python script that prints prime numbers less than 20.
12. Write a python program to find factorial of a number using Recursion.
13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides). R18 B.Tech. CSE (Internet of Things) Syllabus JNTU HYDERABAD 17
14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
15. Write a python program to define a module and import a specific function in that module to another program.
16. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral.
19. Write a Python class to implement pow(x, n)

20. Write a Python class to reverse a string word by word.

Course Outcome:

1. Student should be able to understand the basic concepts scripting and the contributions of scripting language
2. Ability to explore python especially the object-oriented concepts, and the built in objects of Python.
3. Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations

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Semester	VII	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Internship II	**Practical**	00
Subject Code	BT725	**Credit**	03

Each student has to undergo Vocational Training/ Internship - I using any language platform based on Summer Internship and / or Industrial Training)

Guidelines for Pursual / Assessment of Project I Laboratory:

1. Students are encouraged to pursue live / research based / survey based / case study-based projects under this Laboratory post summer internship or Industrial Training period;
2. Students are encouraged to work individually for a single project title but group of maximum 04 students is allowed only after permission from the department;
3. Students are initially advised to get approval of their project titles and mentorship consent under any faculty from own discipline and training supervisor in the prescribed format provided;
4. Student groups can be of inter-disciplinary nature;
5. Students are required to submit weekly progress report with due approval signature(s) of their project mentors till the completion of that project;
6. At the end, the students must submit the project reports with due signature(s) of project mentor (in-house, Teaching Faculty from relevant discipline) and training supervisor (representing the organization of training) in the following format.

Vocational / Industrial Training Report Format:

- Cover Page (1 page)
- Inner Pages (3 pages)
- Certificate by Company/Industry/Institute
- Declaration by student
- About Company/Industry/Institute (1 page)
- Table of Contents (1 page)
- List of Tables (1 page)
- List of Figures (1 page)
- Abbreviations and Nomenclature (If any)
- Chapters (1-2 page each)
- Introduction to Project
- Tools & Technology Used
- Snapshots
- Task Deliverables / Project Outcome
- Conclusions and Future Scope
- Bibliography / Webliography / References (1page)
- Weekly Progress Sheets (4 pages)
- Feedback Report by Company/Industry/Institute (1 page)

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Semester	VII	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	PROJECT II	**Practical**	60
Subject Code	BT726	**Credit**	02

Allocation of project:

1. Information regarding broad area must be made available to the students well in advance.
2. Information must cover following parameters.
   i. **Broad Area**: Subject or expertise/application area.
   ii. **Required skills**: Knowledge of subject(s), software, tools & other characteristics.
   iii. **Type of project**: Hardware, Software, Design, Survey, Study Based etc.
   iv. **Guide Available**: Name of Guide (S) from Department & Institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students and department faculty (HOD) concern.
5. One project group must contain maximum three students.

Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outside person/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students.

Internal Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority. However, printing and binding would be as per the conventional format.
3. Evaluation will be based on live demonstration / presentation and Viva.
4. Final submission of project is expected as:
   i. One copy to the Institution central library,
   ii. One copy to the department.

External Evaluation:

External assessment of project would be like conduction of practical exams of university, and must be executed as per the norms of practical exams.

Semester - VIII

S. No.	Code	Subject	Periods per Week			Scheme of Marks		Total Credit
			L	T	P	ESE	IM	
1.	BT820	Internship / Training III	-	-	-	70	30	6
2.	BT821	PROJECT III	-	-	-	120	80	6
3.	BTP2XX	Professional Elective V (Online Mode/ MOOCs)	-	-	-	70	30	3
4.	BTOXX	Open Elective IV (Online Mode/ MOOCs)	-	-	-	70	30	3
Total			**15**	**0**	**8**	**480**	**270**	**22**

L – Lecture,
T – Tutorial,
P – Practical,
ESE – End Semester Examination,
IM – Internal Marks (Include Class Test & Teacher's Assessments)

Department of Computer Science & Engineering
MATS University, Raipur (C.G.)
Syllabus for B. Tech. Computer Science and Engineering
(Scheme: 2020)

Semester	VIII	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Internship / Training III	**Practical**	00
Subject Code	BT820	**Credit**	06

Each student has to undergo Vocational Training/ Internship - I using any language platform based on Summer Internship and / or Industrial Training)

Guidelines for Pursual / Assessment of Project I Laboratory:

1. Students are encouraged to pursue live / research based / survey based / case study-based projects under this Laboratory post summer internship or Industrial Training period;
2. Students are encouraged to work individually for a single project title but group of maximum 04 students is allowed only after permission from the department;
3. Students are initially advised to get approval of their project titles and mentorship consent under any faculty from own discipline and training supervisor in the prescribed format provided;
4. Student groups can be of inter-disciplinary nature;
5. Students are required to submit weekly progress report with due approval signature(s) of their project mentors till the completion of that project;
6. At the end, the students must submit the project reports with due signature(s) of project mentor (in-house, Teaching Faculty from relevant discipline) and training supervisor (representing the organization of training) in the following format.

Vocational / Industrial Training Report Format:

- Cover Page (1 page)
- Inner Pages (3 pages)
- Certificate by Company/Industry/Institute
- Declaration by student
- About Company/Industry/Institute (1 page)
- Table of Contents (1 page)
- List of Tables (1 page)
- List of Figures (1 page)
- Abbreviations and Nomenclature (If any)
- Chapters (1-2 page each)
- Introduction to Project
- Tools & Technology Used
- Snapshots
- Task Deliverables / Project Outcome
- Conclusions and Future Scope
- Bibliography / Webliography / References (1page)
- Weekly Progress Sheets (4 pages)
- Feedback Report by Company/Industry/Institute (1 page)

Department of Computer Science & Engineering
MATS University, Raipur (C.G.)
Syllabus for B. Tech. Computer Science and Engineering
(Scheme: 2020)

Semester	VIII	**Lecture**	00
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	PROJECT III	**Practical**	00
Subject Code	BT821	**Credit**	06

Allocation of project:

1. Information regarding broad area must be made available to the students well in advance.
2. Information must cover following parameters.
   i. **Broad Area**: Subject or expertise/application area.
   ii. **Required skills**: Knowledge of subject(s), software, tools & other characteristics.
   iii. **Type of project**: Hardware, Software, Design, Survey, Study Based etc.
   iv. **Guide Available**: Name of Guide (S) from Department & Institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students and department faculty (HOD) concern.
5. One project group must contain maximum three students.

Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outside person/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students.

Internal Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority. However, printing and binding would be as per the conventional format.
3. Evaluation will be based on live demonstration / presentation and Viva.
4. Final submission of project is expected as:
   i. One copy to the Institution central library,
   ii. One copy to the department.

External Evaluation:

External assessment of project would be like conduction of practical exams of university, and must be executed as per the norms of practical exams.

Department of Computer Science & Engineering

MATS University, Raipur (C.G.)

Syllabus for B. Tech. Computer Science and Engineering

(Scheme: 2020)

MATS UNIVERSITY, RAIPUR (CG)

Department of Computer Science and Engineering

School of Engineering and Information Technology

Syllabus
of
Open Elective Subjects
B. Tech. (All Branch)
Scheme – 2020

OPEN ELECTIVE

S. No.	Code	Subject	Periods per week			Scheme of marks		Total Credit
			L	T	P	ESE	IM	
1.	BTO01	Cyber Law and Ethics	3	-	-	70	30	3
2.	BTO02	Supply Chain Management	3	-	-	70	30	3
3.	BTO03	Engineering Economics & Financial Accounting	3	-	-	70	30	3
4.	BTO04	Knowledge Entrepreneurship	3	-	-	70	30	3
5.	BTO05	Technology Management	3	-	-	70	30	3
6.	BTO06	Ad-Hoc and Sensor Networks	3	-	-	70	30	3
7.	BTO07	Technologies for Sustainable Development	3	-	-	70	30	3
8.	BTO08	E- Commerce & Strategic IT	3	-	-	70	30	3
9.	BTO09	Decision Support & Executive Information System	3	-	-	70	30	3
10.	BTO10	Applied Graph Theory	3	-	-	70	30	3
11.	BTO11	Innovative Entrepreneurial Skill	3	-	-	70	30	3
12.	BTO12	Soft Computing	3	-	-	70	30	3
13.	BTO13	Disaster Management	3	-	-	70	30	3
14.	BTO14	Professional Ethics in Engineering	3	-	-	70	30	3
15.	BTO15	Intellectual Property Rights	3	-	-	70	30	3
16.	BTO16	IT in Business	3	-	-	70	30	3
17.	BTO17	Environmental Management & Sustainable Development	3	-	-	70	30	3
18.	BTO18	Satellite Communication	3	-	-	70	30	3

19.	BTO19	Enterprise Resource Planning	3	-	-	70	30	3
20.	BTO20	Entrepreneurship Development	3	-	-	70	30	3
21.	BTO21	Renewable Energy Sources	3	-	-	70	30	3
22.	BTO22	Soft Skills and Interpersonal Communication	3	-	-	70	30	3
23.	BTO23	ICT for Development	3	-	-	70	30	3
24.	BTO24	Human Resource Development and Organizational Behaviour	3	-	-	70	30	3
25.	BTO25	Introduction to Philosophical Thoughts	3	-	-	70	30	3
26.	BTO26	Comparative study of Literature	3	-	-	70	30	3
27.	BTO27	Indian Music System	3	-	-	70	30	3
28.	BTO28	History of Science and Engineering	3	-	-	70	30	3
29.	BTO29	Introduction to Arts and Aesthetics	3	-	-	70	30	3
30.	BTO30	Economic Policies in India	3	-	-	70	30	3
31.	BTO31	Principle of Management	3	-	-	70	30	3
31.	BTO32	Metro Systems and Engineering	3	-	-	70	30	3

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Cyber Law and Ethics	**Practical**	00
Subject Code	BTO01	**Credit**	03

Course objectives:

1. To create cyber security awareness.
2. To understand principles of web security.
3. To understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.
4. To have idea about issues for creating security policy for a large organization.

UNIT – I INTRODUCTION TO CYBER LAW

Evolution of Computer Technology, Emergence of Cyber Space, Cyber Jurisprudence, Jurisprudence and Law, Doctrinal Approach, Consensual Approach, Real Approach, Cyber Ethics, Cyber Jurisdiction, Hierarchy of Courts, Civil and Criminal Jurisdictions, Cyberspace-Web Space, Web Hosting and Web Development Agreement, Legal and Technological Significance of Domain Names, Internet as a Tool for Global Access.

UNIT – II INFORMATION TECHNOLOGY ACT

Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature, Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

UNIT – III CYBER LAW AND RELATED LEGISLATION

Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Names and Copyright Disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution , Online Dispute Resolution (ODR).

UNIT – IV ELECTRONIC BUSINESS AND LEGAL ISSUES

Evolution and Development in E-Commerce, Paper vs. Paperless Contracts, E-Commerce Models: B2B, B2C, E security.

UNIT – V APPLICATION AREA

Business, Taxation, Electronic Payments, Supply Chain, EDI, E-Markets, Emerging Trends.

Text Book:

1. Cyber Laws: Intellectual property & E Commerce, Security- Kumar K, dominant Publisher.
2. Information Security Policy & Implementation Issues, NIIT, PHI

Reference Books:

1. Cyber Crime Notorious Aspects of the Humans & Net Criminals Activity in Cyber World, Barna Y Dayal D P Dominant Publisher.
2. Cyber Crime Impact in the new millennium, Marine R.C. Author press.
3. Spam Attack, Cyber Stalking & abuse, Barna Y, Dayal D P Dominant publisher.
4. Frauds & Financial criouses in Cyber space, Barna Y, Dayal D P , Dominant publisher.
5. Information Security, NIIT, PHI.

Course Outcome:

After completion of the course study, students will be able to

1. Acknowledge about the cybercrime, cyber criminal, and intellectual property rights.
2. Protection and resilience of critical information infrastructure.
3. To enable effective prevention, investigation and prosecution of cybercrime and enhancement of law enforcement.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Supply Chain Management	**Practical**	00
Subject Code	BTO02	**Credit**	03

Course Objective:

1. To have knowledge of supply chain management.
2. To learn the applicability of supply chain management in any business/organization.

UNIT – I INTRODUCTION

Supply Chain Management (SCM), Importance of Supply Chain Management, Supply Chain Management Today and Tomorrow, The Supply Chain Management Pipeline, Objectives of the Supply Chain Management, Supply Chain Principles/ Methodology and Solutions: Supply Chain Principles, Methodology of a Supply Chain Management project-solutions, Expected results/ benefits, Opportunity areas (examples), Characteristics of Firms/ Organizations and Service Providers.

UNIT – II SUPPLY CHAIN DRIVERS AND METRICS

Drivers of Supply Chain Performance, Framework for Structuring Drivers, Facilities, Inventory, Transportation, Information, Sourcing, Pricing, Obstacles to Achieving Fit.

UNIT – III APPLICATIONS

Where the technique has been applied, how can be SCM applied to an organization? Types of firms/ Organizations, where SCM can be applied, Duration and Implementation cost of Supply Chain Management, Conditions for implementation, European Organizations supporting the implementation of the method.

UNIT – IV IMPLEMENTATION PROCEDURE

Steps-actions/ phases: Implementing a competitive approach to Warehousing and Distribution Partial techniques and tools included in each step, related software.

UNIT – V INFORMATION TECHNOLOGY IN A SUPPLY CHAIN

The Role of IT in a Supply Chain, The Supply Chain IT Framework, Customer Relationship Management, Internal Supply Chain Management, Supplier Relationship Management, The Transaction Management Foundation, The Future of IT in the Supply Chain, Risk Management in IT, Supply Chain IT in Practice , Summary of Learning Objectives.

Text Book:

1. Supply Chain Management: Strategy, Planning, and Operation, Sunil Chopra and Peter Meindel, Prentice Hall of India.

Reference Books:

1. Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies, Second Edition, David Simchi-Levi, Philip Kaminsky, and Edith Simchi-Levi, McGraw-Hill/Irwin, New York, 2003.
2. Introduction to Supply Chain Management, Robert Handfield & Ernest Nichols, Prentice hall.

Course Outcome:

After completion of the course study, students will be able to

1. Know how Supply chain management is essential to company success and customer satisfaction.
2. Apply SCM knowledge and capabilities to support medical missions, conduct disaster relief operations, and handle other types of emergencies.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Engineering Economics And Financial Accounting	**Practical**	00
Subject Code	BTO03	**Credit**	03

Course Objective:

1. To introduce the theory of engineering economics, demand and supply analysis.
2. To understand the project financial procedures
3. To study the concepts of financial accounting.

UNIT – I INTRODUCTION

Managerial Economics, Relationship With Other Disciplines, Firms: Types, Objective And Goals, Managerial Decisions And Decision Analysis.

UNIT – II DEMAND AND SUPPLY ANALYSIS

Demand, Types of Demand, Determinants of Demand, Demand Function, Demand Elasticity, Demand Forecasting, Supply: Determinants of Supply, Supply Function, Supply Elasticity.

UNIT – III PRODUCTION FUNCTION AND COST ANAYSIS

Production Function, Returns of Scale, Production Optimization, Least Cost Output, Isoquants, Managerial uses of Production Function. Cost Concepts: Cost Function, Types of Cost, Determinants of Cost, Short Run and Long Run Cost Curves, Cost Output Decision, Estimation of Cost.

UNIT –IV PRICING

Determinants of Price, Pricing under Different Objectives and different Market Structures, Price Discrimination, Pricing Methods in Practice, Role of Government in Pricing Control.

UNIT – V FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT):

Balance Sheet & related concepts, profit & loss statements and related concepts, Financial Ratio Analysis, Cash Flow Analysis, Funds Flow Analysis, Comparative Financial Statements, Analysis & Interpretation of Financial Statements. Investments, Risks And Return Evaluation Of Investment Decision, Average Rate Of Return, Payback Period, Net Present Value, Internal Rate Of Return.

Text Books:

1. Managerial Economics; Applications, Strategy and Tactics, McGuigan, Moyer and Harris, Thomson South Western, 10th Edition, 2005.
2. Fundamentals of Financial Management, Prasanna Chandra, Tata Mcgraw Hill Publishing Ltd., 4th edition, 2005.

Reference Books:

1. Economics, Samuelson Paul A. and Nordhaus W.D., Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.
2. Basic Financial Accounting for Management, Paresh Shah, Oxford University Press, New Delhi, 2007.
3. Managerial Economics in a global economy, Salvatore Dominick, Thomson South Western, 4th Edition, 2001.

Course Outcome:

After completion of the course study, students will be able to

1. Explain theory of engineering economics, demand and supply concept and application area of it.
2. Analyze the project in terms of financial procedures and accounting.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Knowledge Entrepreneurship	**Practical**	00
Subject Code	BTO04	**Credit**	03

Course Objective:

1. To study about entrepreneurship.
2. To learn how to start a business/venture with attractive business opportunities.
3. To learn how to create functional plans, from where to get finance for business setup.
4. To learn business management.

UNIT – I ENTREPRENEURSHIP

Concept, Knowledge and Skills Requirement, Characteristic of successful Entrepreneurs, Role of Entrepreneurship in Economic Development, Entrepreneurship Process, Factors Impacting Emergence of Entrepreneurship, Managerial Vs. Entrepreneurial Approach And Emergence Of Entrepreneurship.

UNIT – II STARTING THE VENTURE

Generating Business Idea: Sources of new ideas, methods of generating ideas, creative problem solving, Opportunity Recognition, Environmental Scanning, Competitor and Industry Analysis, Feasibility Study-Market Feasibility, Technical/Operational Feasibility, Financial Feasibility, Drawing Business Plan, Preparing Project Report, Presenting Business Plan to Investors.

UNIT – III FUNCTIONAL PLANS

Marketing Plan , marketing research for the new venture, steps in preparing marketing plan, contingency planning, organizational plan, form of ownership, designing organization structure, Job Design, Manpower Planning, Financial Plan, Cash Budget, Working Capital, Performa Income Statement Performa Cash Flow, Perform Balance Sheet, Break Even Analysis.

UNIT – IV SOURCES OF FINANCE

Debt or Equity Financing, Commercial Banks, Venture Capital, Financial Institutions Supporting Entrepreneurs, Legal Issues , Intellectual Property Rights: Patents, Trade Marks, Copy Rights, Trade Secrets, Licensing, Franching

UNIT – V BUSINESS MANAGEMENT FOR ENTREPRENEURS

The Core Group and the Employees, The Board : The Board in Practice ,The Board Work in the New Business, The Main Tasks of the Board ,The Useful Effect of the Board ,The Director's Fee .

Text Book:

1. Knowledge Based Entrepreneurship, John Heeboll, Copenhagen University SCIENCE and KU-HUM/DTU Summer School 2007.

Reference Book:

1. Knowledge-Driven Entrepreneurship: The Key to Social and Economic Transformation, Thomas Andersson, Piero Formica, Martin G. Curley, Springer Science & Business Media, 01-Dec-2009.

Course Outcome:

After completion of the course study, students will be able to

1. Have idea of entrepreneurship.
2. Start a venture with attractive business opportunities.
3. Create functional plans and execute these plans with proper financial support from investors.
4. Manage business efficiently.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Technology Management	**Practical**	00
Subject Code	BTO05	**Credit**	03

Course Objective:

1. To study about technology market and associated industry.
2. To learn the development of a new product with proper management.
3. To study about innovation in the field of technology.

UNIT – I THE EVOLUTION OF TECHNOLOGY, MARKETS, AND INDUSTRY

Technology and Industry Evolution, Evolution of Markets: Innovation Adoption, Diffusion, Market Growth, New Product Entry, and Competitor Responses.

UNIT – II THE DEVELOPMENT AND INTRODUCTION OF NEW PRODUCTS

Understanding Customer Needs, Product Development as a Problem Solving Process, Managing the 'Unmanageable' of Sustained Product Innovation.

UNIT – III THE MANAGEMENT AND ORGANIZATION OF INNOVATION

Rival Interpretations of Balancing Exploration and Exploitation: Simultaneous or Sequential? , R&D Project Selection and Portfolio Management: A review of the past, a description of the present, and a sketch of the future, managing the innovative performance of technical professionals.

UNIT – IV TECHNOLOGY STRATEGY

The Economics and Strategy of Standards and Standardization, Intellectual Property and Innovation, Orchestrating Appropriability: Towards an endogenous view of capturing value from innovation investments, Individual Collaborations, Strategic Alliances and Innovation: Insights from the Biotechnology Industry.

UNIT – V WHO INNOVATES

Technology Based Entrepreneurship, knowledge spillover, Entrepreneurship and Innovation in large and small firms, Financing of Innovation, the contribution of public entities to Innovation and Technological Changes.

Text Book:

1. Handbook of Technology and Innovation Management, Scott Shane, Case Western Reserve University, A John Wiley and Sons, Ltd., Publication.

Reference Book:

1. Forecasting and Management of Technology, Alan L. Porter, Scott W. Cunningham, Jerry Banks, A. Thomas Roper, Thomas W. Mason, Frederick A. Rossini , John Wiley & Sons.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the concept of technology management with its application areas.
2. Develop a new product with the proper management.
3. Apply innovative ideas in technology invention.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Ad-Hoc and Sensor Networks	**Practical**	00
Subject Code	BTO06	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Technologies for Sustainable	**Practical**	00
Subject Code	BTO07	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	E-Commerce & Strategic IT	**Practical**	00
Subject Code	BTO08	**Credit**	03

Course Objectives:

1. To understand the business impact and potential of e-commerce.
2. To learn the technologies associated with e-Commerce.
3. To learn e-commerce from an enterprise point of view.
4. To learn the security concern related to e-commerce.

UNIT – I INTRODUCTION

E-Commerce History and Evolution, E-Commerce Industry Framework, Brief History of Ecommerce, Consumer to Business Electronic Commerce, Architectural Framework, Internet and other Novelties, Networks and Electronic Transactions Today.

UNIT – II ENCRYPTION

Encryption Techniques, Symmetric Encryption: Secret Key Encryption, Asymmetric Encryption: Public and Private Pair Key Encryption, Digital Signatures, Virtual Private Network, Domain Name Server, LAN, Electronic Commerce Online Resources Designing, Electronic Payment Systems.

UNIT – III ELECTRONIC PAYMENT SYSTEMS

Types of electronic payment systems, digital token-based electronic payment systems, smart cards & electronic payment systems, credit card based electronic payment systems, Internet Strategies: Internet Techniques, Shopping techniques and online selling techniques;

UNIT – IV INFORMATION DISTRIBUTION AND MESSAGING

FTP, E-Mail, www server, HTTP, Web service implementation, Information publishing , Web Browsers, HTML, Common Gateway Interface

UNIT – V MOBILE & WIRELESS COMPUTING FUNDAMENTALS

Mobile computing framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile computing applications, personal communication service.

Text Books:

1. Frontiers of E-commerce, Kalakota&Whinston, Addison Wesley.
2. E-Business Road Map for Success, Dr. Ravi Kalakota& Marcia Robinson, Addison Wesley.
3. Electronic Commerce by Bharat Bhasker, TMH.

Reference Books:

1. Pete Lohsin , John Vacca “Electronic Commerce”, New Age International.
2. Goel, Ritendra “E-commerce”, New Age International.

Course Outcomes:

After completion of the course study, students will be able to

1. Apply the skills necessary for large scale web based e-commerce project development.
2. Work on information distribution and messaging services in e-commerce applications.
3. Work on business applications of wireless and mobile technologies for e-commerce.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Decision Support & Executive Information System	**Practical**	00
Subject Code	BTO09	**Credit**	03

Course Objective:

1. To get idea about the fundamental terms, concepts and theories associated with Decision Support Systems, computerized decision aids, expert systems, group support systems and executive information systems.
2. To examine examples and case studies documenting computer support for organizational decision making, and various planning, analysis and control tasks.
3. To discuss and develop the analysis, design and implementation of computerized Decision Support Systems.

UNIT – I DECISION SUPPORT SYSTEM

What is a DSS? Decision Making Rational Decisions, Definitions of Rationality, Bounded Rationality and Muddling Through, The Nature of Managers, Appropriate Data Support, Information Processing Models, Group Decision Making.

UNIT – II COMPONENT OF DSS

Data Component : Information and its Usefulness, Characteristics of Information, Databases to Support Decision Making, Database Management Systems, Data Warehouses, Data Mining and Intelligent Agents Model Component-:Models Representation Methodology, Time Model Based Management Systems, Access to Models, Understandability of Results, Integrating Models Sensitivity of a Decision, Brainstorming and Alternative Generation, Evaluating Alternatives, Running External Models, Mail Component: Integration of Mail Management Examples of Use implications for DSS.

UNIT – III INTELLIGENCE AND DECISION SUPPORT SYSTEMS

Programming Reasoning, Backward Chaining Reasoning, Forward Chaining Reasoning, Comparison, Certainty Factors, User-Interface Component: User Interface Components, The Action Language, Menus, Command Language, I/O Structured Formats, Free Form Natural Language, The Display or Presentation Language, Windowing Representations, Perceived Ownership of Analyses, Graphs and Bias Support for All Phases of Decision Making, The Knowledge Base Modes of Communication

UNIT – IV DESIGNING A DSS

Planning for DSS, Designing a Specific DSS, Interviewing Techniques, Other Techniques, Situational Analysis, Design Approaches, Systems Built from Scratch, Using Technology to Form the Basis of the DSS, Evaluating a DSS Generator, Using a DSS Generator, The Design Team, DSS Design and Re-engineering Discussion.

UNIT – V IMPLEMENTATION AND EVALUATION OF DSS

Implementation Strategy, Prototypes, Interviewing, User Involvement, Commitment to Change, Managing Change, Institutionalize System, Implementation and System Evaluation, Technical Appropriateness, Measurement Challenges , Organizational Appropriateness.

Text Books:

1. Decision Support System, Vicki l Sauter
2. Management Information system, Gerald V. Post & David L. Anderson.

Reference Books:

1. Decision Support Systems and Intelligent Systems, E. Turban and J.E. Aronson, Prentice Hall.
2. Decision Support Systems, V. S. Janakiraman and K.Sarukesi, PHI.

Course Outcomes:

After completion of the course study, students will be able to

1. Define the relationship between business information needs and decision making
2. Appraise the general nature and range of decision support systems.
3. Appraise issues related to the development of DSS.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Applied Graph Theory	**Practical**	00
Subject Code	BTO10	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Innovative Entrepreneurial Skill	**Practical**	00
Subject Code	BTO11	**Credit**	03

Course Objective:

1. To understand the concept of innovation and applicability of innovation in entrepreneurship.
2. To identify and analyze the opportunities for entrepreneurship and innovation.
3. To understanding industry dynamics and factors for developing successful innovations and apply this understanding to innovations in various sectors.

UNIT – I INNOVATION

An Abstract Concept, Creativity, Innovation and Imagination, Types of Innovation, classification according to products, Processes or Business Organizations.

UNIT – II ENTREPRENEURSHIP

Who is an Entrepreneur? Entrepreneurship: A state of Mind, Emergence of entrepreneur, Role of Entrepreneur, A Doer not a Dreamer, Characteristics of an Entrepreneur, Factors affecting Entrepreneurial Growth: Social, Cultural, Personality Factors, Psychological and Social Factors, Impact of Entrepreneurship for Sustainable Development.

UNIT – III ENTERPRENEUR vs. ENTERPRENEURSHIP

Difference between Entrepreneur and Entrepreneurship, Difference between Entrepreneur and Intra-preneur, Common Entrepreneurial Competencies/Traits, Entrepreneurship Stimulants, Obstacles Inhibiting Entrepreneurship, Types of Entrepreneurs, Functions of an Entrepreneur.

UNIT – IV IDENTIFICATION OF BUSINESS OPPORTUNITIES

Introduction, Sources of Business Product Ideas, Steps in Identification of Business Opportunity and its SWOT Analysis.

UNIT – V TECHNO ECONOMIC FEASIBILITY OF THE PROJECT

Introduction, Techno Economic Feasibility of the Project, Feasibility Report, and Considerations while preparing a Feasibility Report, Proforma of Feasibility Report, Role of Institutions and entrepreneurship.

Text Books:

1. Competing through Innovation, Bellon& Whittington, Prentice Hall of India
2. A Guide to Entrepreneurship, David Oates- JAICO Publishing House.

Reference Books:

1. Entrepreneurship, Rober D Hisrich, Peters, Shepherd- TMH
2. Entrepreneurship in Action, Coulter, Prentice Hall of India.
3. Entrepreneurship Management and Development, Ajith Kumar, HPH.
4. Fundamentals of entrepreneurship- Mohanty, PHI.
5. Patterns of Entrepreneurship- Jack M Kaplan, Wiley, student Edit

Course Outcome:

After completion of the course study, students will be able to

1. Apply innovative skills in entrepreneur activity.
2. Have entrepreneurship in leading sectors.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Soft Computing	**Practical**	00
Subject Code	BTO12	**Credit**	03

Course Objective:

1. To introduce basics of soft computing (neural networks, fuzzy system).
2. To give idea of genetic algorithm and its applications.

UNIT – I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS

Evolution of Computing, Soft Computing Constituents, From Conventional AI to Computational Intelligence, Machine Learning Basics.

UNIT – II GENETIC ALGORITHMS

Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning, Machine Learning Approach to Knowledge Acquisition,Chromosome representation, Encoding, Decoding, Genetic Operators, Selection, Crossover, Mutation, Elitism, Schema Theorem, EGA, Convergence Theorem, Real-Coded GA, Ordered GA, Steady-State GA, Multi-Objective Evolutionary Algorithms, Applications in Search and Optimization, Recent Advances in Evolutionary Computing (Particle Swarm Optimization, Ant Colony Optimization).

UNIT – III NEURAL NETWORKS

Machine Learning using Neural Network, Adaptive Networks, Feed Forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks, Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance Architectures, Advances in Neural networks.

UNIT – IV FUZZY LOGIC

Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions, Fuzzy Rules and FuzzyReasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.

UNIT – V NEURO-FUZZY MODELING

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.

Text Books:

1. Neuro-Fuzzy and Soft Computing, Jyh-Shing Roger Jang, Chuen-Tsai Sun, EijiMizutani, Prentice-Hall of India, 2003.
2. Fuzzy Sets and Fuzzy Logic-Theory and Applications, George J. Klir and Bo Yuan, Prentice Hall, 1995.
3. Neural Networks Algorithms, Applications, and Programming Techniques, James A.Freeman and David M. Skapura, Pearson Edn., 2003.

Reference Books:

1. An Introduction to Genetic Algorithm, Mitchell Melanie, Prentice Hall, 1998.
2. Genetic Algorithms in Search, Optimization and Machine Learning, David E. Goldberg, Addison Wesley, 1997.
3. Introduction to Fuzzy Logic using MATLAB, S. N. Sivanandam, S. Sumathi and S. N. Deepa, Springer, 2007.
4. Introduction to Genetic Algorithms, S.N.Sivanandam · S.N.Deepa, Springer, 2007.
5. Introduction to Artificial Neural Systems, Jacek M. Zurada, PWS Publishers, 1992.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the neural network, fuzzy set theory.
2. Implement numerical methods in soft computing
3. Apply genetic algorithm in real time applications.

School of Engineering and Information Technology
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Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Disaster Management	**Practical**	00
Subject Code	BTO13	**Credit**	03

Course Objective:

1. To introduce disaster, its nature and types.
2. To understand disaster zoning and hazard assessment.
3. To know about the disaster mitigation and preparedness.
4. To understand management during disaster and construction technology for its mitigation.
5. To identify relief measures.

UNIT – I INTRODUCTION

Nature of Disasters, Natural and Other Disasters, Earthquakes, Floods, Draught, Cyclones, Fire, and other Environmental Disasters.

UNIT – II DISASTER ASSESSMENT

Behavior of structures in Disaster Prone Areas, Disaster Zoning, Hazard Assessment, Environmental Impact Assessment

UNIT – III DISASTER PROTECTION

Methods of Mitigating Damage during Disasters, Disaster Preparedness.

UNIT – IV DISASTER MANAGEMENT

Management Systems during Disasters, Construction Technology for Mitigation of Damage of Structures.

UNIT – V RELIEF MEASURES

Short Term, and Long Term Relief Measures.

Text Books:

1. Design of Earthquake Resistant Buildings – Minoru Wakabayashi (McGraw Hill Publication).
2. Dynamics of Structures: Theory and Application to Earthquake Engineering (2nd edition), Anil K Chopra (Pearson Education Publication)

Reference Books:

1. Fundamentals of Vibrations – Anderson, R.A. (Mc Millan) IS – 1893 (Part I): 2002, IS – 13920: 1993, IS – 4326: 1993, IS-13828: 1993
2. Earth quake engineering damage assessment and structural design – S.F. Borg Disasters and development – Cuny F (Oxford University Press Publication)

Course Outcome:

After completion of the course study, students will be able to

1. Explain disaster and its nature.
2. Understand impact and hazard assessment.
3. Understand disaster preparedness and mitigation.
4. Use construction technology for disaster management.
5. Identify short term and long term relief measures.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Professional Ethics In Engineering	**Practical**	00
Subject Code	BTO14	**Credit**	03

Course Objective:

1. To study about engineering Ethics, variety of moral issues and moral dilemmas, professional Ideals and virtues.
2. To learn basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards, Exposure to Safety and Risk, Risk Benefit Analysis.
3. To learn Collegiality and Loyalty, Collective Bargaining, Confidentiality, Occupational Crime, Professional, Employee, Intellectual Property Rights.

UNIT – I MORALS AND ETHICS IN ENGINEERING

Senses of Engineering Ethics, Variety of Moral Issues, Types of Inquiry, Moral Dilemmas, Moral Autonomy, Kohlberg's Theory, Gilligan's theory, Indian Theory Consensus and Controversy, Professions and Professionalism, Professional Ideals and Virtues, Uses of Ethical Theories.

UNIT – II ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as Experimentation, Engineers as Responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards, A Balanced Outlook on Law, The Challenger Case Study, Titanic disaster as Case Study.

UNIT – III ENGINEER'S RESPONSIBILITY FOR SAFETY

Safety and Risk, Assessment of Safety and Risk, Risk Benefit Analysis, Reducing Risk, The Government Regulator's Approach to Risk, Disasters at Chernobyl and Bhopal (Case Studies).

UNIT – IV RESPONSIBILITIES, RIGHTS AND ACCOUNTABILITY

Collegiality and Loyalty, Respect for Authority, Collective Bargaining, Confidentiality, Conflicts of Interest, Occupational Crime, Professional Rights, Employee Rights, Intellectual Property Rights (IPR), Discrimination.

UNIT – V GLOBAL ISSUES

Multinational Corporations: Business Ethics, Environmental Ethics, Computer Ethics, Role in Technological Development, Weapons Development, Engineers as Managers, Consulting Engineers, Engineers as Expert Witnesses and Advisors, Honesty, Moral Leadership, Sample Code of Conduct.

Text Books:

1. Ethics in Engineering, Mike Martin and Roland Schinzinger, McGraw Hill, New York, 2005.

Reference Books:

1. Engineering Ethics Concepts and Cases, Charles E Harris, Michael S Pritchard and Michael J Rabins, Thompson Learning, 2000.
2. Engineering Ethics, Charles D Fleddermann, Prentice Hall, New Mexico, 1999.
3. Ethics and the Conduct of Business, John R Boatright, Pearson Education, 2003.
4. Fundamentals of Ethics for Scientists and Engineers, Edmund G Seebauer and Robert L Barry, Oxford University Press, 2001.
5. Business Ethics – An Indian Perspective, Prof. (Col) P S Bajaj and Dr. Raj Agrawal, Biztantra, New Delhi, 2004.

Course Outcome:

After completion of the course study, students will be able to

1. Have perception of profession, professional ethics, various moral & social issues, industrial standards, code of ethics and role of professional ethics in engineering field.

2. Know professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis.
3. Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives.

School of Engineering and Information Technology
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Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Intellectual Property Rights	**Practical**	00
Subject Code	BTO15	**Credit**	03

Course Objective:

1. To provide an overview of Intellectual Property Right.
2. To study the complexities involved in the process of attributing intellectual property rights to people.
3. To learn the legalities of intellectual property to avoid plagiarism, copyright infringements etc.

UNIT – I INTRODUCTION

Basic Concepts of Intellectual Property: Introduction to Intellectual Property Rights, Laws and its Scope, Trade Related Aspects of Intellectual Property Rights.

UNIT – II PATENTS

Patents: Introduction to Patent Law and Condition for Patentability, Procedure for Obtaining Patents, Rights of a Patentee, Patent Infringements, Biotechnology Patents and Patents on Computer Programs, Patents from an International Perspective.

UNIT – IIITRADEMARK AND GEOGRAPHICAL INDICATIONS

Statutory Authorities and Registration Procedure, Rights Conferred by Registration, Licensing, Assignment and Transfer of Trademark Rights, Trademark Infringement, Geographical Indication of Goods & Appellations of Origin.

UNIT – IV COPYRIGHT

Registration Procedure, Copyright Authorities, Assignment & Transfer of Copyright, Copyright Infringement and Exceptions to Infringement, Software Copyright.

UNIT-V LAW ON DESIGNS

Introduction to the Law on Industrial Designs, Registration and Piracy, International Perspective, Introduction to the Law on Semiconductor Layout Design, Registration, Commercial Exploitation and Infringement.

Text Books:

1. Managing Intellectual Property, Vinod V Sople, PHI
2. Cyber Law, Intellectual Property and E-Commerce Security, Kumar K, Dominent Publication And Distribution, New Delhi.

Reference Books:

1. Inventors Guide to Trademarks and Patents, Craig Fellenstein, Rachel Ralson- Pearson Education.
2. Intellectual Property, David Bainbridge, Longman.

Course Outcome:

After completion of the course study, students will be able to

1. Identify different types of Intellectual Properties, right of ownership, scope of protection as well as the ways to create and to extract value from Intellectual Property.
2. Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development.
3. Identify activities and constitute Intellectual Property infringements and the remedies available to the owner and describe the precautious steps to be taken to prevent infringement of proprietary rights in products and technology development.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Enterprise Resource Planning	**Practical**	00
Subject Code	BTO19	**Credit**	03

Course Objectives:

1. To introduce Enterprise System functionality.
2. To learn the Business Processes.
3. To get the idea about real time implementation scenario of ERP.

UNIT – I CONCEPTUAL FOUNDATION OF BUSINESS PROCESS REENGINEERING

Role of Information Technology and BPR; Process Improvement and Process Redesign, Process Identification and Mapping; Role/Activity Diagrams, Process Visioning, and Benchmarking.

UNIT – II ENTERPRISE RESOURCE PLANNING

Evolution of ERP- MRP and MRP II, Structure of ERP- Two Tier Architecture, Three Tier Architecture, Electronic Data Processing, Management Information System, Executive Information System, ERP as an Integrator of Information Needs at Various Levels.

UNIT – III TYPICAL BUSINESS PROCESSES

Core Processes, Product Control, Sales Order Processing, Purchases, Administrative Processes, Human Resource, Finance Support Processes, Marketing, Strategic Planning, Research and Development, Problems in Traditional View.

UNIT – IV ERP MODELS/FUNCTIONALITY

Sales Order Processing, Production Scheduling, Forecasting, Distribution, Finance, Features of Each of the Models, and Description of Data Flow across each module, Overview of Supporting Databases & Packages

UNIT – V ERP IMPLEMENTATION ISSUES

Opportunities and Problems in ERP Selection, and Implementation; ERP Implementation: Identifying ERP Benefits, Team Formation, Consultant Intervention, Selection of ERP, and Process of ERP.

Text Books:

1. ERP, Concepts and Practices, V. K. Garg & N. K. Venkatkrishnan, PM.
2. Enterprise wide Resource Planning-theory and practice, Rahul V. Altekar, PHI.
3. Enterprise Resource Planning, Alexis Leon, TMH.

References Books:

1. MIS, S. Sadagopan, PM.
2. Analysis and Design of Information Systems, V. Rajaraman, PHI.
3. Concepts in ERP, Monk' & Brady, Vikas pub, Thomson

Course Outcomes:

After completion of the course study, students will be able to

1. Demonstrate a good understanding of basic issues in Enterprise Systems.
2. Explain the scope of an Enterprise Systems.
3. Describe the selection, acquisition and implementation of enterprise systems
4. Explain the challenges associated with implementing enterprise systems and their impacts on organizations.
5. Communicate and assess an organization’s readiness for enterprise system implementation with a professional approach in written form.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
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(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Entrepreneurship Development	**Practical**	00
Subject Code	BTO20	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Renewable Energy Sources	**Practical**	00
Subject Code	BTO21	**Credit**	03

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MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Soft Skills and Interpersonal Communication	**Practical**	00
Subject Code	BTO22	**Credit**	03

Course Objective

UNIT – I

Getting Started

1. Soft Skills: An Introduction – Definition and Significance

of Soft Skills; Process, Importance and Measurment of

Soft Skill Development.

2. Self-Discovery: Discovering the Self; Setting Goals;

Beliefs, Values, Attitude, Virtue. 3. Positivity and Motivation: Developing Positive Thinking

and Attitude; Driving out Negativity; Meaning and

Theories of Motivation; Enhancing Motivation Levels.

UNIT -2

1. Interpersonal Communication: Interpersonal relations;

communication models, process and barriers; teamcommunication; developing interpersonal relationships

through effective communication; listening skills;

essential formal writing skills; corporate communication

styles – assertion, persuasion, negotiation.

2. Public Speaking: Skills, Methods, Strategies and

Essential tips for effective public speaking.

3. Group Discussion: Importance, Planning, Elements, Skills

assessed; Effectively disagreeing, Initiating, Summarizing

and Attaining the Objective.

4. Non-Verbal Communication: Importance and Elements;

Body Language.

5. Teamwork and Leadership Skills: Concept of Teams;

Building effective teams; Concept of Leadership and

honing Leadership skills.

UNIT -3

1. Interview Skills: Interviewer and Interviewee – in-depth

perspectives. Before, During and After the Interview.

Tips for Success.

2. Presentation Skills: Types, Content, Audience Analysis,

Essential Tips – Before, During and After, Overcoming

Nervousness.

3. Etiquette and Manners – Social and Business.

4. Time Management – Concept, Essentials, Tips.

5. Personality Development – Meaning, Nature, Features,

Stages, Models; Learning Skills; Adaptability Skills.

UNIT – 4

1. Decision-Making and Problem-Solving Skills: Meaning,

Types and Models, Group and Ethical Decision-Making,

Problems and Dilemmas in application of these skills.

2. Conflict Management: Conflict - Definition, Nature,

Types and Causes; Methods of Conflict Resoultion.

3. Stress Management: Stress - Definition, Nature, Types,

Symptoms and Causes; Stress Analysis Models and

Impact of Stress; Measurement and Managemet of Stress

4. Leadership and Assertiveness Skills: A Good Leader;

Leaders and Managers; Leadership Theories; Types of

Leaders; Leadership Behaviour; Assertivness Skills.

5. Emotional Intelligence: Meaning, History, Features,

Components, Intrapersonal and Management Excellence;

Strategies to enhance Emotional Intelligence.

Reference Books: a. Managing Soft Skills for Personality Development – edited by B.N.Ghosh, McGraw Hill India, 2012. b. English and Soft Skills – S.P.Dhanavel, Orient Blackswan India, 2010.

COURSE OUTCOMES By the end of the course, students shall be able to: • Understand the significance and essence of a wide range of soft skills. • Learn how to apply soft skills in a wide range of routine social and professional settings. 5 • Learn how to employ soft skills to improve interpersonal relationships • Learn how to employ soft skills to enhance employability and ensure workplace and career success.

Objectives: • An integrated course with modules catering to both beginners as well as advanced learners. • A comprehensive course that covers all the major aspects of soft skills training. • Carefully designed sections on each soft skill that offer detailed information as well as practical exercises. Teaching methodology is learner-

oriented, communicative and task-based. • Updated with latest inputs from expert and experienced soft skills trainers in the corporate arena. • Aims at enriching the individual's personality and ensuring personal, social and professional productivity and satisfaction. • The certificate is not only a valuable addition to the career profile but also qualifies one to impart vital soft skills training in different spheres.

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	ICT for Development	**Practical**	00
Subject Code	BTO23	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Human Resources Development and Organizational Behaviour	**Practical**	00
Subject Code	BTO24	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Introduction to Philosophical Thoughts	**Practical**	00
Subject Code	BTO25	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Comparative Study of Literature	**Practical**	00
Subject Code	BTO26	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Indian Music System	**Practical**	00
Subject Code	BTO27	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	History of Science and Engineering	**Practical**	00
Subject Code	BTO28	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Introduction to Arts and Aesthetics	**Practical**	00
Subject Code	BTO29	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Economic Policies in India	**Practical**	00
Subject Code	BTO30	**Credit**	03

School of Engineering and Information Technology
MATS University, Raipur (C.G.)
Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Principle of Management	**Practical**	00
Subject Code	BTO31	**Credit**	03

Course Objective:

1. To study strategic management in business operations.
2. To study management, quality management, marketing management, and project management.
3. Identify relevant challenges and application area of human resource management.

UNIT – I DEFINITION AND NATURE OF MANAGEMENT

Concept of Management, Management as Process, Management as Group , Management as Discipline, Nature and Characteristics of Management, Importance of Management , Management and Administration, Functions of Manager in the Information Age: Information Age, Roles of Manager, Science Theory and Practice of Management: Henry Fayol's Principles of Management, Managerial objectives and Role, Social Responsibilities of Business.

UNIT – II PLANNING AND DECISION MAKING

Concept and Nature of Planning, Significance of Planning, Steps in Planning, Organizing: Process and Significance of Organizing, Staffing: Systems Approach to Staffing, Directing: Concept and Nature of Direction, Controlling: Concept and Nature of Control, Process of Controlling.

UNIT – III MOTIVATION

Concept and Nature of Motivation, Need and Significance of Motivation, Theories of Motivation (Maslow's, Herzberg), Leadership: Definition and Nature of Leadership, Types of Leaders, Qualities of A Good Leader ,Styles of Leadership, Group and Team Working: Concept and Nature of Group, Stages of Team Development.

UNIT – IV MARKETING MANAGEMENT

Marketing Environment, Marketing and Selling, Marketing Mix, Advertising: Role and Functions Of Advertising, Sales Promotion: Merits, Demerits, Techniques, Financial Management: Introduction to Book Keeping and Financial Statements, Break Even Analysis.

UNIT – V PRODUCTIVITY AND TQM

Production Planning and Control, Emerging Trends in Management: Challenge of Globalization, WTO, Outsourcing: Nature and Scope of Outsourcing, Business Process Outsourcing, IT in Management.

Text Books:

1. Principles of Management, Ankur Chhabra, Sun India's publications
2. Principles of Management, Govindrajan M, &Natrajan, S, Prentice Hall of India, N. Delhi,2005
3. Organizational Behavior, Luthans Fred TMH, New Delhi

Reference Books:

1. Principles of Management and administration, Koontz and O'Donnell, Prentice Hall of India.
2. The Practice of Management, Peter F Drucker, Allied Publicatons.
3. Fundamental of Management, Robbins, S. P. 3rd edition, PHI, N. Delhi,2005
4. Management Concepts and Strategies, Chandan J. S, Vikas Publication, N. Delhi,2006
5. An Introduction to accountancy, S.N. Maheshwari, Vikas Publication, N Delhi.

Course Outcome:

After completion of the course study, students will be able to

1. Discuss and communicate the management evolution and how it will affect future managers.
2. Perform different kind of managerial tasks like planning, organizing, leading, and controlling.

3. Explain how organizations adapt to an uncertain environment and identify the techniques that managers use to influence and control the internal environment.

School of Engineering and Information Technology
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Syllabus for B. Tech. (All Branch)
(Scheme: 2020)

Semester	As per choice	**Lecture**	48
Branch	B. Tech. (All Branch)	**Tutorial**	00
Subject Name	Metro System and Engineering	**Practical**	00
Subject Code	BTO32	**Credit**	03

MATS UNIVERSITY, RAIPUR (CG)

Department of Computer Science and Engineering

School of Engineering and Information Technology

Syllabus
of
Professional Elective Subjects
B. Tech. Computer Science and Engineering
Scheme – 2020

PROFESSIONAL ELECTIVE

S. No.	Code	Subject	Periods per week			Scheme of marks		Total Credit
			L	T	P	ESE	IM	
1.	BTP201	Digital Signal Processing	3	-	-	70	30	3
2.	BTP202	Object Oriented Database Management System	3	-	-	70	30	3
3.	BTP203	Distributed Operating System	3	-	-	70	30	3
4.	BTP204	Multimedia and Virtual Reality	3	-	-	70	30	3
5.	BTP205	Software Testing	3	-	-	70	30	3
6.	BTP206	Network Programming	3	-	-	70	30	3
7.	BTP207	Cloud Computing	3	-	-	70	30	3
8.	BTP208	Robotics	3	-	-	70	30	3
9.	BTP209	IOT and Applications	3	-	-	70	30	3
10.	BTP210	Advanced Computer Architecture	3	-	-	70	30	3
11.	BTP211	Digital Image Processing	3	-	-	70	30	3
12.	BTP212	Bio-Informatics	3	-	-	70	30	3
13.	BTP213	Genetic Algorithm	3	-	-	70	30	3
14.	BTP214	Grid Computing	3	-	-	70	30	3
15.	BTP215	Big Data & Hadoop	3	-	-	70	30	3
16.	BTP216	Cryptography	3	-	-	70	30	3
17.	BTP217	Network Security CMC	3	-	-	70	30	3
18.	BTP218	Advanced Operating System	3	-	-	70	30	3

19.	BTP219	Web Technology and its applications	3	-	-	70	30	3
20.	BTP220	Advanced JAVA and J2EE	3	-	-	70	30	3
21.	BTP221	Network Management	3	-	-	70	30	3
22.	BTP222	Natural Language Processing	3	-	-	70	30	3
23.	BTP223	Embedded Systems	3	-	-	70	30	3
24.	BTP224	Data Mining & Warehousing	3	-	-	70	30	3
25.	BTP225	Communication Network	3	-	-	70	30	3
26.	BTP226	Advance Computer Networks	3	-	-	70	30	3
27.	BTP227	Computer Vision	3	-	-	70	30	3
28.	BTP228	Artificial Intelligence & Expert System	3	-	-	70	30	3
29.	BTP229	Cyber Crime and Computer Forensics	3	-	-	70	30	3
30.	BTP230	Object Oriented System Design	3	-	-	70	30	3

Department of Computer Science & Engineering
MATS University, Raipur (C.G.)
llabus for B. Tech. Computer Science and Engineering (Scheme: 2(

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Digital Signal Processing	**Practical**	00
Subject Code	BTP201	**Credit**	03

Course Objective:

1. To introduce the fundamental concepts and applications of digital signal processing.
2. To study analysis and synthesis algorithms and systems that process discrete time signals, with emphasis on realization and implementation.

UNIT – I DISCRETE-TIME SIGNALS

Signal Classifications, Frequency Domain Representation, Time Domain Representation, and Representation of sequences by Fourier transform, Properties of Fourier transform, Discrete Time Random Signals, Energy and Power Theorems.

UNIT – II SAMPLING OF TIME SIGNALS

Sampling theorem and its application, Frequency Domain Representation of Sampling and Reconstruction of Band Limited Signal from its Samples, Discrete Time Processing of Continuous Time Signals, changing the sampling rate using Discrete Time Processing.

UNIT – III Z-TRANSFORM

Introduction: Properties of the Region of Convergence, Properties of the Z-Transform, Inversion of the Z-Transform, Applications of Z-Transform.

UNIT – IV BASICS OF DIGITAL FILTERS

Classification, Properties, Time Invariant system, Finite Impulse Response (FIR) system, Infinite Impulse Response (IIR) system, fundamentals of digital filtering, various types of digital filters, design techniques of digital filters: Window technique for FIR, Bi-linear transformation and backward difference methods for IIR filter design, Analysis of finite word length effects in DSP, DSP algorithm implementation consideration, Applications of DSP.

UNIT – V DISCRETE AND FAST FOURIER TRANSFORM

DFT and FFT: Discrete Fourier transforms properties of DFT, Circular convolution, Linear convolution using DFT, Fast Fourier transform: Radix 2 FFT algorithm, Decimation in time, Decimation in frequency, Bit reversal.

Text Books:

1. Digital Signal Processing, Proakis and Manolakis, Pearson.
2. Digital Signal Processing, S. Salivahanan, A. Vallavaraj and C. Gnanapriya, TMH.

Reference Books:

1. Digital Signal Processing, Alon V. Oppenhelm, Ronald W. Schafer, PHI.
2. Digital Signal processing ,Sanjit K. Mitra, TMH.

Course Outcome:

After completion of the course study, students will be able to

1. Describe and analyze discrete time signals in the time domain and frequency domain.
2. Apply digital signal processing techniques to analyze & design discrete time signals and systems.
3. Design and apply digital filters

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Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Object Oriented Database Management System	**Practical**	00
Subject Code	BTP202	**Credit**	03

Course Objective:

1. To discuss the requirements for advanced database features in database applications.
2. To study the concept of Parallel and Distributed Database.
3. To understand the enhanced data models for advanced applications of DBMS.
4. To examine the concepts of various emerging database technologies.

UNIT – I THE EXTENDED ENTITY- RELATIONSHIP MODEL AND OBJECT MODEL

The ER Model Revisited, Motivation for Complex Data Types, User Defined Abstract Data Types and Structured Types, Subclasses, Super Classes, Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization And Generalization, Relationship, Types of degree higher than Two.

UNIT – II OBJECT ORIENTED DATABASES

Overview of Object-Oriented Concepts, Object Identity, Object Structure, and Type Constructors, Encapsulation of Operations, Methods, and Persistence, Type Hierarchies and Inheritance, Type extents and Queries, Complex objects; Database schema design for OODBMS; OQL, Persistent programming languages; OODBMS architecture and Storage Issues; Transactions and Concurrency Control, Example of ODBMS.

UNIT – III OBJECT RELATIONAL AND EXTENDED RELATIONAL DATABASES

Database Design for an ORDBMS – Nested Relations and Collections; Storage and Access methods, Query Processing and Optimization; An overview of SQL3, Implementation issues for extended type; Systems Comparison of RDBMS, OODBMS, and ORDBMS.

UNIT – IV PARALLEL AND DISTRIBUTED DATABASE AND CLIENT SERVER ARCHITECTURE

Architectures for Parallel Databases, Parallel Query Evaluation; Parallelizing Individual Operations, Sorting, Joins; Distributed Database Concepts, Data Fragmentation, Replication, and Allocation Techniques for Distributed Database Design; Query Processing in Distributed Databases; Concurrency Control and Recovery in Distributed Databases, An Overview of Client-Server Architecture.

UNIT – V DATABASES ON THE WEB AND SEMI STRUCTURED DATA

Web Interfaces to the Web, Overview of XML; Structure of XML Data, Document Schema, Querying XML Data; Storage of XML Data, XML Applications; Semi Structured Data Model, Implementation Issues, Indexes for Text Data, Enhanced Data Models for Advanced Applications: Active Database Concepts, Temporal Database Concepts, Spatial Databases, Concepts And Architecture; Deductive Databases And Query Processing; Mobile Databases, Geographic Information Systems.

Text Books:

1. Object Oriented Interfaces and Databases, Rajesh Narang, Prentice Hall of India.
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw-Hill.

Reference Books:

1. Fundamentals of Database Systems, Elmasri and Navathe, Pearson Education.
2. Database System Concepts, Korth, Silberchatz, Sudarshan, McGraw-Hill.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the needs and concepts of object-oriented database, spatial database, web database, data warehousing and data mining.
2. Analyze, design and evaluate the construct of various advanced databases topics such as Object Oriented, Object Relational, Semi Structured, Unstructured and Distributed Databases.
3. Implement practical solutions to complex database problems using OO/OR database, spatial database, data warehousing and data mining approaches.

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Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Distributed Operating System	**Practical**	00
Subject Code	BTP203	**Credit**	03

Course Objective:

1. To give basics of Distributed Operating System.
2. To study the communication in distributed system.
3. To learn about inter-process communication in distributed environment.
4. To have concepts of distributed shared memory and distributed file systems.

UNIT – I INTRODUCTION

Distributed Operating System: Concepts and Definition, Goals, Examples of Distributed Operating Systems, Hardware Concepts, Software Concepts, Architectural Model of Distributed System, and Design Issues.

UNIT – II COMMUNICATION IN DISTRIBUTED SYSTEM

Communication in Distributed Systems, Computer Network & Layered Protocols, Message Passing and Related Issues, Synchronization, Client Server Model & its Implementation, Remote Procedure call, Group communication, Case Studies: SUN RPC.

UNIT – III PROCESS MANAGEMENT & SYNCHRONIZATION

Process and Processors in Distributed System Threads, System Models, Processors Allocation, Scheduling in Distributed System, Fault Tolerance, Real Time Distributed System, Synchronization in Distributed System, Clock Synchronization, Mutual Exclusion, Election algorithms, Atomic transactions, Deadlocks in Distributed Systems.

UNIT – IV DISTRIBUTED SHARED MEMORY

Introduction, General Architecture of DSM Systems, Design and Implementation Issues of DSM, Granularity, Structure of Shared Memory Space, Consistency Models, Replacement Strategy, and Thrashing.

UNIT – V DISTRIBUTED FILE SYSTEMS

Distributed File Systems, Distributed File System Design, Distributed File System Implementation, Trends in Distributed File System.

Text Books:

1. Distributed Operating Systems, A. S. Tanenbaum, Pearson.
2. Distributed Operating Systems Concepts and Design, Pradeep K. Sinha, PHI.

Reference Books:

1. Advanced Concepts in Operating Systems, M. Singhal and N. G. Shivaratna, McGraw-Hill.
2. Distributed Systems: Concepts ad Design, George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair, Pearson Education.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the concepts of Distributed System (Hardware, Software, and Operating System).
2. Summarize the major security issues associated with distributed systems along with the system security techniques.
3. Apply standard design principles in the construction of Distributed Operating Systems.

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Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Multimedia and Virtual Reality	**Practical**	00
Subject Code	BTP204	**Credit**	03

Course Objective:

1. To study the fundamental concept of multimedia and virtual reality.
2. To study issues and problems in the representation, manipulation, and delivery of multimedia content.
3. To understand the concepts of multimedia components.
4. To study application areas of Multimedia & Virtual Reality System.

UNIT –I INTRODUCTION

Concept of Multimedia, Media & Data Stream, Properties of Multimedia System, Data Stream Characteristics of Continuous Media, Multimedia Applications, Hardware and Software Requirements, Multimedia Products & its Evolution.

UNIT – II COMPONENTS OF MULTIMEDIA

Text, Basic Sound Concepts, MIDI, Speech, Basic Concept of Images, Graphics Format, Overview of Image Processing, Basic Concepts of Video & Animation, Conventional System, Transmission, Enhanced System, High Definition System, Computer Based Animation, Design & Authoring Tools, Categories of Authority Tools, Types of products.

UNIT – III DATA COMPRESSION

Coding Requirement, Source, Entropy, Hybrid Coding, JPEG, MPEG, Text Compression using Static Huffmann Technique, Dynamic Huffmann Technique, and Statistical Coding Techniques.

UNIT – IV OPTICAL STORAGE MEDIA

Videodisk and other WORMS, Compact Disk Digital Audio, Advantage of CD-DA Frames tracks blocks of CD-DA, CD-ROM, CD-Rom based developments, Principles of CDWO, Prospects of CD Technologies.

UNIT – V VIRTUAL REALITY

Introduction, Virtual Reality Systems, Related Technologies: Tele-operation & Augmented Reality System, VRML Programming, Domain Dependent Application like Medical, Visualization Visibility Computation Time Critical Rendering.

Text Books:

1. Multimedia System Design, Andleigh and Thakarar , PHI
2. Multimedia Technology & Application, David Hillman, Galgotia Publications.

Reference Books:

1. Multimedia Computing Communication and Application, Steinmetz, Pearson Edn.
2. Virtual Reality Systems, John Vince, Pearson Education.
3. Fundamentals of Computer Graphics and Multimedia, D.P. Mukherjee, PHI

Course Outcome:

After completion of the course study, students will be able to

1. Explain fundamental video, audio, image, text processing techniques.
2. Perform text compression, audio compression, image compression, and video compression.
3. Explain the basic techniques in designing video transmission systems.
4. Explain the technologies related to virtual reality and application of virtual reality system.
5. Do VRML programming.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Software Testing	**Practical**	00
Subject Code	BTP205	**Credit**	03

Course Objective:

1. To study software testing objectives, process, criteria, strategies, and methods.
2. To study various software testing issues and solutions in software unit, integration, regression, and system testing.
3. To learn planning of a test project, design test cases, conduction of testing operations, generation of a test report.
4. To understand automation testing process, its problems and solutions.
5. To study about software quality assurance.

UNIT – I INTRODUCTION

Quality Revolution, Software Quality, Role of Testing, Objectives of Testing, Concept of Complete Testing, Central Issue of Testing, Sources of Information for Test Case selection, Test Planning and Design, Monitoring and Measuring Test Execution, Test Tools and Automation, Test Team Organization and Management.

UNIT – II TESTING THEORY

Basic Concepts of Testing Theory, Theory of Good Enough and Gerhart, Theory of Weyuker and Ostrand, Theory of Gourlay, Adequacy of Testing, Limitations of Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Debugging.

UNIT – IIII CONTROL FLOW AND DATA FLOW TESTING

Outline of Control Flow Testing, Control Flow Graph, Paths in Control Flow Graphs, Path Selection Criteria, Data Flow Testing criteria, Comparison of Data Flow and Test Selection Criteria, Domain Error, Testing of Domain Errors.

UNIT – IV SYSTEM DESIGN AND CONCEPTS

System Test design, Test design Factors, Requirement Identification, Test Objective Identification, Structure of a System Test Plan, Assumptions, Test Approach, Test Suite Structure, Types of Acceptance Testing.

UNIT – V SOFTWARE QUALITY

Five Views of Software Quality, Quality Control, Quality assurance, Cost of quality, Software Quality Assurance, SQA Plan, ISO 9000, Capability Maturity Model, McCall's Quality Factors.

Text Books:

1. Software Testing and Quality Assurance, Kshirasagar Naik, John Wiley & Sons.
2. Effective Methods for Software Testing, William Perry, John Wiley & Sons.

Reference Books:

1. Testing Computer Software, CemKaner and Jack Falk, Wiley.
2. Software Testing Ron Patton, SAMS Publications.

Course Outcome:

After completion of the course study, students will be able to

1. Design and conduct software testing for a software project.
2. Identify software testing problems, and solve the problems by designing and selecting software test models, criteria, strategies, and relevant methods.
3. Use software testing methods and modern software testing tools for their software projects.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Network Programming	**Practical**	00
Subject Code	BTP206	**Credit**	03

Course Objective:

1. To understand network management protocols and basics of TCP &UDP sockets.
2. To learn sockets and socket programming.
3. To learn client server programming.
4. To give idea of developing robust &high performance scalable network applications.

UNIT- I NETWORKING & TCP/IP

Communication Protocols, Network Architecture, UUCP, XNS, IPX/SPX For LANS, TCP & IP Headers, IPv4 & IPv6 Address Structure, Programming Applications: Time & Date Routines, Internet Protocols: Application Layer, Transport Layer, Network Layer, Data Link Layer Protocols, Chat, Email, Web Server Working Method & Programming.

UNIT-II SOCKET PROGRAMMING

Creating Sockets, POSIX Data Type, Socket Addresses, Assigning Address to a Socket, Java Socket Programming, Thread Programming, Berkeley Sockets: Overview, Socket Address Structures, Byte Manipulation & Address Conversion Functions, Elementary Socket System Calls–Socket, Connect, Bind, Listen, Accept, Fork, Exec, Close, TCP Ports (Ephemeral, Reserved), Berkeley Sockets: I/O Asynchronous & Multiplexing Models, Select & Poll Functions, Signal &Fcntl Functions, Socket Implementation (Client & Server Programs), UNIX Domain Protocols.

UNIT- III APIs & WINSOCK PROGRAMMING

Windows Socket API, Window Socket & Blocking I/O Model, Blocking Sockets, Blocking Functions, Timeouts for Blocking I/O, API Overview, Different APIs & their Programming Technique, DLL & New API's, DLL Issues, Java Beans.

UNIT- IV WEB PROGRAMMING & SECURITY

Java Network Programming, Packages, RMI, Overview Of Java Script, WAP Architecture & WAP Services, Web Databases, Component Technology, CORBA Concept, CORBA Architecture, CGI Programming, Firewall & Security Technique, Cryptography, Digital Signature.

UNIT- V CLIENT SERVER PROGRAMMING

Client Side Programming: Creating Sockets, Implementing Generic Network Client, Parsing Data Using String Tokenizer, Retrieving File from an http server, Retrieving Web Documents by using the url class. Server Side Programming: Steps for Creating Server, Accepting Connection from Browsers, Creating an http server, Adding Multithreading to an http server.

Text Books:

1. Steven.W.R: UNIX Network Programming, PHI (VOL I& II).
2. Window Socket Programming by Bobb Quinn and Dave Schutes.

Reference Books:

1. Davis.R.: Windows Network Programming, Addison Wesley.
2. NETWORK PROGRAMMING With Windows Socket By Baner .P., PH New Jersey.

Course Outcome:

After completion of the course study, students will be

1. Familiar with protocols, network interfaces, and Design/performance issues of a network.
2. Familiar with basics of Socket and Socket programming.
3. Familiar with network tools and network programming.
4. Familiar with client server programming.

Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Cloud Computing	**Practical**	00
Subject Code	BTP207	**Credit**	03

Course Objective:

1. To give the idea of cloud computing.
2. To provide students a sound foundation of the Cloud Computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.

UNIT – I INTRODUCTION TO CLOUD COMPUTING

The Emergence of Cloud Computing, Cloud-Based Service Offerings, Benefits of using a Cloud Model, Key Characteristics of Cloud Computing, Understanding- Public & Private Cloud Environments, The Evolution of Cloud Computing – Hardware & Internet Software Evolution.

UNIT – II CLOUD SECURITY CHALLENGES

Software-as-a-Service, Security Management People, Security Governance, Security Portfolio Management, Security Architecture Design, Identity Access Management (IAM), Data Security.

UNIT – III CLOUD AS

Communication-as-a-Service (CAAS), Infrastructure-as-a-Service (IAAS), Monitoring-as-a-Service (MAAS), Platform-as-a-Service (PAAS), Software-as-a-Service (SAAS).

UNIT – IV THE MSP MODEL Evolution from the MSP Model to Cloud Computing and Software-as-a-Service, The Cloud Data Center, Basic Approach to a Data Center-Based SOA, Open Source Software, Service-Oriented Architectures as a Step Toward Cloud Computing.

UNIT – V VIRTUALIZATION CONCEPTS & SMARTPHONE

Virtualization Benefits, Hardware Virtualization, Software Virtualization, Memory Virtualization, Storage Virtualization, Data Virtualization, Network Virtualization, Virtualization Security Recommendations, Introduction To Various Virtualization OS Vmware , KVM, Virtual Machine Security, Smartphone, Mobile Operating Systems For Smartphone's (Iphone, Windows Mobile), Google(Android) Blackberry, Ubuntu Mobile Internet.

Text Book:

1. Cloud Computing: A Practical Approach, Toby Velte, Anthony Vote and Robert Elsenpeter, McGraw Hill.

Reference Books:

1. Cloud Application Architectures: Building Applications and Infrastructures in the Cloud, George Reese, O'Reilly Media, 2003.
2. "Cloud Security and Privacy: An Enterprise Perspective on *Ris*ks and Compliance, Tim Matherm, SubraKumaraswamy and ShahedLatif, O'Reilly Media, 2005.

Course Outcome:

After completion of the course study, students will be to

1. Understand the key dimensions of the challenges of cloud computing.
2. Students will be able to perform cloud oriented analysis.
3. Assess economics, financial, and technological implications for selecting cloud computing for an organization.
4. Design the composition of a cloud services.
5. Design application services for technology abstraction.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Robotics	**Practical**	00
Subject Code	BTP208	**Credit**	03

Course Objective:

1. To study microcontroller operations for robotics.
2. To study implementation of interfaces in a microcontroller.
3. To study Microchip PIC micro PIC16F627 erasing and reprogramming,
4. To learn about sensors, connectors, and peripheral wiring to a microcontroller.
5. To design a robot.

UNIT – I MICROCONTROLLER IN ROBOTS

Support components - Memory and Device Programming, Interrupts, Built in Peripherals, Interfacing the Controller to Robots.

UNIT – II SOFTWARE DEVELOPMENT

Source Files, Object Files, Libraries, Linkers and Hex Files, Assemblers, Interpreters, Compilers, Simulators and Emulators, Integrated Development Environments.

UNIT – III THE MICROCHIP & MICROCONTROLLER

Different PIC Micro MCU Devices and Features, Application Development Tools, Basic Circuit Requirements, PIC16F627, EL Cheapo PIC Micro Programmer Circuit.

UNIT – IV THE MICROCONTROLLER CONNECTIONS

Hardware Interface Sequencing, Robot C Programming Template, Protyping with the PIC micro Microcontroller, Inter-Computer Communications, RS232, HyperTerminal RS 232 Terminal Emulator, RS 232 Interface Example between PC and PIC Micro MCU, Bidirectional Synchronous Interfaces, Output Devices, LEDS, PWM Power Level Control, Sensors, Whiskers for Physical Object Detection, IR Collision Detection Sensors, IR Remote Controls, Ultrasonic Distance Measurement, Light Level Sensors, Sound Sensors, Odometry for Motor Control and Navigation, Radio control servos.

UNIT – V BRINGING ROBOTS TO LIFE

Real Time Operating System (RTOS), Example Application Running in an RTOS, State Machines, Randomly Moving a Robot Application with IR Remote Control, Behavioral programming, Neural Networks and Artificial Intelligence.

Text Book:

1. Programming Robot Controllers, Myke Predko, McGrawHill, 1st Edition, 2003.

Reference Books:

1. Microprocessor Based Design: A comprehensive Guide to Effective Hardware Design, Michael Slater, Prentice Hall, 1989.
2. Programming and customizing the 8051- micro-controller, Myke Predko, Tata McGraw-Hill, New Delhi, 2000.
3. The 8051 micro-controller architecture, programming and applications, Kenneth J. Ayala, Penram International publishers, Mumbai, 1996.
4. Introduction to AI Robotics, Murphy Robin R, MIT Press, 2000.
5. Introduction to Autonomous mobile Robots, Siegwart R and Nourbakhsh I.R, Prentice Hall India, 2005.

Course Outcome:

After completion of the course study, students will be to

1. Explain microcontroller operations of Robotics.
2. Explain sensors, connectors, and peripheral wiring to a microcontroller.
3. Implement basic microprogramming required for robot design.

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Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	IOT and Applications	**Practical**	00
Subject Code	BTP209	**Credit**	03

Course Objective:

1. To introduce IoT basics.
2. To understand IoT market perspective.
3. To learn data and knowledge management and use of devices in IoT technology.
4. To understand state of the art – IoT architecture.
5. To get idea about real world IoT applications and design constraints.

UNIT – I IOT & WEB TECHNOLOGY

The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.

UNIT – II M2M to IOT

A Basic 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.

UNIT – III IOT ARCHITECTURE

State of the Art – Introduction, Architecture Reference Model- Introduction, Reference Model and Architecture, IoT Reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT – IV IOT APPLICATIONS FOR VALUE CREATIONS

Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.

UNIT – V INTERNET OF THINGS PRIVACY, SECURITY AND GOVERNANCE

Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security.

Text Books:

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

Reference Books:

1. Rethinking the Internet of Things: A Scalable Approach to Connecting Everything, Francis daCosta, 1st Edition, Apress Publications, 2013.
2. Getting Started with the Internet of Things, Cuno Pfister, O"Reilly Media, 2011.

Course Outcome:

After completion of the course study, students will be to

1. Understand the vision of IoT from a global context.
2. Determine the market perspective of IoT.
3. Use devices, gateways and data management in IoT.
4. Build state of the art architecture in IoT.
5. Develop IoT applications with real world design constraints.

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Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Advance Computer Architecture	**Practical**	00
Subject Code	BTP210	**Credit**	03

Course Objective:

1. To endow with in detail coverage of current and budding trends in computer architectures, focusingon performance and the hardware/software interface.
2. To analyze basic issues in architecture design and their impact on application performance.

UNIT – I FUNDAMENTALS OF COMPUTER DESIGN AND PIPELINING

Fundamentals of Computer Design, Measuring and reporting performance, Quantitative principles of computer design, Instruction set principles, Classifying ISA, Design issues, Pipelining, Basic concepts, Hazards, Implementation,Multicycle operations.

UNIT – II INSTRUCTION LEVEL PARALLELISM WITH DYNAMIC APPROACHES

Concepts, Dynamic Scheduling, Dynamic hardware prediction, Multiple issue, Hardware based speculation, Limitationsof ILP, Case studies.

UNIT – III INSTRUCTION LEVEL PARALLELISM WITH SOFTWARE APPROACHES

Compiler techniques for exposing ILP, Static branch prediction, VLIW, Advanced compiler support, Hardware support for exposing more parallelism, Hardware versus software speculation mechanisms, Case studies.

UNIT – IV MULTIPROCESSORS AND MULTICORE ARCHITECTURES

Symmetric and distributed shared memory architectures, Performance issues, Synchronization issues, Models of memory consistency, Software and hardware multithreading, SMT and CMP architectures, Design issues, Case studies.**UNIT – V MEMORY AND I/O**

Cache performance, Reducing cache miss penalty and miss rate, Reducing hit time, Main memory and performance, Memory technology, Types of storage devices, Buses, RAID –Reliability, availability and dependability, I/O performance measures, Designing an I/O system.

Text/Reference Books:

1. Computer Architecture, A Quantitative Aapproach, John L. Hennessey and David A. Patterson,Morgan Kaufmann / Elsevier, 4th Edition, 2007.
2. Parallel Computing Architecture: A Hardware/ Software Approach, David E. Culler, Jaswinder PalSingh, Morgan Kaufmann / Elsevier, 1997.
3. Computer Organization and Architecture–Designing for Performance, William Stallings, PearsonEducation, Seventh Edition, 2006.
4. Computer Architecture, Behrooz Parhami, Oxford University Press, 2006.

Course Outcome:

After completion of the course study, students will be able

1. Confer the organization of computer-based systems and how a range of design choices are inclinedby applications.
2. Differentiate diverse processor architectures and system-level design processes.
3. Recognize the components and operation of a memory hierarchy and the series of performance issuesinfluencing its design.
4. Recognize the organization and operation of modern generation parallel computer systems, includingmultiprocessor and multi core systems.
5. Recognize the ethics of I/O in computer systems, counting feasible mechanisms for I/O andsecondary storage organization.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Digital Image Processing	**Practical**	00
Subject Code	BTP211	**Credit**	03

Course Objectives:

1. To learn the basic theory and algorithms that is widely used in digital image processing.
2. To give exposure to the students about current technologies and issues that is specific to image processing systems.
3. To develop idea of using computers to process images.
4. To develop critical thinking about shortcomings of the state of the art in image processing.

UNIT – I INTRODUCTION

Image Formation Model, Spatial & Gray Level Resolution, Image Enhancement In Special Domain: Piecewise Transformation Functions, Histogram Equalization, Histogram Specification, Image Averaging, Spatial Filter, Smoothing and Sharpening, Laplacian Filter, Canny Edge Detector.

UNIT – II IMAGE ENHANCEMENT IN FREQUENCY DOMAIN & IMAGE SEGMENTATION

2D Discrete Fourier Transform & its Inverse, Filtering in Frequency Domain, Ideal & Gaussian Low Pass Filters, High Pass Filtering, FFT, Line Detection, Edge Detection, Edge Linking & Boundary Detection, Thresholding, Region Based Segmentation.

UNIT – III MORPHOLOGICAL IMAGE PROCESSING

Logic Operations Involving Binary Image, Dilation & Erosion, Opening & Closing, Applications to Boundary Extraction, Region Filling, Connected Component Extraction.

UNIT – IV IMAGE COMPRESSION

Coding Redundancy, Huffman Coding, LZW Coding, Run Length Coding, Lossy Compression, DCT, JPEG, MPEG, and Video Compression.

UNIT – V IMAGE REPRESENTATION & 3D

Boundary Descriptors, Shape Numbers, Texture, Projective Geometry, Correlation Based And Feature Based Stereo Correspondence, Shape From Motion, Optical Flow.

Text Books:

1. Ganzalez and Woods, Digital Image Processing, Pearson education.
2. Sonka and Brooks, Image Processing, TSP ltd,

Reference Books:

1. Jain and Rangachar, Machine Vision, MGH.
2. Schalkoff, Digital Image Processing, John Wiley and sons.

Course Outcome:

After completion of the course study, students will be able to

1. Describe, analyze and reason about how digital images are represented, manipulated, encoded and processed, with emphasis on algorithm design, implementation and performance evaluation.
2. Apply principles and techniques of digital image processing in applications related to digital imaging system design and analysis.
3. Analyze and implement image processing algorithms.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Bio-Informatics	**Practical**	00
Subject Code	BTP212	**Credit**	03

Course Objectives:

1. To provide students with a practical and hands-on experience with common bioinformatics tools and databases.
2. To train students in the basic theory and application of programs used for database searching, protein and DNA sequence analysis, prediction of protein function.

UNIT – I INTRODUCTION

Bioinformatics: Introduction, Application, Data Bases and Data Management, Central Dogma; information Search and Data Retrieval, Genome Analysis and Gene Mapping- Analysis, Mapping, Human Genome Project (HGP).

UNIT – II SEQUENCE ALIGNMENT METHODS

Alignment of Pairs and Sequences, Alignment of Multiple Sequences and Phylogenetic Analysis, Tools for similarity Search and Sequence Alignment- FASTA BLAST.

UNIT – III IMPLEMENTATION METHODS

Profiles and Hidden Marcov Models (Hmms), Gene Identification and Prediction-Basics, Pattern Recognition, Methods and Tools, Gene Expression and Micro Arrays.

UNIT – IV PROTEIN CLASSIFICATION AND STRUCTURE VISUALIZATION

Protein Classification and Structure Visualization; Protein Structure Prediction; Proteomics, Computational Methods: Analysis of Pathways, Metabolic Network Properties, Metabolic Control Analysis, Stimulation of Cellular Activities, Biological Markup Languages.

UNIT – V DRUG DISCOVERY

Drug Discovery: Introduction, Technology and Strategies, Cell Cycle, G-protein, Coupled, Receptors. Computer Aided Drug Design: Introduction, Drug Design Approaches, Designing methods, ADME-Tox Property Prediction.

Text Books:

1. Bioinformatics- Concepts Skills & Applications, S.C. Rastogy, 2nd Edition, Prentice Hall of India.
2. Bioinformatics, V. R Srinivas, Prentice Hall of India

Reference Books:

1. Bioinformatic Computing, Bergeron, MIT Press.
2. Evolutionary Computation in Bioinformatics, Gary B. Fogel, David W. Corne (Editors), 2002.
3. Introduction to Bioinformatics, Arthur M. Lesk, 2002, Oxford University Press.
4. Current Topics in Computational Molecular Biology (Computational Molecular Biology), Tao Jiang, Ying Xu, Michael Zhang (Editors), 2002, MIT Press.

Course Outcome:

After completion of the course study, students will be able to

1. Access, evaluate, and interpret bioinformatics/public health data.
2. Use informatics methods and resources as strategic tools to promote bioinformatics.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Genetic Algorithm	**Practical**	00
Subject Code	BTP213	**Credit**	03

Course Objectives:

1. To introduce basics of genetic algorithms.
2. To familiarize with Mathematical foundations for Genetic algorithm, operators
3. To study the Applications of Genetic Algorithms.

UNIT – I INTRODUCTION

Introduction and Overview, Pervasiveness of the Problem of Program Induction, Introduction to Genetic Algorithms, Representation Problem for Genetic Algorithms, Overview of Genetic Programming, Detailed Description of Genetic Programming, Introductory Examples of Genetic Programming.

UNIT – II IMPLEMENTATION ASPECTS

Computer Implementation, Data Structure, Reproduction, Crossover, Mutation, Mapping Objective Function to Fitness Form, Fitness Scaling, Coding, Discritization, Constraints.

UNIT – III GENETIC ALGORITHM EVOLUTION

Amount of Processing required solving a Problem, Non Randomness of Genetic Programming, Symbolic Regression Q Error-Driven Evolution, Control Q Cost-Driven Evolution, Evolution of Emergent Behavior, Evolution of Subsumption, Entropy-Driven Evolution, Evolution of Strategy, co-Evolution.

UNIT – IV APPLICATIONS

Risk of Genetic Algorithm, Genetic Algorithm Application of Historical Interest, Function Optimization, Improvement in Basic Techniques, Current Applications of Genetic Algorithms.

UNIT – V COMPARATIVE ANALYSIS

Parallelization of Genetic Programming, Ruggedness of Genetic Programming, Extraneous Variables and Functions, Operational Issues, Review of Genetic Programming Comparison with Other Paradigms.

Text Book:

1. Genetic algorithm in search optimization and machine learning", David E Goldberg.

Reference Book:

1. "An Introduction to genetic Algorithms ", Milanie Mitchell MIT Press

Course Outcome:

After completion of the course study, students will be able to

1. Implement genetic algorithm functions and operators.
2. Develop genetic algorithm applications.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Grid Computing	**Practical**	00
Subject Code	BTP214	**Credit**	03

Course Objectives:

1. To understand the need for and evolution of Grids in the context of processor, and data intensive applications.
2. To be familiar with the fundamental components of Grid environments, such as authentication, authorization, resource access, and resource discovery.

UNIT – I CONCEPTS AND ARCHITECTURE

Introduction: Parallel and Distributed Computing, Cluster Computing, Grid Computing Anatomy and Physiology of Grid, Web and Grid Services, Grid Standards – OGSA WSRF- Trends, Challenges and Applications.

UNIT – II GRID MONITORING

Grid Monitoring: Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems- R-GMA – Grid ICE – MDS Service Level Agreements (SLAs) - Other Monitoring Systems Ganglia, Grid Mon, Hawkeye and Network Weather Service.

UNIT – III GRID SECURITY AND RESOURCE MANAGEMENT

Grid Security: A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management, Gridway and Gridbus Broker-principles of Local Schedulers- Overview of Condor, SGE, PBS, LSF Grid Scheduling with QoS.

UNIT – IV DATA MANAGEMENT AND GRID PORTALS

Data Management: Categories and Origins of Structured Data, Data Management Challenges, Architectural Approaches, Collective Data Management Services, Federation Services, Grid Portals, Generations of Grid Portals.

UNIT – V GRID MIDDLEWARE

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

Text Books:

1. The Grid 2: Blueprint for a New Computing Infrastructure, Ian Foster, Carl Kesselman, Elsevier Series, 2004.
2. High Performance Computing: Paradigm and Infrastructure, Parvin Asadzadeh, Rajkumar Buyya, Chun Ling Kei, Deepa Nayar, and Srikumar Venugopal, Wiley Press.

Reference Books:

1. Grid Computing for Developers, Vladimir Silva, Charles River Media, January 2006.
2. Grid Computing: Making The Global Infrastructure a Reality, Fran Berman , Geoffrey Fox, Anthony J.G. Hey, Wiley, 2003.
3. The Grid: Core Technologies, MaozhenLi , Mark Baker, Wiley, 2005.
4. Globus Toolkit 4 : Programming Java Services , The Elsevier Series in Grid Computing, Borja Sotomayor , Lisa Childers, Morgan Kaufmann, 2005.

Course Outcome:

After completion of the course study, students will be able to

1. Justify the applicability, or non-applicability of Grid technologies for a specific application.

2. Evaluate enabling technologies such as high-speed links and storage area networks for building computer grids.
3. Design a grid computing application in one of the key application areas e.g. Computer Animation, EResearch.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Big Data and Hadoop	**Practical**	00
Subject Code	BTP215	**Credit**	03

Course Objectives:

1. To understand the basics of Big Data Analytics and Hadoop.
2. To analyze the big data using intelligent techniques.
3. To develop various search methods and visualization techniques.
4. To explore various techniques for mining data streams.
5. To understand the application area of Big Data.

UNIT – I CONCEPTS OF BIG DATA

Concept of Big Data Platform, Evolution and Challenges of Conventional Systems, Intelligent Data Analysis, Nature of Data, Analytic Processes and Tools, Analysis vs. Reporting, Modern Data Analytic Tools, Applications of Big Data.

UNIT – II MINING DATA STREAMS

Introduction to Streams Concepts, Characteristics, 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, Role of High Speed Mass Storage.

UNIT – III HADOOP: History of Hadoop, The Hadoop Distributed File System, Components of Hadoop, Analyzing the Data with Hadoop, Scaling Out, Hadoop Streaming, Map Reduction Working, Anatomy of a Map Reduce Job Run Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

UNIT – IV HADOOP ENVIRONMENT

Setting up a Hadoop Cluster, Cluster Specification, Cluster Setup and Installation, Hadoop Configuration, Security in Hadoop, Administering Hadoop, HDFS, Monitoring, Maintenance-Hadoop, Benchmarks Hadoop in the Cloud.

UNIT – V FRAMEWORKS

Applications on Big Data Using Pig and Hive, Data processing operators in Pig, Hive services, HiveQL Querying Data in Hive, Fundamentals of H.

Text Books:

1. Intelligent Data Analysis, Michael Berthold, David J. Hand, Springer, 2007.
2. Hadoop: The Definitive Guide, Tom White, O'reilly Media, 2012.
3. Mining of Massive Datasets, Anand Rajaraman and Jeffrey David Ullman, Cambridge University Press, 2012.

Course Outcomes:

After completion of the course study, students will be able to

1. Have idea about intelligent applications.
2. Use knowledge of vast data.
3. Know different big data modelling techniques.
4. Work in Hadoop environment.

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Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Cryptography	**Practical**	00
Subject Code	BTP216	**Credit**	03

Course Objective:

• To understand the principles and practices of cryptography.

• To understand the practical applications that have been implemented and are in use to provide network security.

UNIT I: Overview

Security trends, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security. **Symmetric (Private Key) Ciphers:** Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. **Block Ciphers and the Data Encryption Standard:** Block Cipher Principles, The Data Encryption Standard (DES), The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles.

UNIT II: Symmetric Ciphers (continued)

Basic Concepts in Number Theory and Finite Fields: Groups, Rings, and Fields, Modular Arithmetic, the Euclidian algorithm, Finite Fields of the Form GF(p), Polynomial Arithmetic, Finite Fields of the Form GF(2n). **Advanced Encryption Standard:** The Origins AES, Evaluation criteria for AES, the AES Cipher. **Stream cipher:** Stream ciphers and RC4**.**

UNIT III: Asymmetric (Public Key) Ciphers

Introduction to Number Theory: Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms. **Public-Key Cryptography and RSA:** Principles of Public-Key Cryptosystems. Key Management-Other Public-Key Cryptosystems: Key management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

UNIT IV: Asymmetric Ciphers (continued)

Message Authentication and Hash functions: Message authentication requirements, authentication functions, Message authentication codes, Hash functions, Security of Hash functions and MAC, SHA, HMAC, CMAC.

UNIT V: Confidentiality using symmetric encryption

Placement of encryption function, traffic confidentiality, key distribution. **Digital Signatures and Authentication protocols:** Digital signature, Authentication protocols, Digital signature standards.

Course Outcome: after successful completion of this course, the students will be able to explain

• Conventional encryption algorithms for confidentiality and their design principles

• Public key encryption algorithms and their design principles

• Use of message authentication codes, hash functions , digital signature and public key certificates

Text Book:

1. William Stallings, "Cryptography and Network Security, Principles and Practices", Pearson Education, Prentice Hall, 4th Edition.

2. Cryptography and Network Security, Atul Kahate, McGraw Hill Education (India) Private Limited; Third edition.

Reference books:

1. Applied Cryptography: Protocols & Algorithms, Schneier & Bruce, MGH International.

2. Cryptography and Security – by Dr T R Padmanabhan N Harini , Wiley India Pvt Ltd, 2011.

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Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Network Security CMC	**Practical**	00
Subject Code	BTP217	**Credit**	03

Course Objective:

1. To understand the principles and practices of cryptography and network security.
2. To understand the practical applications that has been implemented and is in use to provide network security.

UNIT – I INTRODUCTION

Introduction to Classical and Modern Techniques: Attacks, Services and Mechanisms, Classical Encryption Techniques, DES, Block Cipher, Design Principles and Modes of Operation.

UNIT – II ENCRYPTION TECHNIQUES

Encryption Algorithms and Hash Functions: Triple DES, RC5, Key Management, Public Key Cryptography, RSA Algorithm, Digital Signatures and Authentication Protocols.

UNIT – III SYSTEM SECURITY

System Security: Backups, integrity Management, Protecting against Programmed Threats, Viruses and Worms, Physical Security, Personnel Security.

UNIT – IV NETWORK SECURITY

Network Security: Protection against Eavesdropping, Security for Modems, IP Security, Web Security, Electronic Mail Security, Authentication, Applications.

UNIT – V SECURITY TOOLS

Security Tools: Firewalls, Wrappers, Proxies, Discovering a Break-in, Denial of Service Attacks and Solutions, Cryptographic Security Tools: KERBEROS, PGP, SSH, SRP, OPIE.

Text Books:

1. Cryptography and Network Security Principles and Practice, William Stallings, Pearson Education.
2. Practical UNIX and Internet Security, Simson Garjainkal, and Gene Spafford, Oreilly Pule Pvt. Ltd. 2000.

Reference Books:

1. RSA Security 's official guide to cryptography, Steve Burnett and Stephene Paine, RSA Press, Tata McGraw Hill Edition, 2001.
2. Cryptography and Network Security, Atul Kahate, McGraw Hill Education (India) Private Limited.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the concepts of various Encryption techniques

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Advanced Operating System	**Practical**	00
Subject Code	BTP218	**Credit**	03

Course Objective:

5. To give basics of Distributed Operating System.
6. To study the communication in distributed system.
7. To learn about inter-process communication in distributed environment.
8. To have concepts of distributed shared memory and distributed file systems.

UNIT – I MULTIPROCESSOR SYSTEM

Multiprocessor Operating System: Multiprocessor System Architecture, Structure, Processor Scheduling and Allocation, Memory Management.

UNIT – II DISTRIBUTED OPERATING SYSTEM

Distributed Operating System: Characteristics, Design Issues, Communication Models, Clock Synchronization, Mutual Exclusion, Election Algorithms.

UNIT – III DISTRIBUTED OPERATING SYSTEM FUNCTIONS

Distributed Deadlocks Detection, Distributed Scheduling, Distributed File System, Distributed shared Memory.

UNIT – IVFILE/DISK PROCESSING

Multimedia Files, Video compression, Process Scheduling, File System, File placement, Caching, Disk Scheduling.

UNIT – V REAL TIME OPERATING SYSTEM

Real Time Operating System: Scheduling mechanisms, Interrupts, Memory management, I/O & networking, resource reservation.

Case studies: Open source software, LINUX, Open SOLARIS, Amoeba, Mach, chorus etc.

Text Books:

1. Advanced Concepts in Operating Systems, M Singhal and NG Sivaratri, Tata McGraw Hill Inc., 2001
2. Distributed Operating System, A.S. Tanenbaum, Pearson Education Asia, 2001.

Reference Book:

1. Operating System Concepts, Silberschatz And P. Galvin, Addison Wesley 2004.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the concepts of Distributed System, Real Time Systems (Hardware, Software, and Operating System).
2. Summarize the major security issues associated with distributed systems along with the system security techniques.
3. Apply standard design principles in the construction of Advanced Operating Systems.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Web Technology and its applications	**Practical**	00
Subject Code	BTP219	**Credit**	03

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Advanced JAVA and J2EE	**Practical**	00
Subject Code	BTP220	**Credit**	03

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Network Management	**Practical**	00
Subject Code	BTP221	**Credit**	03

Course Objective:

1. Provide students with an improved foundation of knowledge in current and reflective practicenecessary to hold up a career in indulging the different protocols, software, and network architectures.
2. Understanding theory of local area networks, their topologies, protocols and applications.
3. Computer networking at sophisticated professional level.

UNIT – I HIGH SPEED NETWORKS

Frame Relay Networks, Asynchronous transfer mode, ATM Protocol Architecture, ATM logical Connection, ATM Cell, ATM Service Categories–AAL, High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fiber Channel, Wireless LAN's.

UNIT – II CONGESTION AND TRAFFIC MANAGEMENT

Queuing Analysis, Queuing Models, Single Server Queues, Effects of Congestion, Congestion Control, TrafficManagement, Congestion Control in Packet Switching Networks, Frame Relay Congestion Control.

UNIT – III TCP AND ATM CONGESTION CONTROL

TCP Flow control, TCP Congestion Control, Retransmission, Timer Management, Exponential RTO back off, KARN'sAlgorithm, Window management, Performance of TCP over ATM. Traffic and Congestion control in ATM, Requirements, Attributes, Traffic Management Frame work, Traffic Control, ABR traffic Management, ABR rate control, RM cell formats, ABR Capacity allocations, GFR traffic management.

UNIT – IV INTEGRATED AND DIFFERENTIATED SERVICES

Integrated Services Architecture, Approach, Components, Services, Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ, Random Early Detection, Differentiated Services.

UNIT – V PROTOCOLS FOR QoS SUPPORT

RSVP, Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms, Multiprotocol Label Switching,Operations, Label Stacking, Protocol details, RTP, Protocol Architecture, Data Transfer Protocol, RTCP.

Text Books:

1. High Speed Networks And Internet, William Stallings, Pearson Education, Second Edition, 2002.

Reference Books:

1. High Performance Communication Networks, Warland & Pravin Varaiya, Jean Harcourt Asia Pvt. Ltd., IIEdition, 2001.
2. MPLS and VPN architecture, Irvan Pepelnjk, Jim Guichard and Jeff Apcar, Cisco Press, Volume 1 and 2, 2003.

Course Outcome:

After completion of the course study, students will be able to

1. To classify and relate vital theorems and formulae for the information-theoretic basis of communication and theperformance of TCP/IP network protocols.

Depict the basis and organization of conceptually layered Network protocol model

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Natural Language Processing	**Practical**	00
Subject Code	BTP222	**Credit**	03

Course Objective:

1. To introduce the concept of Natural Language Processing.
2. To study various phases of Natural Language Processing.
3. To learn the linguistic implementation.
4. To learn the concept of speech recognition.

UNIT – I INTRODUCTION

Introduction: NLP, Challenges of NLP, NLP Applications, Processing of Indian Languages.

Words and Word Forms: Morphology fundamentals; Morphological Diversity of Indian Languages; Morphology Paradigms; Finite State Machine Based Morphology; Automatic Morphology Learning; Shallow Parsing; Named Entities; Maximum Entropy Models; Random Fields, Scope Ambiguity and Attachment Ambiguity resolution.

UNIT – II PARSING IN NLP

Structures: Theories of Parsing, Parsing Algorithms; Robust and Scalable Parsing on Noisy Text as in Web documents; Hybrid of Rule Based and Probabilistic Parsing; Scope Ambiguity and Attachment Ambiguity resolution.

UNIT – III MACHINE TRANSLATION

Machine Translation: Need of MT, Problems of Machine Translation, MT Approaches, Direct Machine Translations, Rule-Based Machine Translation, Knowledge Based MT System, Statistical Machine Translation, UNL Based Machine Translation, Translation involving Indian Languages.

UNIT – IV LINGUISTICS

Meaning: Lexical Knowledge Networks, WorldNet Theory; Indian Language Word Nets and Multilingual Dictionaries; Semantic Roles; Word Sense Disambiguation; WSD and Multilinguality, Metaphors.

UNIT – IV SPEECH RECOGNITION

Speech Recognition: Signal processing and analysis method, Articulation and acoustics, Phonology and phonetic transcription, Word Boundary Detection; Argmax based computations; HMM and Speech Recognition.

Text/Reference Books:

1. Natural Language Understanding, Allen J., Benjamin/Cunnings, (1987).

2. Natural Language Processing and Information Retrieval, Siddiqui and Tiwary U.S., Oxford University Press (2008).

3. Natural Language Processing: The PLNLP Approach, Jensen K., Heidorn G.E., Richardson S.D., Springer (2013).

4. Phonetics, Roach P., Oxford University Press (2012).

5. Speech and Language Processing, Jurafsky, Dab and Martin, James, Second Edition, Prentice Hall, 2008.

Course Outcome:

After completion of the course study, students will be to

1. Explain the concept of Natural Language Processing.
2. Implement various phases of Natural Language Processing.
3. Do linguistic implementation and develop the various speech recognition applications.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Embedded System	**Practical**	00
Subject Code	BTP223	**Credit**	03

Course Objective:

1. To introduce modern embedded systems.
2. To understand and program such systems using a concrete platform built around a modern embedded processor.

UNIT – I INTRODUCTION

Introduction to Embedded systems, hardware/software code sign, Embedded micro controller cores, embedded memories, Examples of embedded systems, sensors and interfacing techniques, Real-time concepts.

UNIT – II REAL TIME OPERATING SYSTEM

Real-time operating systems, Required RTOS services/capabilities (in contrast with traditional OS), Resource Management/scheduling paradigms: static priorities, static schedules, dynamic scheduling, best effort current best practice in scheduling (e.g. Rate Monotonic vs. static schedules).

UNIT – III ISSUES REALTED TO EMBEDDED SYSTEM

Real world issues: blocking, unpredictability, interrupts, caching, Examples of OSs for embedded systems - RT Linux, VRTX.

UNIT – IV PROGRAMMING LANGUAGES

Programming languages for embedded systems e.g., Handel-C and Esterel, system support for embedded systems, selected embedded system-based applications: process control, robotics, etc.

UNIT – V SOFTWARE DEVELOPMENT METHODOLOGY

Software Development Methodology: Model based development, Statecharts, etc. Case studies, controlling an Injection molding process, Flight simulator, digital call center handler, codec.

Text/ Reference Books:

1. Specification and Design of Embedded Systems, D. Gajski, F. Vahid, S. Narayan, and J. Gong, Pearson Education.
2. Hardware Software Co-design: Principles and Practice, Syaunstrup and W. Wolf, Kluwer Academic Publishers.

Course Outcome:

After completion of the course study, students will be able to

1. Explain the concept of modern embedded systems.
2. To develop and program such systems using a concrete platform built around a modern embedded processor.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Data Mining and Warehousing	**Practical**	00
Subject Code	BTP224	**Credit**	03

Course Objectives:

1. To understand the overall architecture of a data warehouse.
2. To discuss different data mining models and techniques.
3. To evaluate different models used for OLAP and data pre-processing.
4. To design and implement systems for data mining and evaluate the performance of different data mining algorithms.
5. To propose data mining solutions for different applications.
6. To differentiate online transaction processing and online analytical processing.

UNIT – I INTRODUCTION TO DATA WAREHOUSE

Overview and Concepts: Need for Data Warehousing, Basic Elements of Data Warehousing, Trends in Data Warehousing. Planning and Requirements: Project Planning and Management, Collecting the Requirements. Architecture and Infrastructure: Architectural Components, Infrastructure and Metadata.

UNIT – II DATA DESIGN AND DATA REPRESENTATION

Principles of Dimensional Modeling, Dimensional Modeling Advanced Topics, Data Extraction, Transformation and Loading, Data Quality.

UNIT – III INFORMATION ACCESS AND DELIVERY

Matching Information to Classes of Users, OLAP in Data Warehouse, Data Warehousing and the Web, Implementation and Maintenance: Physical Design process, Data Warehouse Deployment, Growth & Maintenance.

UNIT – IV DATA MINING

Introduction: Basics of data mining, related concepts, Data mining techniques. Data Mining Algorithms: Classification, Clustering, Association rules. Knowledge Discovery: KDD Process.

UNIT – V WEB MINING

Web Mining: Web Content Mining, Web Structure Mining, and Web Usage Mining. Advanced Topics: Spatial Mining, Temporal Mining, Visualization, Data Generalization and Summarization based Characterization. Analytical characterization: Analysis of Attribute Relevance. Mining Class Comparisons: Discriminating between different Classes, Mining Descriptive Statistical Measures in Large Databases, Data Mining Primitives, Languages, and System Architectures, Query Language, Designing GUI based on a Data Mining Query Language, Architectures of Data Mining Systems Application and Trends in Data Mining: Applications, Systems Products and Research Prototypes, Additional Themes in Data Mining, Trends in Data Mining.

Text Books:

1. Prabhu, Data ware housing- concepts, Techniques, Products and Applications, Prentice hall of India
2. Soman K P, “Insight into Data Mining: Theory &Pratice” , Prentice hall of India
3. M.H. Dunham, “Data Mining Introductory and Advanced Topics”, Pearson Education.

Reference Books:

1. Paulraj Ponniah, “Data Warehousing Fundamentals”, John Wiley.
2. Gupta, “Introduction To Datamining with Case Studies”, PHI
3. Ralph Kimball, “The Data Warehouse Lifecycle toolkit”, John Wiley.
4. IBM, “Introduction to Building The Datawarehouse” PHI

Course Outcome:

After completion of the course study, students will be able to

1. Design a data warehouse for an organization.
2. Write queries using DMQL.
3. Extract knowledge using data mining techniques.
4. Adapt new data mining tools.
5. Explore recent trends and advancement in data mining such as web mining, spatial-temporal mining.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Communication Network	**Practical**	00
Subject Code	BTP225	**Credit**	03

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Advanced Computer Network	**Practical**	00
Subject Code	BTP226	**Credit**	03

Course Objective:

1. To study advanced background on computer networking topics.
2. To learn about high speed networks.
3. To get idea of congestion control in networks.
4. To study integrated and differentiated services.

UNIT – I HIGH SPEED NETWORKS

Frame Relay Networks, Asynchronous transfer mode, ATM Protocol Architecture, ATM Logical Connection, ATM Cell, ATM Service Categories, AAL, High Speed LAN's: Fast Ethernet, Gigabit Ethernet, Fiber Channel, and Wireless LAN.

UNIT – II CONGESTION AND TRAFFIC MANAGEMENT

Queuing Analysis, Queuing Models, Single Server Queues, Effects of Congestion, Congestion Control, Traffic Management, Congestion Control in Packet Switching Networks, Frame Relay Congestion Control.

UNIT – III TCP AND ATM CONGESTION CONTROL

TCP Flow control, TCP Congestion Control, Retransmission, Timer Management, Exponential RTO back off, KARN's Algorithm, Window Management, Performance of TCP over ATM, Traffic and Congestion Control in ATM, Requirements, Attributes, Traffic Management Frame Work, Traffic Control, ABR traffic Management, ABR rate control, RM Cell Formats, ABR Capacity Allocations, GFR Traffic Management.

UNIT – IV INTEGRATED AND DIFFERENTIATED SERVICES

Integrated Service Architecture, Approach, Components, Services Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ, Random Early Detection, Differentiated Services.

UNIT – V PROTOCOLS FOR QoS SUPPORT

RSVP, Goals & Characteristics, Data Flow, RSVP Operations, Protocol Mechanisms, Multiprotocol Label Switching, Operations, Label Stacking, Protocol Details, RTP, Protocol Architecture, Data Transfer Protocol, RTCP.

Text Book:

1. High Speed Networks and Internet, William Stallings, Pearson Education, Second Edition, 2002.

Reference Books:

1. High Performance Communication Networks, Warland& Pravin Varaiya, Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
2. MPLS and VPN Architecture,IrvanPepelnjk, Jim Guichard and Jeff Apcar, Cisco Press, Volume 1 and 2, 2003.

Course Outcome:

After completion of the course study, students will be able to

1. Explain advanced networking topics.
2. Implement congestion control while deploying a network.
3. Explain integrated and differentiated services.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Computer Vision	**Practical**	00
Subject Code	BTP227	**Credit**	03

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Artificial Intelligence & Expert System	**Practical**	00
Subject Code	BTP228	**Credit**	03

Course Objective:

1. To give basic concepts of AI towards problem solving, inference, perception, knowledge representation and learning.
2. To investigate applications of AI techniques in Intelligent Agents, Expert Systems, Artificial Neural Networks and other machine learning models.
3. To explore the current scope, potential, limitations, and implications of intelligent systems.

UNIT – I INTRODUCTION TO AI & SEARCH TECHNIQUES

Introduction to AI, Problem Solving, State space search, Blind search: Depth first search, Breadth first search, Informed search: Heuristic function, Hill climbing search, Best first search, A* & AO* Search, Constraint satisfaction. Game tree, Evaluation function, Mini-Max search, Alpha-beta pruning, Games of chance.

UNIT – II KNOWLEDGE REPRESENTATION

Introduction to KR, Knowledge agent, Predicate logic, WFF, Inference rule & theorem proving: forward chaining, backward chaining, resolution; Propositional knowledge, Boolean circuit agents. Rule Based Systems, Forward reasoning: Conflict resolution, backward reasoning, Use of backtracking. Structured KR: Semantic Net-slots, Inheritance, Frames-exceptions and default attached predicates, Conceptual Dependency formalism, Other knowledge representations.

UNIT – III HANDLING UNCERTAINTY & LEARNING

Source of uncertainty, Probabilistic inference, Bayes' theorem, Limitation of naïve Bayesian system, Bayesian Belief Network (BBN), Inference with BBN, Dempster-Shafer Theory, Fuzzy Logic, Fuzzy function, Fuzzy measure, Non monotonic reasoning: Dependency directed backtracking, Truth maintenance systems. Learning: Concept of learning, Learning model, learning decision tree, Paradigms of machine learning, Supervised & Unsupervised learning, Example of learning, Learning by induction, Learning using Neural Networks.

UNIT – IV NATURAL LANGUAGE PROCESSING & PLANNING

Overview of NLP tasks, Parsing, Machine translation, Components of Planning System, Planning agent, State-Goal & Action Representation, Forward planning, Backward chaining, Planning example: partial-order planner, Block world.

UNIT – V EXPERT SYSTEM & AI LANGUAGES

Need & Justification for expert systems, Cognitive problems, Expert System Architectures, Rule based systems, Non production system, Knowledge acquisition, Case studies of expert system. AI language: Prolog syntax, Programming with prolog, Back tracking in prolog, Lisp syntax, Lisp programming.

Text Books:

1. Elaine Rich and Kevin Knight: Artificial Intelligence- Tata MeGraw Hill.
2. Dan W.Patterson Introduction to Artificial Intelligence and Expert Systems- Prentice Hall of India.

Reference Books:

1. Nils J.Nilsson: Principles of Artificial Intelligence- Narosa Publishing house.
2. Clocksin& C.S. Melish; Programming in PROLOG- Narosa Publishing house.
3. M. Sasikumar, S.Ramani, et. al.: Rule based Expert Systems (A practical Introduction) Narosa Publishing House.

Course Outcome:

After completion of the course study, students will be able to

1. Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems.
2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

3. Demonstrate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Cyber Crime and Computer Forensics	**Practical**	00
Subject Code	BTP229	**Credit**	03

Semester	As per choice	**Lecture**	48
Branch	B. Tech. CSE	**Tutorial**	00
Subject Name	Object Oriented System Design	**Practical**	00
Subject Code	BTP230	**Credit**	03