INSTITUTE OF ENGINEERING
Teaching & Scheme of Examination for B.Tech. (Ist Year Common For All Branches)

Year: I　　　　　　　　　　　　　　　　　　　　　　　　　　　**Semester: I**

S. No.	Subject Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/ Min. Pass Marks	External/ Min. Pass Marks	Total/Min. Pass Marks
		Theory							
1	BT-101	ENGLISH	3	-	-	3	30/12	70/28	100/40
2	BT-102	ENGINEERING MATHEMATICS-I	3	-	-	3	30/12	70/28	100/40
3	BT-103	ENGINERING PHYSICS-I	3	-	-	3	30/12	70/28	100/40
4	BT-104	COMPUTER PROGRAMMING &IT	3	-	-	3	30/12	70/28	100/40
5	BT-105	ENGINERING MECHANICS	3	-	-	3	30/12	70/28	100/40
6	BT-106	ENGINEERING CHEMISTRY-I	3	-	-	3	30/12	70/28	100/40
		Practical's							
7	BT-107	PHYSICS LAB- I	-	-	3	3	30/12	45/18	75/30
8	BT-108	ENGINEERING CHEMISTRYLAB-I	-	-	3	3	30/12	45/18	75/30
9	BT-109	COMPUTER PROGRAMMING LAB	-	-	3	3	30/12	45/18	75/30
10	BT-110	PRACTICAL GEOMETRY	-	-	3	3	40/16	60/24	100/40
11	BT-111	WORKSHOP PRACTICE	-	-	3	3	30/12	45/18	75/30
		Total	18	-	12				1000
		Total Teaching Load	32						

INSTITUTE OF ENGINEERING
Teaching & Scheme of Examination for B.Tech. (Ist Year Common For All Branches)

Year: I   **Semester: II**

S. No.	Subject Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/ Min. Pass Marks	External/ Min. Pass Marks	Total/Min. Pass Marks
		Theory							
1	BT-201	COMMUNICATION TECHNIQUES	3	-	-	3	30/12	70/28	100/40
2	BT-202	ENGINEERING MATHEMATICS-II	3	-	-	3	30/12	70/28	100/40
3	BT-203	ENGINERING PHYSICS-II	3	-	-	3	30/12	70/28	100/40
4	BT-204	ENVIRONMENTAL ENGINEERING &DISASTER MANAGEMENT	3	-	-	3	30/12	70/28	100/40
5	BT-205	ELECTRICAL&ELECTRONIC ENGINEERING	3	-	-	3	30/12	70/28	100/40
6	BT-206	ENGINEERING CHEMISTRY-II	3	-	-	3	30/12	70/28	100/40
		Practical's							
7	BT-207	PHYSICS LAB-II	-	-	3	3	30/12	45/18	75/30
8	BT-208	ENGINEERING CHEMISTRYLAB-II	-	-	3	3	30/12	45/18	75/30
9	BT-209	ELECTRICAL &ELECTRONICS LAB	-	-	3	3	30/12	45/18	75/30
10	BT-210	ENGINEERING DRAWING	-	-	3	3	40/16	60/24	100/40
11	BT-211	LANGUAGE LAB	-	-	3	3	30/12	45/18	75/30
		Total	18	-	12				1000
		Total Teaching Load	32						

INSTITUTE OF ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING & INFORMATION TECHNOLOGY
Teaching & Scheme of Examination for B.Tech. (Computer Science Engineering)

Year: II   **Semester: III**

S. No.	Subject Code	Subject Name		Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
				L	T	P		Internal/ Min. Pass Marks	External/ Min. Pass Marks	Total/Min. Pass Marks
		Theory								
1	CS-301	Mathematics III		3	1	-	3	30/12	70/28	100/40
2	CS-302	Web Technology		3	-	-	3	30/12	70/28	100/40
3	CS-303	Data Structures and Algorithms		3	1	-	3	30/12	70/28	100/40
4	CS-304	Object Oriented Programming		3	-	-	3	30/12	70/28	100/40
5	CS-305	Digital Electronics		3	-	-	3	30/12	70/28	100/40
		Elective – I								
6	CS-306	1	Management Information Systems	3	-	-	3	30/12	70/28	100/40
		2	Internet Technology							
		3	Principles of Programming Languages							
		Practical's								
7	CS-307	Web Technology Lab		-	-	3	3	40/16	60/24	100/40
8	CS-308	Data Structure Lab		-	-	3	3	40/16	60/24	100/40
9	CS-309	Programming in C++		-	-	3	3	40/16	60/24	100/40
10	CS-310	Digital Electronics Lab		-	-	3	3	40/16	60/24	100/40
		Total		18	2	12				**1000**
		Total Teaching Load		32						

Year: II   **Semester: IV**

S. No.	Subject Code	Subject Name		Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
				L	T	P		Internal/ Min. Pass Marks	External/ Min. Pass Marks	Total/Min. Pass Marks
		Theory								
1	CS-401	Programming in Java		3	1	-	3	30/12	70/28	100/40
2	CS-402	Operating Systems		3	-	-	3	30/12	70/28	100/40
3	CS-403	Discrete Mathematical Structures		3	1	-	3	30/12	70/28	100/40
4	CS-404	Microprocessor And Interfaces		3	-	-	3	30/12	70/28	100/40
5	CS-405	Database Management Systems		3	-	-	3	30/12	70/28	100/40
		Elective – II								
6	CS-406	1	Statistics and Probability Theory	3	-	-	3	30/12	70/28	100/40
		2	Open Source Technology							
		3	Logic & Functional Programming							
		Practical's								
7	CS-407	Java Programming Lab		-	-	3	3	40/16	60/24	100/40
8	CS-408	Operating Systems Simulation Lab		-	-	3	3	40/16	60/24	100/40
9	CS-409	Microprocessor Lab		-	-	3	3	40/16	60/24	100/40
10	CS-410	Database Management Systems Lab		-	-	3	3	40/16	60/24	100/40
		Total		18	2	12				**1000**
		Total Teaching Load		32						

INSTITUTE OF ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING & INFORMATION TECHNOLOGY
Teaching & Scheme of Examination for B.Tech. (Computer Science Engineering)

Year: III   **Semester: V**

S. No.	Subject Code		Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
				L	T	P		Internal/ Min. Pass Marks	External/ Min. Pass Marks	Total/Min. Pass Marks
			Theory							
1	CS-501		Computer Architecture	3	1	-	3	30/12	70/28	100/40
2	CS-502		Software Engineering	3	-	-	3	30/12	70/28	100/40
3	CS-503		Computer Networks	3	1	-	3	30/12	70/28	100/40
4	CS-504		Advanced Java Programming	3	-	-	3	30/12	70/28	100/40
5	CS-505		Artificial Intelligence	3	-	-	3	30/12	70/28	100/40
			Elective – III							
6	CS-506	1	Advanced Data Structure	3	-	-	3	30/12	70/28	100/40
		2	E-Commerce							
		3	Soft Computing							
			Practical's							
7	CS-507		Network Lab	-	-	3	3	40/16	60/24	100/40
8	CS-508		Advanced Java Programming Lab	-	-	3	3	40/16	60/24	100/40
9	CS-509		UML Lab	-	-	3	3	40/16	60/24	100/40
10	CS-510		Miner Project – I	-	-	3	3	40/16	60/24	100/40
			Total	**18**	**2**	**12**				**1000**
			Total Teaching Load	**32**						

Year: III   **Semester: VI**

S. No.	Subject Code		Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
				L	T	P		Internal/ Min. Pass Marks	External/ Min. Pass Marks	Total/Min. Pass Marks
			Theory							
1	CS-601		Theory of Computation	3	1	-	3	30/12	70/28	100/40
2	CS-602		Design and Analysis of Algorithms	3	-	-	3	30/12	70/28	100/40
3	CS-603		Asp.Net Using C#	3	1	-	3	30/12	70/28	100/40
4	CS-604		Compiler Construction	3	-	-	3	30/12	70/28	100/40
5	CS-605		Software Project Management	3	-	-	3	30/12	70/28	100/40
			Elective – IV							
6	CS-606	1	Advanced Computer Architecture	3	-	-	3	30/12	70/28	100/40
		2	ERP Systems							
		3	Network Programming							
			Practical's							
7	CS-607		Design and Analysis of Algorithms Lab	-	-	3	3	40/16	60/24	100/40
8	CS-608		ASP.Net & C# Lab	-	-	3	3	40/16	60/24	100/40
9	CS-609		Compiler Lab	-	-	3	3	40/16	60/24	100/40
10	CS-610		Miner Project – II	-	-	3	3	40/16	60/24	100/40
			Total	**18**	**2**	**12**				**1000**
			Total Teaching Load	**32**						

INSTITUTE OF ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING & INFORMATION TECHNOLOGY
Teaching & Scheme of Examination for B.Tech. (Computer Science Engineering)

Year: IV   **Semester: VII**

S. No.	Subject Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/ Min. Pass Marks	External/ Min. Pass Marks	Total/Min. Pass Marks
		Theory							
1	CS-701	Cryptography & Network Security	3	-	-	3	30/12	70/28	100/40
2	CS-702	Wireless Communication & Networks	3	1	-	3	30/12	70/28	100/40
3	CS-703	Data Mining and Ware Housing	3	1	-	3	30/12	70/28	100/40
4	CS-704	Computer Graphics & Multimedia Techniques	3	-	-	3	30/12	70/28	100/40
5	CS-705	Software Testing	3	-	-	3	30/12	70/28	100/40
		Elective – V							
6	CS-706	1 Data Compression Techniques 2 Web Services 3 Real Time Systems	3	-	-	3	30/12	70/28	100/40
		Practical's							
7	CS-707	Computer Graphics & Multimedia Lab	-	-	3	3	30/12	45/18	75/30
8	CS-708	Data Mining and Ware Housing Lab	-	-	3	3	30/12	45/18	75/30
9	CS-709	Major Project - I	-	-	3	3	30/12	45/18	75/30
10	CS-710	Practical Training Seminar	-	-	3	-	80/32	120/48	200/80
		Total	18	2	12				**1000**
		Total Teaching Load	32						

Year: IV   **Semester: VIII**

S. No.	Subject Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/ Min. Pass Marks	External/ Min. Pass Marks	Total/Min. Pass Marks
		Theory							
1	CS-801	System Software Engineering	3	1	-	3	30/12	70/28	100/40
2	CS-802	Mobile Computing	3	-	-	3	30/12	70/28	100/40
3	CS-803	Distributed Systems	3	1	-	3	30/12	70/28	100/40
		Elective – VI							
4	CS-804	1 Advanced Database Management Systems 2 Storage and Information Management 3 Digital Image Processing	3	-	-	3	30/12	70/28	100/40
		Practical's							
5	CS-805	System Software Lab	-	-	3	3	40/16	60/24	100/40
6	CS-806	Internet Technology Lab	-	-	3	3	40/16	60/24	100/40
7	CS-807	Unix Lab	-	-	3	3	40/16	60/24	100/40
8	CS-808	Major Project – II	-	-	3	-	80/32	120/48	200/80
9	CS-809	Seminar	-	-	2	-	40/16	60/24	100/40
		Total	12	2	14				**1000**
		Total Teaching Load	28						

SHRI JAGDISHPRASAD JHABARMAL TIBREWALA UNIVERSITY
CHUDELA (JHUNJHUNU), RAJASTHAN

INSTITUTE OF ENGINEERING
TEACHING AND EXAMINATION SCHEME AND DETAILED SYLLABUS FOR
B. TECH. (Iˢᵗ Year Common For All Branches)

YEAR: I   **SEMESTER: I**

BT -101   ENGLISH   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Sentence Elements, Parts of speech Sentence and its Type: Reading comprehension, Précis writing, Meaning of Summary or Précis, Step for writing a précis Guidelines for Précis writing.	9
II	Modals, Preposition, Determiners and articles. The infinitives and ING forms, correct use of tenses and verbs. Gerund and Participle and their correct use in sentence.	8
III	Correspondence with Banks, Opening bank account, Request Credit Facility, Stopping payment of a Cheque, Request bank statement. Complaints and their replies, Causes of complaints, writing complaint letters, Replies to complains, Placing and supplying orders.	7
IV	Letters of Enquiry /Requests for Quotations and their replies, Letters of Enquiry, Offers and Quotations, Invitations to Tenders and Bids, Notices, Inviting tender and Bids, Communication with branch officers	8
V	Writing circulars, Word buildings, Prefixes, suffixes, Synonyms, antonyms, Abbreviations, , Punctuations & Capitalization, Common Errors. Self-development and its different dimensions, listening skills.	8
	Total	40

Reference Books:

1. Wren & Martin English Grammar Book .
2. R.C. Bhatia "Business Communication".
3. John M. Penrose "Business Communication".
4. C.B. Gupta "Business Communication and Organization and Management".
5. Peck, john "The Student guide to Write".

INSTITUTE OF ENGINEERING
TEACHING AND EXAMINATION SCHEME AND DETAILED SYLLABUS FOR
B. TECH. (I^st Year Common For All Branches)

YEAR: I   **SEMESTER: I**

BT-102   ENGINEERING MATHEMATICS-I   **(L, T, P) = 7 (3+1+3)**

Unit	Contents of Course	Hrs.
I	**Differential Calculus** Asymptotes and Curvature (Cartesian Coordinates Only)Concavity, Convexity and Point of Inflexion (Cartesian Coordinates Only)Curve Tracing (Cartesian and Standard Polar Curves – Cardioids, Lemniscuses of Bernoulli, Limacon, Equiangular Spiral)	9
II	**Differential Calculus** Partial Differentiation, Euler's Theorem on Homogeneous Functions Approximate Calculations Maxima& Minima of Two and More Independent Variables Lagrange's Method of Multipliers	8
III	I**ntegral Calculus** Applications in Finding the Length of Simple Curves Surface and Volumes of Solids of Revolution Double Integral, Areas & Volumes by Double Integration Change of Order of Integration Beta Function and Gamma Function (Simple Properties)	7
IV	**Differential Equations** Differential Equations of First Order and First Degree – Variable Separable Homogeneous Forms, Reducible to Homogeneous Form, Linear Form, Exact Form, Reducible to Exact Form Linear Differential Equations of Higher Order with Constant Coefficients Only	8
V	Second Order Ordinary Differential Equations with Variables Coefficients Homogeneous and Exact Forms Change of Dependent Variable Change of Independent Variable, Normal Forms Method of Variation of Parameter	8
	Total	40

Reference Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley 9th Edition.

2. Calculus and Analytical Geometry, Thomas and Finney, Narosa Publishing House. New Delhi.

3. A Text Book of Differential Equations, M.Ray and Chaturvedi, Students Friends & Co. Publisher, Agra.

4. Higher Engineering Mathematics, B.V.Ramana, Tata McGraw Hill.

5. Thomas Calculus, Maurice D. Weir, Joel Hass and others, Pearson, 11 Edition.

INSTITUTE OF ENGINEERING
TEACHING AND EXAMINATION SCHEME AND DETAILED SYLLABUS FOR
B. TECH. (Ist Year Common For All Branches)

YEAR: I   **SEMESTER: I**

BT-103   ENGINEERING PHYSICS - I   **(L, T, P) = 7 (3+1+3)**

Unit	Contents of Course	Hrs.
I	**Interference of light** Michelson's Interferometer: Production of circular & straight line fringes, Determination of wavelength of light. Determination of wavelength separation of two nearby wavelengths. Newton's rings and measurement of wavelength of light. Interference of Optical technology: elementary idea of anti-reflection coating and interference filters.	9
II	**Polarization of light** Plane circular and elliptically polarized light on the basis of electric (light) vector, Malus Law. Double Refraction: Qualitative description of double refraction phase retardation plates, quarter and half wave plates, construction, working and use of these in production and Detection of circular and elliptically polarized light. Optical Activity: Optical activity and law of optical rotation, specific rotation and its Measurement using the half-shade and bi-quartz device.	8
III	**Diffraction of light** Single slit diffraction: Quantitative description of single slit, position of maxima / minima And width of central maximum, intensity variation. Diffraction Grating: Construction and theory. Formation of spectrum by plane transmission grating, Determination of wavelength of light using plane transmission grating. Resolving power: Geometrical & Spectral, Raleigh criterion, Resolving power of diffraction grating	7
IV	**Diffraction of light** Single slit diffraction: Quantitative description of single slit, position of maxima / minima And width of central maximum, intensity variation. Diffraction Grating: Construction and theory. Formation of spectrum by plane transmission grating, Determination of wavelength of light using plane transmission grating. Resolving power: Geometrical & Spectral, Raleigh criterion, Resolving power of diffraction grating,	8
V	**Special Theory of Relativity** Postulates of special theory of relativity, Lorentz transformations, relativity of length, mass and time. Relativistic velocity addition, mass-energy relation. Relativistic Energy and momentum.	8
		40

Reference Books:

1. Fundamental of Optics, Jenkins and White, Fourth Edition, McGraw Hill.
2. Optics, Ajoy Ghatak, Third Edition, Tata McGraw Hill.
3. Quantum Mechanics, Schiff, Third Edition, McGraw Hill.
4. Quantum Mechanics, Merzbacher, Third Edition, Wiley India.
5. Nuclear Physics: Principles and Applications, John Lilley, Wiley India.

YEAR: I   **SEMESTER: I**

BT-104   COMPUTER PROGRAMMING &IT   **(L, T, P) = 7 (3+1+3)**

Unit	Contents of Course	Hrs.
I	Stored Program Architecture of Computers, Storage Device- Primary Memory and Secondary Storage, Random, Direct, Sequential access methods. Concept of High-Level, Assembly and Low Level programming languages. Representing Algorithms through flow chart, pseudo code, step by step. Number System: Data Representation, Concept of radix and representation of numbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to radix r2. r's and (r-1)'s complement, Representation of alphabets.	9
II	Programming in C: Structure of C Program, Concept of Preprocessor, Macro Substitution, Intermediate code, Object Code, Executable Code. Compilation Process, Basic Data types, Importance of braces ({ }) in C Program, enumerated data type, Identifiers, Scope of Variable, Storage Class, Constants Operators& Expressions in C, Type Casting, printf( ) and scanf ( ) with format specifires, reading single character.	8
III	Control Statements, Command Line Arguments, and Arrays in C, Pointers, and Using pointers to represent arrays, Pointer & address arithmetic. Structures, using typedef.	7
IV	Arrays of Structures & pointers, File Handling (fscanf, fprintf, feof, fopen, fclose, fread, fwrite only). Dynamic memory Allocation.	8
V	Functions in C, Passing Parameters (By value & Reference), using returned data, Passing arrays, structures, array of structures, pointer to structures etc., passing characters and strings, The voidpointer	8
		40

Reference Books:

1. Ritchie & Kernighan, The C Programming language, 2nd Ed., PHI.
2. Dey & Ghosh, Computer Fundamentals and programming in C, Oxford.
3. Kamthane, Programming in C, 2nd Ed., Pearson.
4. Schildt, The Complete Reference, 4th Ed., TMH.
5. Balaguruswamy, Programming in ANSI C, 5th Ed., TMH.
6. V. Rajaraman, Fundamentals of Computers, 5th Ed. PHI, 2011.
7. Forouzan et.al, Computer Science, 3rd Ed. Cenage Learning.

YEAR: I   **SEMESTER: I**

BT-105   **ENGINEERING MECHANICS**   **(L, T, P) = 7 (3+1+3)**

Unit	Contents of Course	Hrs.
I	System of forces, Fundamental laws of mechanics, Composition of forces•Free body diagram, Lami's theorem ,Moments and couple, Varignon's theorem, condition of equilibrium ,Types of support and loading, reaction, Analysis of simple trusses by methods of joints and method of sections	9
II	Laws of Coulomb friction, Ladder, Wedges Belt friction and rolling Principle of virtual work and its applications	8
III	Location of centroid and center of gravity, area moment of inertia, mass moment of inertia, Law of machines, Variation of mechanical advantages, efficiency, reversibility of machine, Pulleys, wheel and axle, wheel and differential axle , Transmission of power through belt and rope	7
IV	**Kinematics of Particle** Rectilinear motion, plane curvilinear motion Projectile motion Constrained motion of connected particles **Dynamics of Particle and Rigid Body** Newton's law of motion , D'Alembert's principle	8
V	**Work and Energy** Work, energy (Potential, Kinetic and Spring) Work – Energy relation Law of conservation of energy **Impulse and Momentum** Impulse, momentum , Impulse – Momentum relation, Impact **Vibration** Un-damped Free vibrations	8
		40

Reference Books:

1. Vector Mechanics for Engineers, Beer and Johnston, Tata McGraw-Hill.
2. Engineering Mechanics, Hibbeler, Pearson Education.
3. Engineering Mechanics, Meriam and Kraige, John Wiley & Sons.
4. Engineering Mechanics, Timoshenko and Young, Tata McGraw-Hill.
5. Engineering Mechanics, Shames, Pearson Education.
6. Engineering Mechanics, Boresi and Schmidt, CL-Engineering.
7. Engineering Mechanics, Andrew Pytel & Kiusalas, Cengage Learning.

YEAR: I   **SEMESTER: I**

BT-106   ENGINEERING CHEMISTRY -I   **(L, T, P) = 6 (3+0+3)**

Unit	Contents of Course	Hrs.
I	**POLYMERS:** Introduction - Types of polymers – Classification - Methods of polymerization – Stereo specific polymers - Ziegler Natta catalysis - Properties of polymers –Conducting Polymers- Engineering applications – Biodegradable polymers - Individual polymers (Preparation, Properties, Uses of Poly Styrene, PVC, PTFE, Bakelite's, Cellulose derivatives, Poly Carbonates).	9
II	**PLASTICS:** Types –Compounding of plastics- Moulding (Four types)- Fiber reinforced , Glass fiber reinforced plastics –Bullet Proof Plastics– Properties of plastics – Engineering applications **RUBBERS & ELASTOMERS:** Introduction – Preparation – Vulcanization – Properties - Engineering applications. Buna-S, Buna-N, - Poly Urethane - Engineering applications of Elastomers.	8
III	**CORROSION:** Mechanism- Factors influence the rate of corrosion - Types of Corrosion -Protection methods (Anodic &Cathodic protection), - Metallic Coatings - Paints, Varnishes, Enamels, Special paints.	7
IV	**FUEL TECHNOLOGY:** Introduction & classification of fuels, advantages and disadvantages of fuels, calorific value, introduction to liquid fuels, classification of petroleum, refining of petroleum, cracking (thermal and catalytic) knocking, diesel index, gaseous fuels (natural gas, CNG, LPG, producer gas, water gas), polymerization, anti-knocking agents, octane &cetane number. **LUBRICANTS:** Introduction and classification of lubricants, functions of lubricants, mechanism of lubricants, properties of lubricants, viscosity, flash point and fire point, cloud and pour point, aniline point, saponification values	8
V	**BUILDING MATERIALS (CEMENT, REFRACTORIES, CRAMICS) CEMENT:** Introduction, Manufacturing of Portland Cement (Dry &Wet Process)-Chemistry of Setting and Hardening of Cement-Effect of Carbon dioxide, Sulphur Dioxide, Chloride on Cement concrete. **REFRACTORIES:** Introduction-Classification –Properties-Applications	8
	Total	36

Reference Books:

1. The Chemistry and Technology of Coal, by J G Speigh, CRC Press
2. The Chemistry and Technology of Petroleum, by J G Speigh, CRC Press
3. Polymer Chemistry: An Introduction, Malcolm P. Stevens, Oxford University Press
4. Solid State Chemistry and Its Applications, Anthony R West, John Wiley & Sons
5. Lubricants and Lubrications, Theo Mang, Wilfeied, Wiley-VCH
6. Hand Book of Conjugated Polymers, Tejre A Skotheim and J. R. Reynolds, CRC Press

YEAR: I   **SEMESTER: I**

BT-107   PHYSICS LAB- I   **(L, T, P) = 3(0+0+3)**

1. To convert a Galvanometer in to an ammeter of range 1.5 amp and calibrate it.
2. To convert a Galvanometer in to a Volt of range 1.5 volt and calibrate it.
3. To study the variation of semiconductor resistance with temperature and hence determine the Band Gap of semiconductor in the form of reverse biased P-N junction diode.
4. To determine the wave length of sodium light by Newton's Ring.
5. To determine the specific rotation of Glucose (Sugar) solution using a Polarimeter.
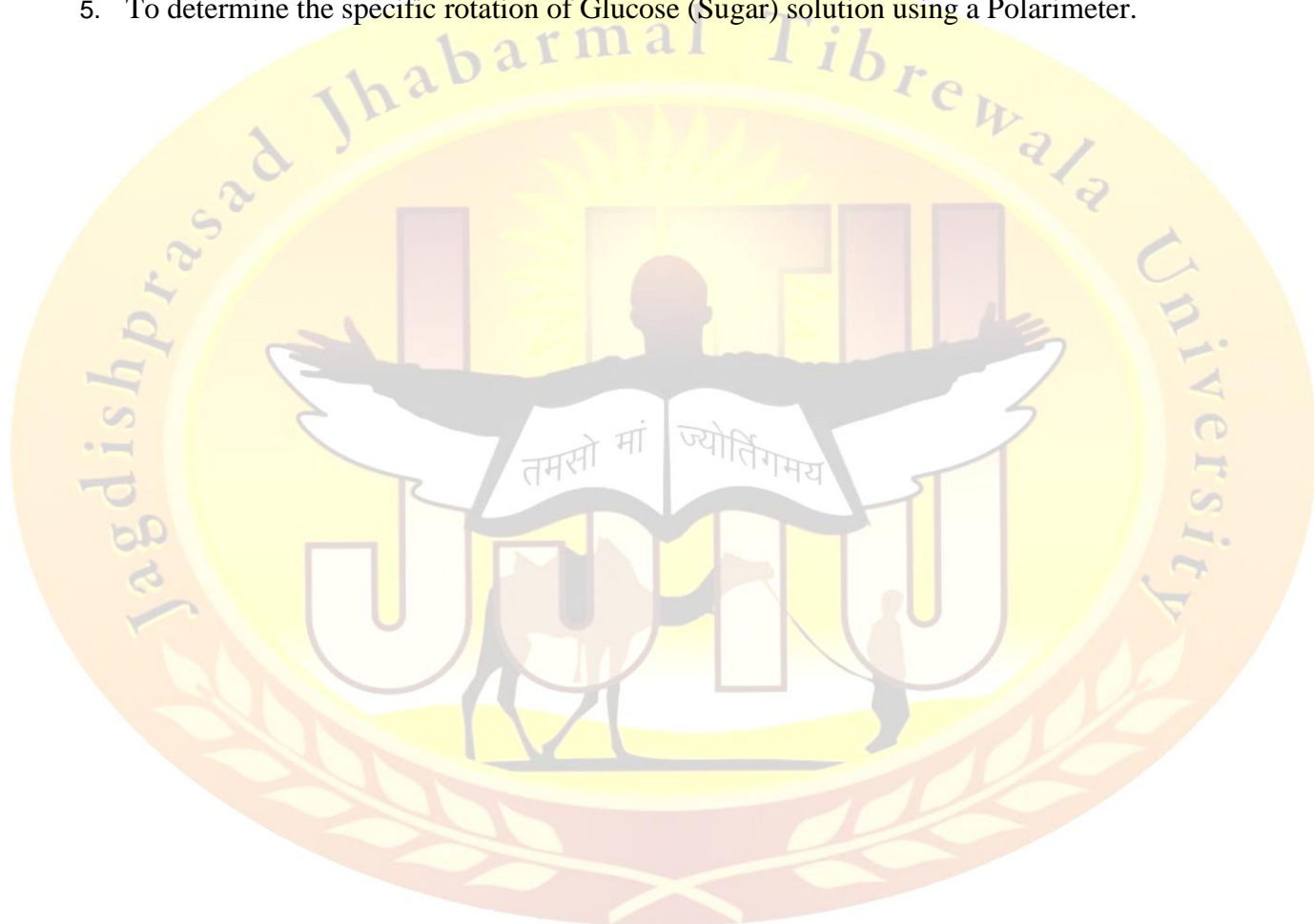
YEAR: I   **SEMESTER: I**

BT-108   ENGINEERING CHEMISTRY - I   **(L, T, P) = 3(0+0+3)**

1. Introduction to Chemistry Lab (the teachers are expected to teach fundamentals like Primary, Secondary Standard Solutions , Normality, Molarity, Molality etc and laboratory ware used,error ,accuracy ,precision, Theory of indicators, use of volumetric titrations

2. **Introduction to Volumetric Analysis:**
   The Teacher has to perform four types of volumetric titrations and will explain about the working of Indicators. (The Teacher has to call the students at random to perform the titrations)

3. **ANALYSIS OF WATER**
   Estimation of :
   a)   Calcium, Magnesium, Iron (111),Zinc (SEPERATELY)
   b)   TOTAL HARDNESS BY EDTA METHOD
   c)   TURBIDITY
   d)   CONDUCTIVITY
   e)   pH
   f)   TOTAL DISSOLVED SALTS
   g)   FLORIDES,CHLORIDES AND NITRATES (USING ION ANALYSER OR BY OLORIMETER)
   h)   DISSOLVED OXYGEN
   i)   BACTERIAL COUNT

   The student has to get his water sample and the teacher has to explain the analysis and the results are to be compared with the INDIAN STANDRDS.All the teachers are requested to give top priority to water analysis as it is very useful for the students and society. Complete water analysis may take couple of hours more but this has a unique influence on the system.

4. **CONSTRUCTION OF GALVANIC CELL**
   Based on the position of the metals in the electrochemical series a model Electrochemical Cell is constructed and the values are determined and effect of metal ion concentration, Temperature etc. on emf are calculated.

YEAR: I   **SEMESTER: I**

BT-109   COMPUTER PROGRAMING LAB   **(L, T, P) = 3(0+0+3)**

1. Simple OS Commands, vi editor, compiling program, compiler   options, linking libraries.

2. Simple input output program, integer, real, character and string. (Formatted & Unformatted), using command line Arguments

3. Conditional statement (if, if-else-if, switch-case)

4. Looping & iterations (for, while, do-while, continue, break)

5. Using Arrays (one, two and three dimensional)

6. Using Structures and Union.

7. Program using Function (with and without recursion), passing parameters by value &reference.

8. Using pointers.

9. File handling

YEAR: I   **SEMESTER: I**

BT-110   PRACTICAL GEOMETRY   **(L, T, P) = 3(0+0+3)**

1. (a) Lines, Lettering & Dimension (Sketch Book)

   (b) Scale-representative Fraction, Plan scale, Diagonal Scale, Vernier scales (In sheet)comparative Scale, & scale of chords (Sketch Book)

2. (a) Conic Section:-Construction of Ellipse, Parabola & Hyperbola by different methods (In sheet)

   (b) Engineering curves:-Construction of cycloid, Epicycloids, Hypocycloid and Involutes (In sheet) Archimedean and Logarithmic spiral, (Sketch book)

3. (a) Type of Projection, Orthographic Projection: First Angle and third Angle Projection (Sketch Book)

   (b) Projection of Points (Sketch Book)

   (c) Projection of Straight lines, different position of Straight lines, methods for determining True length, true inclinations and Traces of straight lines (Four problems in sheet and three problems in (Sketch Book)

   (d)Projection of Planes: Different positions of Plane lamina like.:- Regular polygon, circle three of planes (Four problems in Drawing sheet and three problems in Sketch Book.)

4. (a)Projection of Solids:- Projection of right and regular Polyhedron, Prisms, Pyramids and cone (Four Problem in Drawing sheet and there in Sketch Book.)

   (b) Section of Solids:- Projection of Frustum of a cone and pyramid, Projection of Truncated Solids (like Prism, Pyramid, Cylinder and Cone) in different positions.

5. (a) Development of Surfaces:- Parallel line and Radial line method for right, regular solids

   (b) Isometric Projections:- Isometric Scales, Isometric Axes, Isometric Projection of Solids

YEAR: I   **SEMESTER: I**

BT-111   WORKSHOP PRACTICE   **(L, T, P) = 3(0+0+3)**

Carpentry Shop

1. T – Lap joint

Foundry Shop

1. Mould of any pattern

2. Casting of any simple pattern

Welding Shop

1. Gas welding practice by students on mild steel flat

2. Demonstration of brazing

Machine Shop Practice

1. Job on lathe with one step turning and chamfering operations

2. Job on shaper for finishing two sides of a job

3. Drilling two holes of size 5 and 12 mm diameter on job used / to be used for shaping

4. Grinding a corner of above job on bench grinder

Fitting and Smithy Shop

1. Finishing of two sides of a square piece by filing

2. Tin smithy for making mechanical joint and soldering of joint

3. To cut a square notch using hacksaw and to drill three holes on PCD and tapping

YEAR: I   **SEMESTER: II**

BT -201   COMMUNICATION TECHNIQUES   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Communication: Its meaning, Importance and process, Importance of effective communication in business, The process of communication, Need for Communication	9
II	Objectives of communication, Types of communication, Verbal Communication, Nonverbal communication, Downward Communication, Upward communication, The c's of Good communication, Barriers of communication	8
III	Groups: Their Importance and Characteristics, Importance, Characteristics of Group Personality Advantages and disadvantages of Groups, Techniques of Group Decision Making.	7
IV	Tips of clear writing, Intrapersonal communication, Interpersonal communication, Self-Development & Communication, Speech & presentation. Questions/question Tags, Conditionals.	8
V	Business Correspondence, Formal & Informal letters, Essential Features of business letter, Drafting Advertisements. ,different dimension of personality development	8
	Total	40

Reference Books:

1. Wren & Martin English Grammar Book.
2. R.C. Bhatia "Business Communication".
3. John M. Penrose "Business Communication".
4. C.B. Gupta "Business Communication and Organization and Management".
5. Peck, john "The Student guide to Write".

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YEAR: I   **SEMESTER: II**

BT -202   ENGINEERING MATHEMATICS-II   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	**Coordinate Geometry of Three Dimensions** • Equation of a sphere • Intersection of a sphere and a plane, tangent plane, normal lines • Right circular cone • Right circular cylinder	9
II	**Matrices** • Rank of a matrix, inverse of a matrix by elementary transformations • Solution of simultaneous linear equations • Eigen values and Eigen vectors, Cayley – Hamilton theorem (without proof) • Diagonalization of matrix	8
III	**Vector Calculus** Scalar and vector field, differentiation & integration of vector functions Gradient, Divergence, Curl and Differential Operator Line, Surface and volume Integrals Green's Theorem in a Plane, Gauss' and Stoke's Theorem (without proof) and their Applications	7
IV	**Dynamics** • Angular Motion, Radial and Transverse Velocities and Accelerations • Tangential and Normal Accelerations • Rectilinear Motion in Resisting Medium	8
V	**Differential Equations** Series Solutions of Second Order Linear Differential Equations with Variable Coefficients (Complementary Functions only) Partial Differential Equations of First Order Lagrange's Form, Standard Forms Charpit's Method	8
	Total	40

Reference Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley 9th Edition.
2. Calculus and Analytical Geometry, Thomas and Finney, Narosa Publishing House N. Delhi.
3. A Text Book of Differential Equations, M.Ray and Chaturvedi, Students Friends & Co. Publisher, Agra.
4. Higher Engineering Mathematics, B.V.Ramana, Tata Mcgra Hill.
5. Mathematics for Engineers, Chandrika Prasad, Prasad Mudranalaya Allahabad.
6. Advanced Mathematics for Engineers, Chandrika Prasad, Prasad Mudranalaya Allahabad.

YEAR: I **SEMESTER: II**

BT -203 ENGINERING PHYSICS-II **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	**Applications of Schrödinger's Equation** Particle in three-dimensional boxes. Degeneracy, Barrier penetration and tunnel effect. Tunneling probability, Alpha **Decay. Summerfield's Free electron gas model** Postulates, Density of energy states, Fermi energy level.Band Theory of solids	9
II	**Lasers** Theory of laser action: Einstein's coefficients, Components of a laser, Threshold conditions for laser action. Theory, Design and applications of He-Ne and semiconductor lasers. Elementary ideas of Q-switching and mode locking. **Holography** Holography versus photography, Basic theory of holography, Basic requirement of a holographic laboratory. Applications of holography in microscopy and interferometry	8
III	**Coherence** Spatial and temporal coherence, Coherence length, Coherence time and 'Q' Factor for light. Visibility as a measure of coherence. Spatial Coherence and size of the source. Temporal coherence and spectral purity. **Optical Fibers** Optical fiber as optical wave-guide. Numerical aperture and maximum angle of acceptance	7
IV	**Nuclear Radiation Detectors and Dielectrics** Characteristics of gas filled detectors: general considerations. Constructions, Working and properties of: Ionization chamber, proportional Counter, G.M.Counter and Scintillation Counter. Dielectrics: Electric break down and measurement of dielectric constant	8
V	**Electro Dynamics** Scalar and Vector fields ,Definitions of gradient Divergence and curl , Maxwell's Equations ,Boundary Conditions , Wave equation and its solution for free space ,Nature of E.M. Waves, Poynting vector	8
	Total	40

Reference Books:

1. Fundamental of Optics, Jenkins and White, Fourth Edition, McGraw Hill.
2. Optics, Ajoy Ghatak, Third Edition, Tata McGraw Hill.
3. Quantum Mechanics, Schiff, Third Edition, McGraw Hill.
4. Quantum Mechanics, Merzbacher, Third Edition, Wiley India.
5. Nuclear Physics: Principles and Applications, John Lilley, Wiley India.

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YEAR: I   **SEMESTER: II**

BT -204 ENVIRONMENTAL ENGINEERING & DISASTER MANAGEMENT (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Basics of Environment. Adverse effects of environmental pollution and control strategies. Environmental Acts and Regulations. Functional concepts of Ecology. Basics of species. Ecosystem. Hydrological and chemical cycles. Energy flow in ecosystems. Biodiversity, Population dynamics. Renewable sources of energy. Potential & present status of renewable Sources of energy in India.	9
II	Quality and quantity of potable water. Surface and ground water sources. Basics of water Supply schemes. Treatment of water. Wastewater management, Treatment & disposal of wastewater. Anaerobic digestion, Septic tanks. Reuse and saving in use of water. Onsite sanitation. Environmental Impact Assessment (EIA). Necessity and methodology of EIA.	8
III	Air Pollution. Harmful effects of Air Pollution. Control of Air Pollution. Noise Pollution. Adverse effects and control of noise pollution. Global warming, Acid rain, Ozone depletion. Solid Waste Management. Classification of solid waste. Collection, transportation, treatment, and disposal of solid waste. Energy recovery. Sanitary landfill**.**	7
IV	Type of Disasters: Natural and Manmade (Earthquake, Tsunami, Cyclone, Flood, Drought, Landslides, Nuclear, Chemical, Fire and Environmental Hazards). Disaster Management Cycleand its components. Vulnerability of Indian Continent to different types of Disasters. Do's and Don'ts for safety during these disasters.Introductory seismology, Occurrence of Earthquakes, Plate Tectonic Theory, types ofearthquake	8
V	Definitions; Earthquake Magnitude, Intensity and their scales, Focus, Focal Depth, Epicentre,Epicentral Distance, Earthquake Energy. Concept of Seismic Zoning. Basic Concepts ofEarthquake Resistant Houses & Construction Practices.	8
	Total	40

Reference Books:

1. Chemistry of water treatment, Samuel Faust & Osman M Aly, CRC Press
2. Boilers water treatment. Principles and Practice, Colin Frayne, CRC Press
3. Corrosion Understanding the Basic, by Joseph R Davis, ASM International
4. Atmospheric pollution, by W Buch , Tata McGraw Hill(TMH)
5. Introduction to Environmental Science, by G Tyler Miller and Scott Spoolman, Cengage Learning
6. Introduction to Environmental Engineering, by Mackenzie L Davis and David A Cornwell, Tata McGraw Hill(TMH)

YEAR: I   **SEMESTER: II**

BT -205   ELECTRICAL & ELECTRONICS ENGINEERING   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Dc Networks: Kirchoff's Laws, Node Voltage and Mesh Current Analysis; Delta-Star and Star-Delta Transformations, Source Convesions. Classification of Network Elements, Superposition Theorem.	9
II	Single Phase AC Circuits: Generation of Single Phase AC Voltage, EMF Equation, Average, RMS and Effective Values. RLC Series, Parallel and Series, Parallel Circuits, Complex representation of Impedances.Phasor Diagram, Power and Power Factor. Three Phase AC Circuits: Generation of 3Phase ACVoltage, Delta and Star Connection, Line & Phase Quantities, 3-Phase Balanced Circuits, Phasor Diagrams, Measurement of Power in 3 Phase Balanced Circuits.	8
III	Transformer: Faradays Law of Electromagnetic Induction, Construction and Operation of Single Phase Transformer. EMF Equation, Voltage and Current relationship and Phasor Diagram of ideal transformer. Electrical DC Machine: Principal of DC Machine, Types, Different parts of DC Machine.	7
IV	Transistor: Bipolar Junction Transistor, Transistor Current Components, Characterestics of CE, CB and CC Transistor Amplifiers. Thyristors: The four layer diode, Bi-directional Thyristors, the uni-juntion transistor and its application in thyristor circuits.	8
V	Communication System: Introduction to modulation (AM, FM & PM), demodulation, multiplexing, Superhetrodyne radio receiver, television. Elementary concepts of optical, satellite & mobile communication.	8
	Total	40

Reference Books:

1. Sedra A S and Smith K C, "Microelectronic Circuits" 4th Ed., New York, Oxford University Press, New York (1997).
2. Tocci R J and Widmer N S, "Digital Systems – Principles and Applications", 8Ed., Pearson Education India, New Delhi (2001).
3. Cooper and Helfrick, "Modern Electronic Instrumentation and Measuring Techniques", 4th print Prentice Hall of India, New Delhi (1996).
4. Boylestad and Nashelsky, "Electronic Devices and Circuit Theory", 8th Ed, Pearson Education India, New Delhi (2002).
5. Millman and Grabel, "Microelectronics", 2nd Ed. Tata McGraw-Hill (1999). th

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YEAR: I   **SEMESTER: II**

BT -206   ENGINEERING CHEMISTRY - II   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.

I	1. JOULE THOMSON EFFECT
	   Definitions of Enthalpy, Free Energy, Entropy, Principle and explanation of Joule Thomson Effect, application to Air Conditioning , Refrigeration (WORKING PRINCIPLE AND FLOW DAIGRAMS)
	2. OSMOSIS &REVERSE OSMOSIS
	   Principles of Osmosis& Reverse Osmosis, application to Desalination process-Types of
	Membranes used in desalination process-Limitations
	3. SOLUBILITY PRODUCT& COMMON ION EFFECT--
	Definition of Solubility & Ionic products, Industrial applications
		9

II	1.CATALYSIS
	   Explanation of Catalysis, Criteria of Catalysts, Few Industrial Catalysts
	2. COLLOIDS
	   Explanation of Colloids- Properties of Colloids, Industrial applications of Colloids
	4.VISCOSITY:
	   Definition of Viscosity -Factors influence the Viscosity- Kinematic Viscosity-Determination of Molecular Weight of any one compound-Application to fluids in motion –Type of flow
		8

III	1. SUPERCONDUCTIVTY – Definition-Preparation –Properties –Engineering Applications 2. SEMICONDUCTORS - Definition –Types of semiconductors (Stiochiometric,Non stichometric ,Organic, Controlled Valency Semiconductors, Doping)-applications 3. STORAGE DEVICES - Materials used and working of Floppy, CD, Pendrive etc. 4. LIQUID CRYSTALS - Definition –Types - applications in LCD and Engineering Applications	7
IV	THERMAL ENERGY- introduction to solid fuels – definition – calorific value (LCV, HCV) bomb calorimeter, pulverized coal – carbonization – analysis of coal (proximate and ultimate analysis) – working of thermal power station.	8
V	NUCLEAR ENERGY: Introduction to nuclear fuels – binding energy – nuclear fission and fusion reactions – nuclear reactions – disposal of nuclear wastes	8
	Total	40

Reference Books:

1. Engineering Chemistry , P.C. Jain Monica Jain (Dhanpat Rai & Co)
2. Chemistry in Engineering & Tech, Vol. I & II , Kuriacose (TMH)
3. Instrumental methods of Chemical analysis, MERITT & WILLARD (EAST – WEST press)
4.   Physical Chemistry , P.W Atkin (ELBS, OXFORD Press)
5.   Physical Chemistry W.J.Moore (Orient Longman)

YEAR: I   **SEMESTER: II**

BT-207   PHYSICS LAB-II   **(L, T, P) = 3(0+0+3)**

1. To determine the height of water tank with the help of a Sextant.
2. To determine the dispersive power of material of a Prism for Violet Red and yellow colours of Mercury light with the help of a spectrometer.
3. To measure the Numerical Aperture of an Optical Fibre.
4. To determine the ferromagnetic constants retentivity, permeability and susceptibility by tracing B-H curve using C.R.O.
5. To study the Charge & Discharge of a condenser and hence determine time constant (Both current and voltage graphs are to be plotted.
6. To determine the high resistance by method of leakage, using a Ballistic galvanometer.
7. To verify the expression for the resolving power of a Telescope.
8. To determine the specific resistance of the material of a wire by Carey Fosters bridge.
9. To determine the specific resistance of the material of a wire by Carey Fosters bridge.
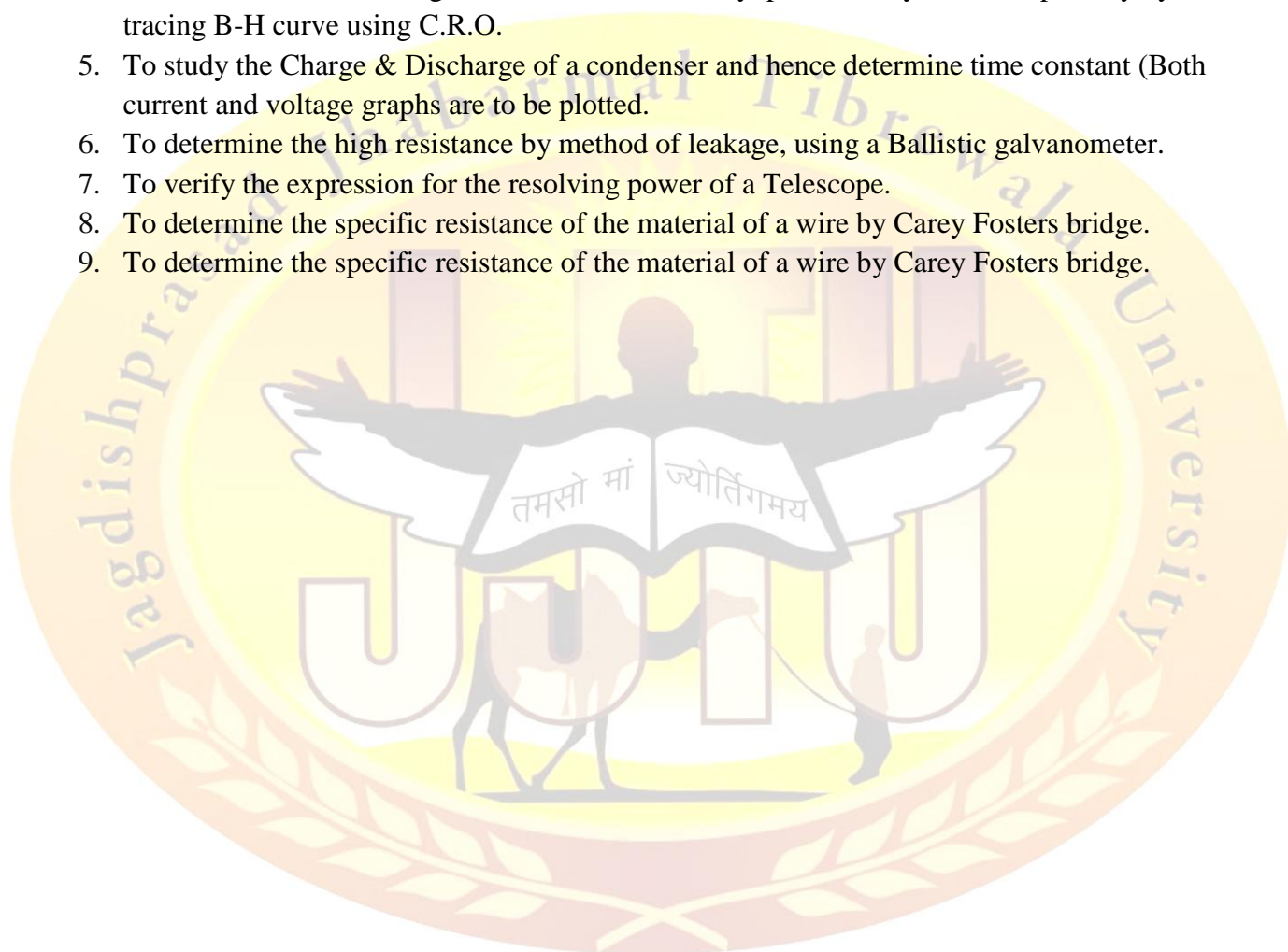
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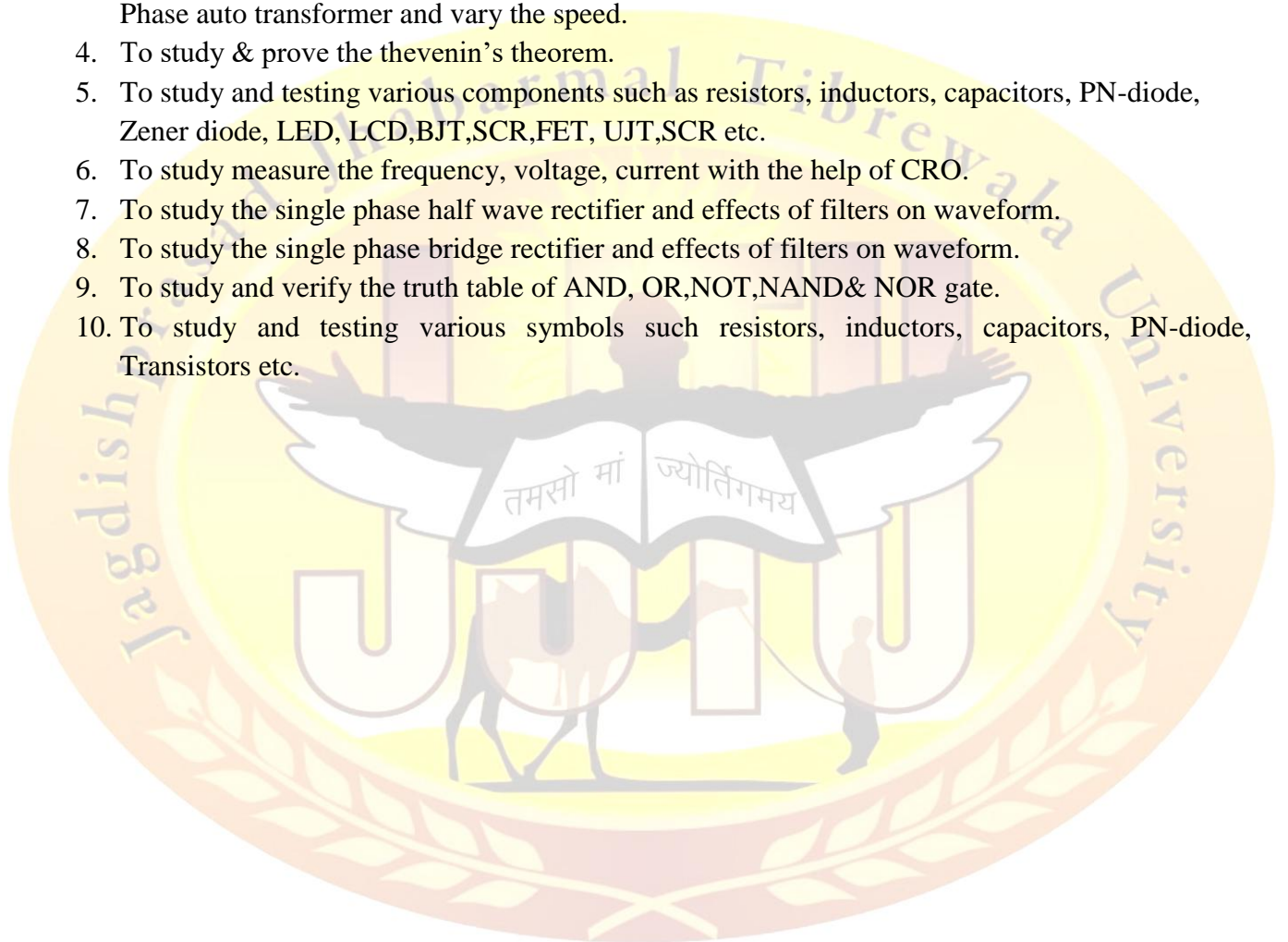**YEAR: I**   **SEMESTER: II**

BT-208   ENGINEERING CHEMISTRY LAB-II   (L, T, P) = 3(0+0+3)

1. **PRODUCTION OF BIODIESEL.**
   INTRODUCTION   TO BIO FUELS :-The teacher has to perform the transesterfication reaction   of FATTY ACID and the   Biodiesel thus produced can be used for analysis.(Please give priority to production of   Biodiesel from waste cooking oil)

2. **Estimation of properties of oil:**
   a. Acid Number
   b. Viscosity
   c. Saponification value
   d. Aniline point
   e. Flash and Fire points
   f. Pour and Cloud point

3. **PREPARATION OF PHENOL –FORMALDEHYDE RESIN**
4. **SOIL ANALYSIS**:
   pH, Determination of Zinc, Iron, Copper.
5. **FOOD ANALYSIS:**
   Determination Saturated and Unsaturated Fatty Acids, pH,etc.

   All the teachers are requested   to focus on bio fuels, soil analysis and food analysis as these are the need of 21 st century and these experiments are so designed to encourage students to carry out lab to land process.

YEAR: I   **SEMESTER: II**

BT-209   ELECTRICAL & ELECTRONICS LAB   (L, T, P) = 3(0+0+3)

1. To study the connection of ceiling fan along with the regulator & vary the speed.
2. To study the connection of single phase induction motor through single phase auto-Transformer and vary the speed.
3. To study the connection of three phase squirrel cage induction motor through three Phase auto transformer and vary the speed.
4. To study & prove the thevenin's theorem.
5. To study and testing various components such as resistors, inductors, capacitors, PN-diode, Zener diode, LED, LCD,BJT,SCR,FET, UJT,SCR etc.
6. To study measure the frequency, voltage, current with the help of CRO.
7. To study the single phase half wave rectifier and effects of filters on waveform.
8. To study the single phase bridge rectifier and effects of filters on waveform.
9. To study and verify the truth table of AND, OR,NOT,NAND& NOR gate.
10. To study and testing various symbols such resistors, inductors, capacitors, PN-diode, Transistors etc.

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**YEAR: I**   **SEMESTER: II**

BT-210   ENGINEERING DRAWING   **(L, T, P) = 3(0+0+3)**

Introduction to machine drawing

Dimensioning, locations and placing,

Orthographic projections: First & third angle methods

Sheet 1: Orthographic Projections (3 Problems)

Sheet 2: Sectional Views (3 Problems)

Sheet 3: Riveted joints, lap joints, butt joints, chain riveting, zig-zag riveting

Sheet 4: Screw fasteners, different threads, Nuts & bolts locking devices, set screws,

Foundation

Sheet 5: Bearing, Plumber block

Lectures on free hand sketches

List of free hand sketches

• Different type of lines

• Conventional representation of materials

• Screw fasteners

• Bearing: Ball, roller, needle, foot step bearing

• Coupling: Protected type, flange, and pin type flexible coupling

• Welded joints

• Belts and pulleys

• Pipes and pipe joints

• Valves

YEAR: I   **SEMESTER: II**

BT-211   LANGUAGE LAB   **(L, T, P) = 3(0+0+3)**

1. Phonetic Symbols and Transcriptions

2. Word Formation

3. Affixes

4. Listening and speaking Skills.

5. Words often Mis-spelt and Mis- Pronounced

6. One Word for Many.

7. Synonyms and Antonyms.

8. Seminar Presentation.

9. Group Discussion.

10. Job Interview
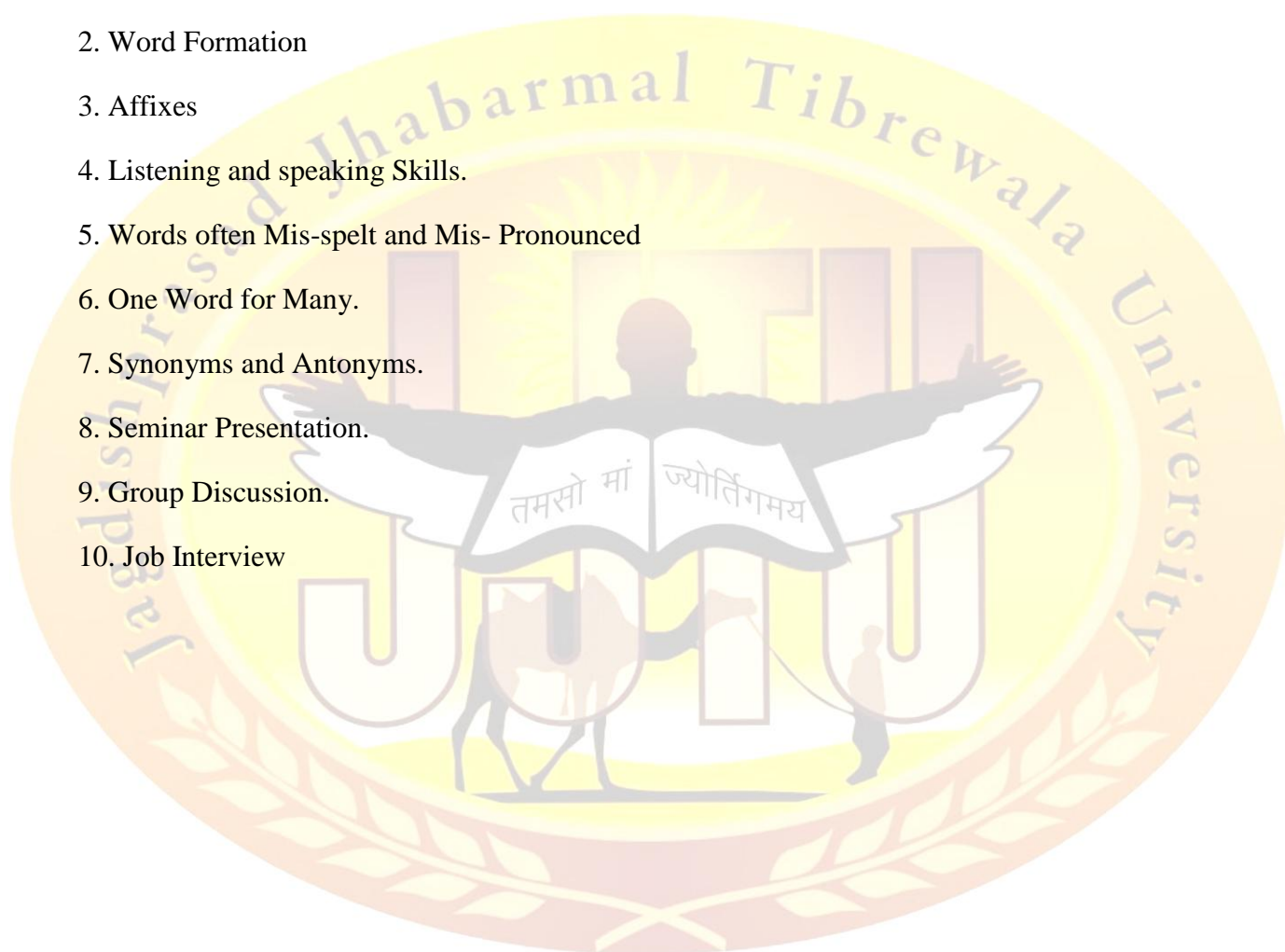
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YEAR: II   **SEMESTER: III**

CS-301   MATHEMATICS III   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	**Introduction:** Engineering application of optimization, Statement and classificationof optimization problem, single variable and multivariable optimization with and without constraints.	7
II	**Linear Programming:** Formulation of Linear Programming problem, Graphical Approach, General Linear Programming problem, Simplex Method. Duality in Linear Programming and Transportation Problems.	7
III	**Project Scheduling:** Project Scheduling by PERT and CPM Network Analysis. **Sequencing Theory:** General Sequencing problem n-jobs through 2 machines & 3 machines and 2-jobs through m machines.	7
IV	**LAPLACE TRANSFORM:** Laplace transform with its simple properties. Inverse Laplace transform, convolution theorem (without proof), solution of ordinary differential equation with constant coefficient, solution of partial differential equation having constant coefficient with special reference to diffusion, Heat conduction and wave equation. Boundary value problems	8
V	**NUMERICALANALYSIS:** Difference operators forward, backward, central, shift and average operators and relation between them. Newton's and Gauss forward and backward interpolation formula for equal interval, Stirling's formula for central difference. Lagrange's Interpolation formula and Inverse Interpolation. Numerical differentiation by Newton's, Gauss and Sterling's formula. Numerical Integration by Simpson's one third and there eight rule. Numerical Integration of ordinary differential equation of first order by Picard's method, Euler's and modified Euler's method, Milne's method and Runga-Kutta fourth order method. Solution of difference equation.	8
	Total	37

Reference Books:
1. Advanced Mathematics for Engineers by Chandrika Prasad
2. Higher Engineering Mathematics by B.S. Grewal
3. Higher Engineering Mathematics by Y.N. Gaur and C.L. Koul
4. Higher Engineering Mathematics by K.C. Jain and M.L. Rawat

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YEAR: II   **SEMESTER: III**

CS-302   **WEB TECHNOLOGY**   **(L, T, P) = 6 (3+0+3)**

Unit	Contents of Course	Hrs.
I	**Introduction and Web Development Strategies History of Web** Protocols governing Web, Creating Websites for individual and Corporate World, Cyber Laws Web Applications, Writing Web Projects, Identification of Objects, Target Users, Web Team, Planning and Process Development.	7
II	HTML, XML and Scripting List, Tables, Images, Forms, Frames, CSS Document type definition,XML schemes, Object Models, Presenting XML, Using XML Processors: DOM and SAX,Introduction to Java Script, Object in Java Script, Dynamic HTML with Java Script.	8
III	Java Beans and Web Servers Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API Introduction to Servelets, Lifecycle, JSDK, Servlet API, Servlet Packages: HTTP package, working with Http request and response, Security Issues.	8
IV	Introduction to JSP, JSP processing, JSP Application Design, Tomcat Server, Implicit,JSPobjects, Conditional Processing, Declaring variables and methods, Error Handling and Debugging, Sharing data between JSP pages- Sharing Session and Application Data.	7
V	Database Connectivity Database Programming using JDBC ,Studying Javax.sql.*package, accessing a database from a JSP page ,Application-specific Database Action, Developing Java Beans in a JSP page, introduction to Struts framework.	6
	Total	36

Reference Books:

1.   Ajitsinghpoonia, web technology and fundamentals

2.   J.E. Frend internet and history

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YEAR: II   **SEMESTER: III**

CS-303   DATA STRUCTURES AND ALGORITHMS   (L, T, P) = 7 (3+1+3)

Unit	Contents of Course	Hrs.
I	**Data Structure:** Definition, Implementation, Operation, Application, Algorithm writing and convention. Analysis ofalgorithm, Complexity Measures and Notations. **Arrays:** Representation of arrays (multidimensional), Addresscalculation using column and row major ordering. **Linked Lists :** Implementation, Doubly linked list, Circular linkedlist, unrolled linked list, skip-lists, Splices, Sentinel nodes, Application (Sparse Matrix, Associative Array, FunctionalProgramming)	8
II	**Stacks :** Definition, Implementation, Application (Tower of Hanoi, Function Call and return, Parentheses Matching,Back-tracking, Expression Evaluation) **Queues :** Definition, deque, enque, priority queue, bounded queue,Implementation, Application	7
III	**Tree:** Definition of elements, Binary trees: Types (Full, Complete, Almost complete), Binary Search Tree, Traversal(Pre, In, Post & Level order) Pruning, Grafting. Application: Arithmetic Expressions Evaluation Variations: IndexedBinary Tree Threaded Binary Tree, AVL tree, Multi-way trees, B tree, B+ tree, Forest, Trie and Dictionary	7
IV	**Graphs:** Elementary definition, Representation (Adjacency Matrix, Adjacency Lists) Traversal (BFS, DFS) **Application:** Spanning Tree (Prim and Kruskal Algorithm) Dijkstra's algorithm, shortest path algorithms.	7
V	**Sorting:** Bubble, Selection, Insertion, Quick, Radix Merge, Bucket, Heap, Searching: Hashing, Symbol Table, BinarySearch, Simple String Searching	7
	Total	36

Reference Books:

1. Aho A.V., J.E.Hopcroft. J.D.Ulman: Data Structures and Algorithms, Addison Wesley.

2. Brastrad: Algorithms, PHI.

3. Horowitz and Sawhni: Algorithms Design and Analysis, CS Press.

4. Kruse R.L.: Data structure and Program Design.PHI.

5. Tanenbaum : Data structures in C,PHI

6. Trembley&Sorenson :An Introduction to Data Structures, Mc-Graw Hill International

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YEAR: II   **SEMESTER: III**

CS-304   OBJECT ORIENTED PROGRAMMING   (L, T, P) = 6 (3+0+3)

Unit	Contents of Course	Hrs.
I	**Introduction to OOPs and C++ Element** - Introduction to OOPs, Features & Advantages of OOPs, Different element of C++ (Tokens, Keywords, Identifiers, Variable, Constant, Operators, Expression, String).	7
II	**Program Control Statements** – Sequential Constructs, Decision Making Construct, Iteration / Loop Construct, Arrays, Functions (User defined Function, Inline Function, Function Overloading), User Defined Data Types (Structure, Union and Enumeration).	7
III	**Class, Object, Constructor & Destructor** – Class, Modifiers (Private, Public & Protected), Data Member, Member Function, Static Data Member, Static Member Function, Friend Function, Object, Constructor (Default Constructor, Parameterized Constructor and Copy Constructor), Destructor.	7
IV	**Pointer, Polymorphism & Inheritance** – Pointer (Pointer to Object, this Pointer, Pointer to Derive Class), Introduction toPolymorphism (Runtime Polymorphism, Compile time Polymorphism), Operator Overloading, Virtual Function, Inheritance (Single Inheritance, Multiple Inheritance, Multilevel Inheritance, Hierarchical Inheritance, Hybrid Inheritance), Virtual Base Class, Abstract Class	8
V	**File Handling, Exception Handling** - Files I/O, Exception Handling (Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism, Re-throwing an Exception).	7
	Total	36

Reference Books:

1. Object Oriented programming with C++ by E. Balaguruswami

2. Success with C++ by Kris James

3. Object Oriented programming with C++ by David Parsons

4. Programming in C++ by D. Ravichandran

5. Mastering C++ by Venugopal, Ravishankar, Rajkumar

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YEAR: II   **SEMESTER: III**

CS-305   DIGITAL ELECTRONICS   **(L, T, P) = 6 (3+0+3)**

Unit	Contents of Course	Hrs.
I	**Number Systems, Basic Logic Gates & Boolean Algebra:** BinaryArithmetic & Radix representation of different numbers. Sign & magnituderepresentation, Fixed point representation, complement notation, various codes &arithmetic in different codes & their inter conversion. Features of logic algebra,postulates of Boolean algebra. Theorems of Boolean algebra. Boolean function.Derived logic gates: Exclusive-OR, NAND, NOR gates, their block diagrams andtruth tables. Logic diagrams from Boolean expressions and vice-versa. Convertinglogic diagrams to universal logic. Positive, negative and mixed logic. Logic gateconversion.	6
II	**Digital Logic Gate Characteristics:** TTL logic gate characteristics.Theory & operation of TTL NAND gate circuitry. Open collector TTL. Three stateoutput logic. TTL subfamilies. MOS & CMOS logic families. Realization of logicgates in RTL, DTL, ECL, C-MOS & MOSFET. Interfacing logic families to oneanother.	8
III	**Minimization Techniques:**Minterm, Maxterm, Karnaugh Map, K map upto4 variables. Simplification of logic functions with K-map, conversion of truthtables in POS and SOP form. Incomplete specified functions. Variable mapping.Quinn-McKlusky minimization techniques.	7
IV	**Combinational Systems:** Combinational logic circuit design, half and fulladder, subtractor. Binary serial and parallel adders. BCD adder. Binary multiplier.Decoder: Binary to Gray decoder, BCD to decimal, BCD to 7-segment decoder.Multiplexer, demultiplexer, encoder. Octal to binary, BCD to excess-3 encoder.Diode switching matrix. Design of logic circuits by multiplexers, encoders, decodersand demultiplexers.	7
V	**Sequential Systems:** Latches, flip-flops, R-S, D, J-K, Master Slave flipflops. Conversions of flip-flops. Counters : Asynchronous (ripple), synchronousandsynchronous decade counter, Modulus counter, skipping state counter, counterdesign. Ring counter. Counter applications. Registers: buffer register, shift register.	8
	Total	36

Reference Books:

1. BARTEE**,** "Digital Computer Fundamentals " TMH Publication ISBN 0-07-003899-6

2. MALVINO**,** " Digital Computer Electronics " TMH Publication ISBN 0-07-462235-8

3. MORRIS MANO**,** "Computer System Architecture " PHI Publication ISBN 81-203-0417-9

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YEAR: II   **SEMESTER: III**

CS-306.1   MANAGEMENT INFORMATION SYSTEMS   (L, T, P) = 3(3+0+0)

Unit	Contents of Course	Hrs.
I	Introduction to MIS: concept, Definition, role, Impact and effectiveness of MIS. E-business enterprise: Introduction, E-business, E-commerce, E-communication, E-collaboration. Information Security Challenges: Security Threats controlling and management.	7
II	Basic of Management Information System: Decision Making, Information and knowledge, OO- Technology and MIS, Business process Re-engineering.	7
III	Application of Management Information system: Application in manufacturing sector using for personal management, financial management, Production Management, Material Management, Marketing Management Application in Service Sector.	8
IV	Enterprise Resource Planning (ERP): EMS, ERP, Benefits implementation, EMS & MIS. Case Studies: Application of SAP technologies in manufacturing sector	7
V	Database and client server architecture, Data Warehouse: architecture to implementation, E-business Technology: Electronic payment systems, Web enabled business management, MIS in web environment.	7
	Total	36

Reference Books:

1. W.S. Jawadekar-Management Information System, Tata McGraw Hill.

2. Loudon & Loudon-Management Information, Pearson Education Asia

YEAR: II   **SEMESTER: III**

CS-306.2   INTERNET TECHNOLOGY   **(L, T, P) = 3(3+0+0)**

Unit	Contents of Course	Hrs.
I	**Introduction :** Internet connection concepts- server, client and parts, Domain Name Systems, Telephone,cable and satellite connections- Dialup, ISDN, ADSL and leased line based connection, cable and DSS accounts,Web TV and Intranets, ISP features.	8
II	**Intranets:** What is Intranet? – Intranet Vs LANs Components of an Intranet Workstations and client software,Server and Network operating systems, Network Cards, Cabling and Hubs, Steps for creating an Intranet,Maintenance and connecting to Internet.	8
III	**E-Mail Technology:** Features and Concepts- Message headers, Address book, Attachment, Filtering andforwarding mails.	6
IV	**Video Conferencing And Internet Telephony:** Voice vs. Video conferencing, Video conferencinghardware and features of video conferencing software, digital telephony as ISDN application, H 323 protocols andmulti-point conferencing.	7
V	**Web Technology:** Elements of the Web- Clients and servers, Languages and protocols Web page and Websites, special kinds of Web sites, Web Resources- Search Engines, Message boards, clubs, News groups andchat, Web page creation concepts- planning, Navigation, Themes and Publishing , Analyzing web traffic- Log filedata, analyzing log files and products for analyzing web traffic.	7
	Total	36

Reference Books:

1. Young, "The Complete Reference Of Internet", Tata McGraw Hill.

2. Deitel, Deitel and Nieto, "Internet and World Wide Web – How To Program", Pearson Education Publisher, 2000.

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YEAR: II   **SEMESTER: III**

CS-306.3 PRINCIPLES OF PROGRAMMING   LANGUAGES   (L, T, P) = 3(3+0+0)

Unit	Contents of Course	Hrs.
I	**Programming Language:** Definition, History, Features. Issue in Language Design: Structure and Operation of computerLanguage Paradigms. Efficiency, Regularity. Issues in Language Translation: Syntax, Semantics, Stages analysis andsynthesis, Parse Tree, CFG and BNF grammar.	8
II	Specification and Implementation of Elementary and Structured Data Types. Type equivalence, checking andconversion. Array, List, Structure, Union.	7
III	Sequence control with Expressions, Conditional Statements, Loops, Exception handling. Subprogram definition andactivation, simple and recursive subprogram. Subprogram environment. Parameter passing mechanism.	7
IV	Abstract Data type, information hiding, encapsulation, type definition. Static and Stack-Based Storage managementFixed and Variable size heap storage management. Garbage Collection	7
V	**Parallel Programming:** Introduction, parallel processing and programming language. Threads, semaphore, monitor,message passing.	7
	Total	36

Reference Books:

1. V.Rajaraman :Fundamentals of Computers

2. Ghezzi: Programming Language Concepts, Addison Wesley.

3. Kernighan, Ritchie :Programming in C

4. Structure :Programming in C++

5. Pratt :Programming Languages

6. Ravi Shetty:Programming Language

YEAR: II   **SEMESTER: III**

CS-307   **WEB TECHNOLOGY LAB**   **(L, T, P) = 3(0+0+3)**

1. Develop a static html page using style sheet to show your own profile.Add a page to show 5 photos and add a page to show your academics in a table .Add a page containing 5 links to your favorite website Add navigational links to all above pages (add menu).
2. Update your homepage, by creating few html file (e.g. header, footer, left-sidebar, right), in these file you will put all html codeto be shown on every page.
3. Use Cascading Style Sheets to format your all pages in a common format.
4. Basic Php programs: Write a simple "hello word" program using php.
5. Write a program to accept two strings (name and age) from user. Print welcome statement e.g. "Hi Ram, your age is 24."
6. Write a program to create a calculator, which can support add, subtraction and multiply and division operation.
7. Write a program to take input parameters for a table (no. of rows and no. of columns), and create the desired table.
8. Create a "Contact Me" page -Ask user to enter his name, email ID, Use Java-Script to verify entered email address.
9. Store submitted value in a MySql database. Display latest 5 submitted records in contact me page. Display above record withnavigation support. e.g. (next, previous, first, last).

YEAR: II   **SEMESTER: III**

CS-308   DATA STRUCTURE LAB   **(L, T, P) = 3(0+0+3)**

1.   Program on array searching, sorting (Bubble sort, Quick sort, Marge sort etc.)
2.   Program to insert element at desire position, replacing element, deletion in array.
3.   Various matrices operations.
4.   Various strings programs.
5.   Implementation of stack and queue using array
6.   Implementation of stack and queue using link lists
7.   Implementation of circular queue using link lists.
8.   Polynomial addition, multiplication.
9.   Two-way link lists programs.
10.   Infix to postfix/prefix conversion.
11.   BST implementation (addition, deletion, searching).
12.   Graph traversal (BFS, DFS).
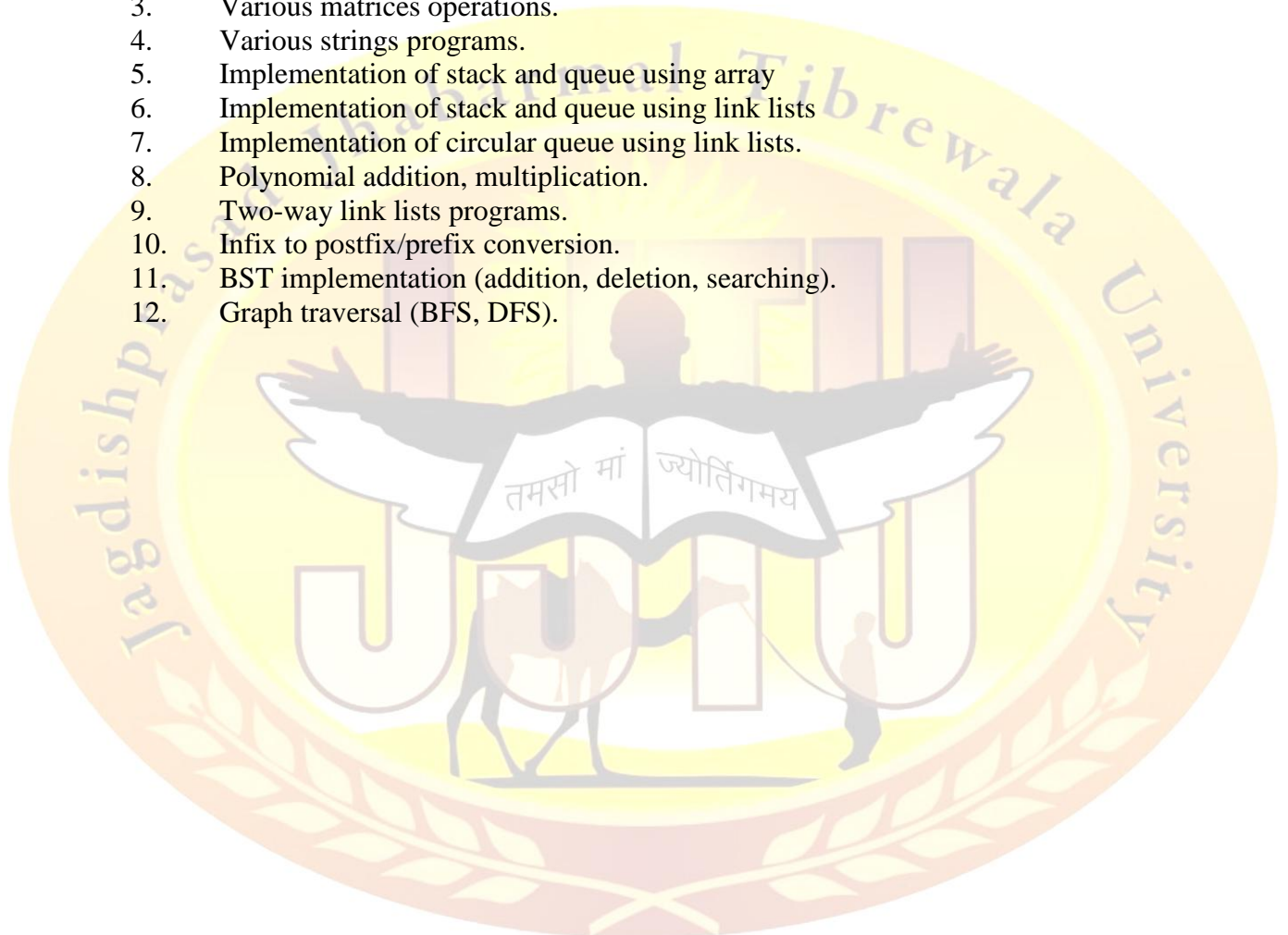
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YEAR: II   **SEMESTER: III**

CS-309   PROGRAMMING IN C++   **(L, T, P) = 3(0+0+3)**

1. To write a simple program for understanding of C++ program structure without any CLASS declaration. Program may be based on simple input output, understanding of keyword using.

2. Write a C++ program to demonstrate concept of declaration of class with public & private member, constructors, object creation using constructors, access restrictions, defining member functions within and outside a class. Scope resolution operators, accessing an object's data members and functions through different type of object handle name of object, reference to object, pointer to object, assigning class objects to each other.

3. Program involving multiple classes (without inheritance) to accomplish a task. Demonstrate composition of class.

4. Demonstration Friend function friend classes and this pointer.

5. Demonstration dynamic memory management using new & delete & static class members.

6. Demonstration of restrictions an operator overloading, operator functions as member function and/ or friend function, overloading stream insertion and stream extraction, operators, overloading operators etc.

7. Demonstrator use of protected members, public & private protected classes, multilevel inheritance etc.

8. Demonstrating multiple inheritance, virtual functions, virtual base classes, abstract classes

YEAR: II   **SEMESTER: III**

CS-310   DIGITAL ELECTRONICS LAB   **(L, T, P) = 3(0+0+3)**

1. To verify the truth tables of basic logic gates: AND, OR, NOR, NAND, NOR. Also to verify the truth table of Ex-OR, Ex-NOR (For 2, 3, & 4 inputs using gates with 2, 3, & 4 inputs).

2. To verify the truth table of OR, AND, NOR, Ex-OR, Ex-NOR realized using NAND & NOR gates.

3. To realize an SOP and POS expression.

4. To realize Half adder/ Subtractor& Full Adder/ Subtractor using NAND & NOR gates and to verify their truth tables.

5. To realize a 4-bit ripple adder/ Subtractor using basic Half adder/ Subtractor& basic Full Adder/ Subtractor.

6. To verify the truth table of 4-to-1 multiplexer and 1-to-4 demultiplexer. Realize the multiplexer using basic gates only. Also to construct and 8-to-1 multiplexer and 1- to-8 demultiplexer using blocks of 4-to-1 multiplexer and 1-to-4 demultiplexer

7. Design & Realize a combinational circuit that will accept a 2421 BCD code and drive a TIL - 312 seven-segment displays.

8. Using basic logic gates, realize the R-S, J-K and D-flip flops with and without clock signal and verify their truth table

9. Construct a divide by 2, 4& 8 asynchronous counter. Construct a 4-bit binary counter and ring counter for a particular output pattern using D flip flop.

10. Perform input/output operations on parallel in/Parallel out and Serial in/Serial out registers using clock. Also exercise loading only one of multiple values into the register using multiplexer.

11. Note: As far as possible, the experiments shall be performed on bread board. However, experiments Nos. 1-4 are to be performed on bread board only.

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YEAR: II   **SEMESTER: IV**

CS-401   PROGRAMMING IN JAVA   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	JAVA: Introduction to Object Orientated Programming, Abstraction, ObjectOriented Programming Principles, Features of JAVA, Introduction to Java bytecode, Java Virtual machine. PROGRAM ELEMENTS: Primitive data types, variables, assignment,arithmetic, short circuit logical operators, Arithmetic operators, bit wiseoperators, relational operators, Boolean logic operators, the assignmentoperators, operator precedence, Decision and control statements, arrays.	7
II	CONTROL STATEMENTS: Java's Selection Statements, if statement, switchstatement, Iteration Statements, while, do-while, for, for-each, Nested Loops,Jump Statements, Using break, Using continue, return. OBJECTS AND CLASSES: Objects, constructors, returning and passing objectsas parameter, Nested and inner classes, Single and Multilevel Inheritance,Extended classes, Access Control, usage of super, Overloading and overridingmethods, Abstract classes, Using final with inheritance.	7
III	PACKAGE AND INTERFACES: Defining package, concept of CLASSPATH,access modifiers, importing package, Defining and implementing interfaces.STRING HANDLING: String constructors, special string operations, characterextraction, searching and comparing strings, string Buffer class.	7
IV	EXCEPTION HANDLING: Exception handling fundamentals, Exception types,uncaught exceptions, try, catch and multiple catch statements. Usage of throw,throws and finally .FILE HANDLING: I/O streams, File I/O.	8
V	CONCURRENCY: Processes and Threads, Thread Objects, Defining andStarting a Thread, Pausing Execution with Sleep, Interrupts, Joins,Synchronization. APPLET: Applet Fundamentals, using paint method anddrawing polygons.	7
	Total	36

Reference Books:

1. Herbert Schildt: JAVA 2 - The Complete Reference, TMH, Delhi

2. Deitel: How to Program JAVA, PHI

3. U.K. Chakraborty and D.G. Dastidar: Software and Systems – An Introduction,WheelerPublishing.

4. Joseph O'Neil and Herb Schildt: Teach Yourself JAVA, TMH, Delhi.

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YEAR: II   **SEMESTER: IV**

CS-402   OPERATING SYSTEMS   **(L, T, P) = 3 (3+0+0)**

Unit	Contents of Course	Hrs.
I	Introduction to Operating Systems, Operating system services, multiprogramming, time-sharing system, storage structures. System calls, multiprocessor system. Basic concepts of CPU scheduling, Scheduling criteria, Schedulingalgorithms, algorithm evaluation, multiple processor scheduling, real time scheduling. I/0 devices organization, I/0devices organization, I/0 devices organization, I/0 buffering	7
II	Process concept, process scheduling, operations on processes. Threads, inter-process communication, precedencegraphs. Critical section problem, semaphores, and classical problems of synchronization. Deadlock problem, deadlockcharacterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.	7
III	Concepts of memory management, logical and physical address space. swapping, contiguous and non-contiguousallocation paging, segmentation, and paging combined with segmentation	7
IV	Concepts of virtual memory, demand paging, page replacement algorithms. Allocation of frames, thrashing, demandsegmentation. Security threads protection intruders-Viruses-trusted system	8
V	Disk scheduling, file concepts, file access methods, allocation methods, directory systems, file protection, Introductionto distributed systems and parallel processing case study.	8
	Total	37

Reference Books:

1. A.S.Tanenbaum-Modern Operating Systems, Pearson Education Asia.

2. D.M.Dhamdhere-Operating Systems-A Concept based approach, Tata Mc-Graw Hills.

3. Achyutgodble -Operating Systems, Tata Mc-Graw Hills.

4. Stallings-Operating System, Pearson.

YEAR: II   **SEMESTER: IV**

CS-403   DISCRETE MATHEMATICAL STRUCTURES   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Formal Logic: Statement, Symbolic Representation and Tautologies, Quantifiers, Predicator and validity. Normalform. Propositional Logic, Predicate Logic, Logic Programming and Proof of correctness.	7
II	Sets and Functions: Sets, relations, functions, operations, equivalence relations Relation of partial order, partitions, binary relations. Transforms: Discrete Fourier and Inverse Fourier Transforms in one and two dimensions, discreteCosine transform	7
III	Graph Theory: Graphs - Directed and Undirected, Eulerian chains and cycles Hamiltonian chains and cycles, BFSDFS Trees, chromatic number, connectivity and other graphical parameters Applications. Polya's Theory ofenumeration and its applications	7
IV	Proof, Relation and Analysis of Algorithm Techniques for theorem proving: Direct Proof, Proof by Contra position,Proof by exhausting cares and proof by contradiction, Principle of mathematical induction, principle of completeinduction. Solution methods for linear, first-order recurrence relations with constant coefficients.	8
V	Monoids and Groups: Groups, Semigroups and Monoids cyclic semi graphs and sub monoids, Subgroups and cosets.Congruence relations on semi groups. Morphism, Normal sub groups. Structure off cyclic groups, permutation groupsand dihedral groups elementary applications in coding theory	8
	Total	37

Reference Books:

1. Kolman b, Busby R.: Discrete Mathematical Structure for Computer Science, PHI.

2. Knuth, D.E. :The Art of Computer Programming, Volume I, Narosa

3. Liu :Introduction to Discrete Mathematics, McGraw Hill

4. Deo : Graph Theory, PHI

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YEAR: II   **SEMESTER: IV**

CS-404   MICROPROCESSOR AND INTERFACES   (L, T, P) = 3 (3+0+0)

Unit	Contents of Course	Hrs.
I	Introduction to Micro Computer Systems: Microprocessors, microcontroller and microcomputer devices. Machine andassembly language, Bus concept. Architecture &Pinout of 8085A	7
II	Assembly Language and Programming in 8085: Instruction set, Program structures (sequential, conditional, (iterative) Macros and subroutines, Stack, Counter and timing delay, interrupt structure and its programming	7
III	Peripherals and their interfacing with 8085-I: Memory Interfacing, Interfacing I/O ports. Data transfer schemes(Synchronous, asynchronous, interrupt driven), Architecture & interfacing of PPI 8255, Data Converters and Timer8254	7
IV	Peripherals and their interfacing with 8085-II: Architecture & interfacing of-DMA controller 8257, interrupt Controller8259A, USART 8251, Level Converters MC 1488 and MC 1489. Current loop, RS 232 C and RS 422 A	8
V	Comparative study of 8085 A, 8086 and 8088 (Pinout, internal architecture, timing diagrams). Instruction format andaddressing modes – Data and Branch related. Features of Pentium processor, MMX and Dual core processor	8
	Total	37

Reference Books:

1.   Gaonkar-8085 Programming, Penram Press.
2.   A.P. Mathur-Introduction to Microprocessors, Tata Mc-Graw-Hill.
3.   Antanakos-Introduction to Intel Family Microprocessors, Pearson Education.
4.   Gilmore-Microprocessors Principles and Applications, Tata Mc-Graw Hill.
5.   B.Ram-Fundamentals of Microprocessors & Micro Computers, DhanpatRai Pub.
6.   Ray and Bhurchandi-Intel Microprocessors, Tata-Mc-Graw Hill.

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YEAR: II   **SEMESTER: IV**

CS-405   **DATABASE MANAGEMENT SYSTEMS**   **(L, T, P) = 3 (3+0+0)**

Unit	Contents of Course	Hrs.
I	**Introduction:** Applications, Purpose, File System v/s DBMS, Data Abstraction(views), Structure of a DBMS-Query Processor, Database Users and Administrator, Data Dictionary, Transaction Manager, Storage Manager. Data Models Introduction-Network Model, Hierarchical Model, Relational Model, Entity Relationship Model and Object Oriented Model. **Entity Relationship Model:** Structure of RDMS and Database Schema, Entities, Attributes and Entity Sets, Relationship and Relationship Sets, Key Constraints, Participation Constraints (Mapping Cardinalities), Integrity Constraints, Weak Entity Set, Design issues, Extended Features- Aggregation, Generalization and Specialization, case study of an Enterprise.	7
II	**Relational Algebra:** Operations: Selection, Projection, Set, Renaming, Joints, Division. Relational calculus- Tuple Relational Calculus, Domain Relational Calculus.**Query Languages:** Procedural and Non Procedural, DDL, DCL and DML.SQL-Clauses, Nested Queries, SQL Functions- Single Row Function,Multigroup Functions, Set Operations, Aggregate Operators, Null Values, Embedded SQL, Dynamic SQL.	8
III	**Schema Refinement And Normal Forms:** Introductions to Schema Refinement, Functional Dependencies, Boyce-Codd Normal Forms, Third Normal Form, Normalization-Decomposition into BCNF Decomposition into3-NF, Denormalization, Triggers.**Transaction Processing:** Introduction-Transaction State, Transaction properties, Concurrent Executions. Need of Serializability, Conflict vs. ViewSerializability, Testing for Serializability, Recoverable Schedules, Cascadeless Schedules.	8
IV	**Concurrency Control:** Implementation of Concurrency: Lock-based protocols, Timestamp-based protocols, Validation-based protocols, Deadlock handling. **Database Failure and Recovery:** Database Failures, Recovery Schemes: Shadow Paging and Log-based Recovery, Recovery with Concurrent transactions.	7
V	**Indexing and Hashing:** Basic Concepts, Ordered Indices, B+ -Tree Index Files-Tree Index Files, Multiple Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices, Index Definition in SQL.	6
	Total	36

Reference Books:
1. H.f.Korth and Silberschatz: Database Systems Concepts, McGraw Hill
2. Almasri and S.B. Navathe: Fundamentals of Database Systems
3. Ramakrishnan and Gehrke: Database Management System, McGraw Hill
4. C.J. Date: Data Base Design, Addison Wesley
5. Hansen and Hansen : DBM and Design, PHI

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YEAR: II   **SEMESTER: IV**

CS-406.1   STATISTICS AND PROBABILITY THEORY   (L, T, P) = 3 (3+0+0)

Unit	Contents of Course	Hrs.
I	Introduction & Discrete random variablesSample space, events, algebra of events, Bernoulli's trials, Probability&Baye'stheorem. Random variable & their event space, probability generating function,expectations, moments, computations of mean time to failure, Bernoulli & Poissonprocesses.	7
II	Discrete & continuous distributionsProbability distribution & probability densities: Binomial, Poisson, normalrectangular and exponential distribution & their PDF's, moments and MGF's forabove distributions.	7
III	Correlation & Regression Correlation & regression: Linear regression, Rankcorrelation, Method of least squares Fitting of straight lines & second degreeparabola. Normal regression and correlation analysis.	7
IV	Queuing TheoryPure birth, pure death and birth-death processes. Mathematical models for M/M/1,M/M/N, M/M/S and M/M/S/N queues.	8
V	Discrete Parameter mark on chains:M/G/1 Queuing model, Discrete parameter birth-death process	8
	Total	37

Reference Books:

1. Probability,Statistics&RandomProcessByT.Veerajan,TMH
2. FundamentalofMathematicalStatisticsByS.C.GuptaandV.K.Kapoor, Sultanchand&sons.
3. StatisticsandProbabilityTheoryByJain&Rawat,CBC
4. StatisticsandProbabilityTheoryBySchaum's,T.M.H.

YEAR: II   **SEMESTER: IV**

CS-406.2   OPEN SOURCE TECHNOLOGY   **(L, T, P) = 3 (3+0+0)**

Unit	Contents of Course	Hrs.
I	OST overview: Evolution & development of OST and contemporary technologies, Factors leading to its growth.Open Source Initiative (OSI), Free Software Foundation and the GNU Project, principle and methodologies. Contextsof OST (India & international). Applications of open source (open source teaching and open source media) RiskFactors. Myths regarding open source.	7
II	Philosophy of Software Freedom, Free Software, OSS, Closed software, Public Domain Software, Shared software,Shared source. Detail of few OSS like Open Audio, Video, 2d & 3d graphics software, system tools, office tools,Networking& internet, Security, Educational tools and Games	7
III	Open Source Development Model, Starting and Maintaining an Open Source Project. Open Source Hardware, OpenSource Design, Ongoing OS Projects (i.e. examples of few good upcoming software projects.) Case Study: - Linux,Wikipedia.	7
IV	Licenses and Patents: What Is A License, How to create your own Licenses? Important FOSS Licenses (Apache,BSD,GPL, LGPL), copyrights and copy lefts, Patents	8
V	Social and Financial impacts of open source technology, Economics of FOSS: Zero Marginal Cost, Income generationopportunities. Problems with traditional commercial software, Internationalization, Open Source as a Business Strategy.	8
	Total	37

Reference Books:

1.   Vikasthada, Review to OST

2.   Balaguruswamy concepts of open source concepts

YEAR: II   **SEMESTER: IV**

CS-406.3   LOGIC & FUNCTIONAL PROGRAMMING   (L, T, P) = 3 (3+0+0)

Unit	Contents of Course	Hrs.
I	PROPOSITIONS: Fully parenthesized propositions, Evaluation of constant propositions, Evaluation of proposition n astate. Precedence rules for operators, Tautologies, Propositions a sets of states and Transforming English toprepositional form	7
II	REASONING USING EQUIVALENCE TRANSFORMATIONS: The laws of equivalence, rules of substitution andtransitivity, formal system of axioms and Inference rules. NATURAL DEDUCTION SYSTEM: Introduction todeductive proofs, Inference rules, proofs and sub-proofs, adding flexibility to the natural deduction system anddeveloping natural deduction system proofs	7
III	PREDICATES: Extending the range of a state, Quantification, Free and Bound Identifiers, TextualsubstitutionQuantification over other ranges and some theorems about textual substitution and states	7
IV	LOGIC PROGRAMMING: Introduction to prepositional and predicate calculus, First-order predicate calculusFormat logical systems, PROLOG programming-Facts, Rules and queries, Implementations, Applications, Strengths andWeaknesses	8
V	FUNCTIONAL PROGRAMMING: Introduction to lambda calculus-Syntax and semantics, Computability andcorrectness. Features of Functional Languages-Composition of functions, Functions as first-class Objects, no side effectsand clean semantics. LISP Programming-Data types and structures, Scheme dialect, primitive functions, functions for constructing functions and functional forms. Applications of functional languages and comparison of functional andimperative languages	8
	Total	37

Reference Books:

1.   Appleby-Programming Languages, Tata Mc-Graw Hill.

2.   Sebesta-Concepts of Programming Languages, Pearson Education

3.   David Gries-The Science of programming, Narosa Publication House.

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CS-407   JAVA PROGRAMMING LAB   **(L, T, P) = 3 (0+0+3)**

Objectives: At the end of the semester, the students should have clearly understood andimplemented the following:

1. Develop an in depth understanding of programming in Java: data types, variables, operators, operator precedence, Decision and control statements, arrays, switch statement, Iteration Statements, Jump Statements, Using break, Using continue, return.
2. Write Object Oriented programs in Java: Objects, Classes constructors, returning and passing objects as parameter, Inheritance, Access Control, Using super, final with inheritance Overloading and overriding methods, Abstract classes, Extended classes.
3. Develop understanding to developing packages & Interfaces in Java: Package, concept of LASSPATH, access modifiers, importing package, Defining and implementing interfaces.
4. Develop understanding to developing Strings and exception handling: String constructors, special string operations, character extraction, searching and comparing strings, string Buffer class. Exception handling fundamentals, Exception types, uncaught exceptions, try, catch and multiple catch statements.Usage of throw, throws and finally.
5. Develop applications involving file handling: I/O streams, File I/O.
6. Develop applications involving concurrency: Processes and Threads, Thread Objects, Defining and Starting a Thread, Pausing Execution with Sleep, Interrupts, Joins, and Synchronization.
7. Develop applications involving Applet: Applet Fundamentals, using paint method and drawing polygons.

It is expected that each laboratory assignments to given to the students with an aim to In order to achieve the above objectives.

Indicative List of exercises:

8. Programs to demonstrate basic concepts e.g. operators, classes, constructors,control& iteration statements, recursion etc. such as complex arithmetic, matrix arithmetic, tower of Hanoi problem etc.
9. Development of programs/projects to demonstrate concepts like inheritance, exception handling, packages, interfaces etc. such as application for electricity department, library management, ticket reservation system, payroll system etc.
10. Development of a project to demonstrate various file handling concepts.
11. Development of a project to demonstrate various applet concepts.

YEAR: II   **SEMESTER: IV**

CS-408   OPERATING SYSTEMS SIMULATION LAB   (L, T, P) = 3 (0+0+3)

Objectives:

Understand the basic functions of operating systems.

In depth knowledge of the algorithms used for implementing the tasks performedby the operating systems.

Understand & simulate strategies used in Linux & Windows operating systems.

Develop aptitude for carrying out research in the area of operating system.

Suggested Tools:

Operating system simulator- MOSS preferably on Linux platform (Available for free

download from http://www.ontko.com/moss/).

Recommended Excercises:

A. Exercises shall be given on simulation of algorithms used for the tasks

performed by the operating systems. Following modules of the simulator may

be used:

Scheduling

Deadlock

Memory Management Systems

File system simulator

Algorithms described in the text may be assigned. The simulation results such as

average latency, hit & Miss Ratios or other performance parameters may be

computed.

B. One exercise shall be on simulation of algorithms reported in the recent

conferences/ journals and reproducing the results reported therein.

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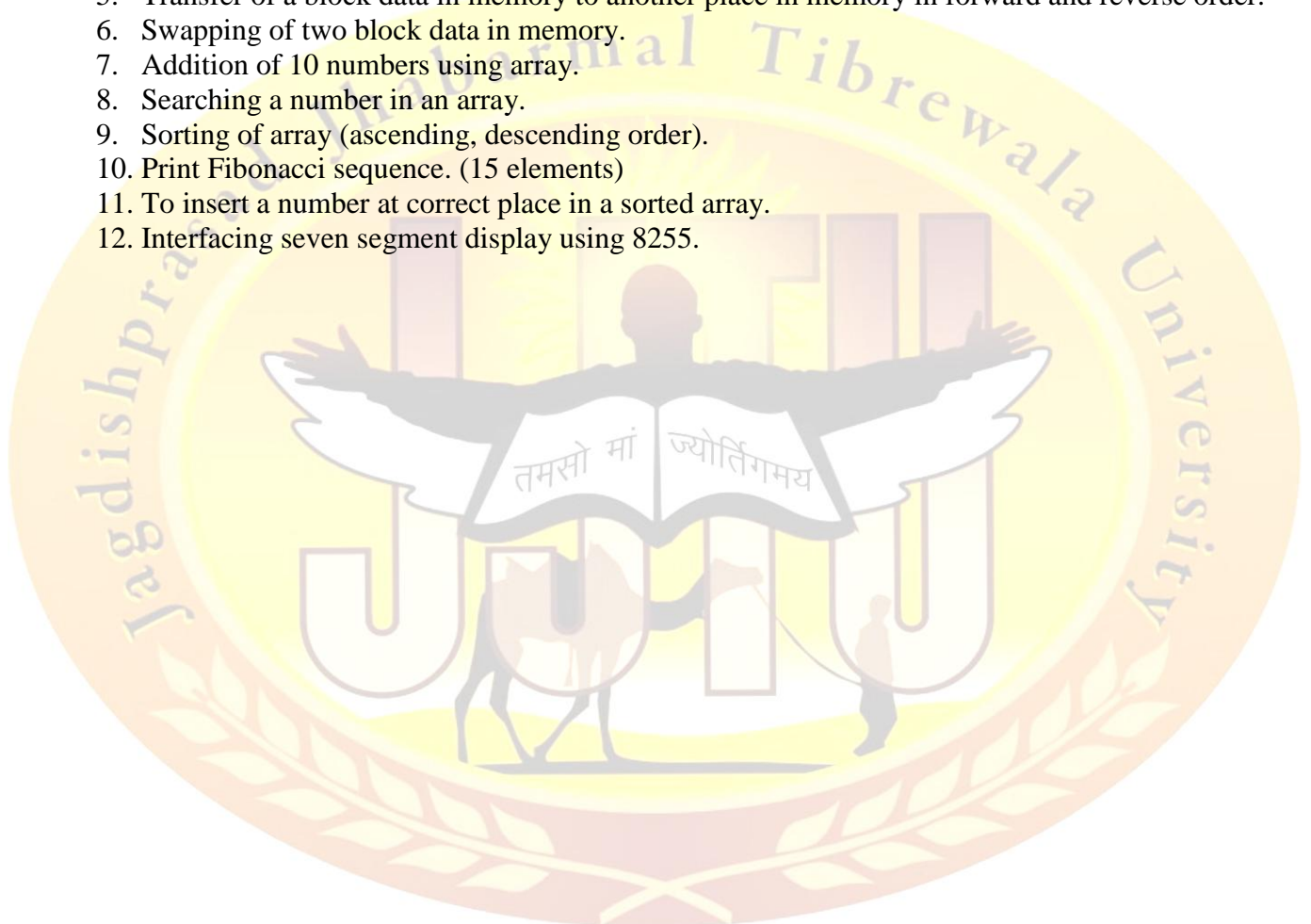**YEAR: II**   **SEMESTER: IV**

CS-409   **MICROPROCESSOR LAB**   **(L, T, P) = 3 (0+0+3)**

1. Study of hardware, functions, memory, and operations of 8085 kit.
2. Program to perform integer addition (two and three numbers 8 bit)
3. Program to perform multiplication (two 8 bit numbers).
4. Program to perform division (two 8 bit numbers).
5. Transfer of a block data in memory to another place in memory in forward and reverse order.
6. Swapping of two block data in memory.
7. Addition of 10 numbers using array.
8. Searching a number in an array.
9. Sorting of array (ascending, descending order).
10. Print Fibonacci sequence. (15 elements)
11. To insert a number at correct place in a sorted array.
12. Interfacing seven segment display using 8255.

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YEAR: II   **SEMESTER: IV**

CS-410   DATABASE MANAGEMENT SYSTEMS LAB   (L, T, P) = 3 (0+0+3)

1. Student can use MySQL (preferred open source DBMS) or any other Commercial DBMS tool (MS-Access / ORACLE) at backend and C++ (preferred) VB/JAVA at front end.
2. Write a C++ program to store students records (roll no, name, father name) of a class using file handling. (Use C++ and File Handling).
3. Re-write program 1, using any DBMS and any compatible language.(C++/MySQL) (VB and MS-Access)
4. Write a program to take a string as input from user. Create a database of same name. Now ask userto input two more string, create two tables of these names in above database.
5. Write a program, which ask user to enter database name and table name to delete. If database existand table exist then delete that table.
6. Write a program, which ask user to enter a valid SQL query and display the result of that query.
7. Write a program in C++ to parse the user entered query and check the validity of query.(Only SELECT query with WHERE clause)
8. Create a database db1, having two tables t1 (id, name, age) and t2 (id, subject, marks).
    (a) Write a query to display name and age of given id (id should be asked as input).
    (b) Write a query to display average age of all students.
    (c) Write a query to display mark-sheet of any student (whose id is given as input).
    (d) Display list of all students sorted by the total marks in all subjects.
9. Design a Loan Approval and Repayment System to handle Customer's Application for Loan and handle   Loan repayments by depositing installments and reducing balances.
10. Design a Video Library Management System for managing issue and return of Video tapes/CD andManage customer's queries.

YEAR: III   **SEMESTER: V**

CS-501   **COMPUTER ARCHITECTURE**   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	REGISTER TRANSFER LANGUAGE: Data movement around registers. Data movement from/to memory,arithmetic and logic micro operations. Concept of bus and timing in register transfer	7
II	CPU ORGANISATION: Addressing Modes, Instruction Format. CPU organization with large registers, stacks andhandling of interrupts & subroutines Instruction pipelining	7
III	ARITHMETIC ALGORITHM: Array multiplier, Booth's algorithm. Addition subtraction for signed unsignednumbers and 2's complement numbers	7
IV	MICROPROGRAMMED CONTROL Unit: Basic organization of micro-programmed controller. Horizontal &Vertical formats, Address sequencer	8
V	MEMORY ORGANISATION: Concept of RAM/ROM, basic cell of RAM. Associative memory, Cache memoryorganization, Vertical memory organization. I/O ORGANISATION: Introduction to Peripherals & their interfacing.Strobe based and handshake-based communication, DMA based data transfer, I/O processor	8
	Total	37

Reference Books:

1.   J.P.Hayes -'Computer Architecture & organization', Mc-Graw Hill.

2.   Heuring-Computer System Design and Architecture, Pearson Education.

3.   M.MORRISMANNO-'Computer System Architecture', Prentice Hall of India.

4.   Bartee-Computer Architecture, Tata Mc-Graw Hill.

5.   Stallings-Computer Organization and Architecture, Pearson Education.

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YEAR: III   **SEMESTER: V**

CS-502   SOFTWARE ENGINEERING   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	System Analysis: Characteristics, Problems in system Development. System Level project Planning, System Development Life cycle (SDLC), Computer system engineering system analysis, modeling the architecture, system specification.	7
II	Software Project Management: Objectives, Resources and their estimation, LOC and FP estimation, effort estimation COCOMO estimation model, risk analysis. Software project scheduling. Software Development : Life Cycle(SWDLC), SWDLC models software engineering approaches	7
III	Requirement Analysis: Requirement analysis tasks, Analysis principles. Software prototyping and specification data dictionary. Finite state machine (FSM) models. Structured Analysis: Data and control flow diagrams, control and process specification behavioral modeling, extension for data intensive applications	7
IV	Software Design: Design fundamentals, Effective modular design. Data architectural and procedural design, design documentation	8
V	Object Oriented Analysis: Object oriented Analysis Modeling, Data modeling. Object Oriented Design: OOD concepts and methods class and object definitions, refining operations. Class and object relationships, object modularization. Introduction to Unified Modeling Language	8
	Total	37

Reference Books:

1. Pressman; Software Engineering-A practitioner's Approach, McGraw Hill International

2. Behforooz and F.J. Hudson: Software Engineering Fundamentals Oxford University Press

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YEAR: III   **SEMESTER: V**

CS-503   **COMPUTER NETWORKS**   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Network, Network Protocols, Edge, Access Networks and Physical Media Protocol Layers and their services models, Internet Backbones, NAP's and ISPs	7
II	Application Layer: Protocol and Service provided by application layer, transport protocols. The World Wide Web. HTTP, Message formats, User Server Interaction and Web caches. FTP commands and replies. Electronic Mail, SMTP, Mail Message Formats and MIME and Mail Access Protocols DNS The internet's directory service DNS records and Message.	7
III	Transport Layer: Transport Layer Service and Principles, Multiplexing and Demultiplexing applications, Connectionless Transport. UDP Segment structure and UDP Checksum. Principles of Reliable Data Transfer-Go back to N and Selective Repeat. Connection Oriented Transport TCP Connection and Segment Structure, Sequence Numbers and acknowledgement numbers, Telnet, Round trip time and timeout. TCP connection management	7
IV	Network Layer and Routing: Network service model, Routing principles. Link State routing Algorithm, A distant Vector routing& OSPF algorithm. Router Components; Input Prot, Switching fabric and output port. IPV6 Packet format. Point To Point Protocol (PPP), transition States, PPP Layers-Physical Layer and Data Link Layer, Link Control Protocols. LCP Packets and options. Authentication PAP and CHAP, Network Control Protocol (NCP).	8
V	Sonet/SDH: Synchronous Transport Signals. Physical configuration-SONET Devices, Sections, Lines and Paths. SONET Layers-Photonic Layer, section layer, line layer, path layer and device layer relationship. Sonet Frame format. Section overhead, Line overhead and path overhead. Virtual Tributaries and types of VTs.	8
	Total	37

Reference Books:

1.   J.F. Kurose and K.W. Ross-Computer Networking, Pearson Education Asia.

2.   B.A. Forouzan-Data Communications and Networking, Tata Mc-Graw Hill.

3.   Garcia and Widjaja-Communication Networks, Tata Mc-Graw Hill.

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YEAR: III   **SEMESTER: V**

CS-504   ADVANCED JAVA PROGRAMMING   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Introduction to Java Enterprise, J2EE Architecture, API JDBC,API J2EE fundamentals, J2EE multi-tier architecture, WebApplications in J2EE,Apache Tomcat5.0 Server Configuration and important file. Httpprotocal with client and server model	7
II	Servlets fundamentals – architecture, life cycle of a servlet,method of Servlet life cycle, initialization, javax.servletandjavax.servlet.http package and method of this package, servlets and HTML, Handling HTTP requests and Responses, retrievingdata in servlet using GET and POST methods,	7
III	JDBC Driver , Servlets with JDBC and Inter servlet communications – JDBC, JDBC servlet, inter servlet communication,different packages of JSP and servlets. Servlet sessions management technique using cookies,URLRewritting, Hidden Form,HttpSession methods, JDBC connection pool, servlet security	7
IV	JSP fundamentals – architecture, JSP Life Cycle, Difference between JSP and Servlet, JSP elements(JSP Expression, JSPScriptlet ,JSP Directives, JSP Declaration) standard actions, (set Properties, get Properties, get Parameter ,set Parameter ,useBean ,param), Implicit objects, JSP errors, JSP with JDBC connection.	8
V	J2ME – introduction, building MID lets, creating a user interface, event handling with commands, tickers, screens,textbox, lists and forms.	8
	Total	37

Reference Books:

1.   Head First Servlet and JSP Kethy Sierra
2.   C. Horstmann and G. Cornell (Prentice-Hall).
3.   P.Wang (Thomson).
4.   T.Budd (Addison-Wesley).
5.   Patrick, Naughton, Herbert

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YEAR: III   **SEMESTER: V**

CS-505   ARTIFICIAL INTELLIGENCE   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of productionsystems. Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques likehill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies	7
II	Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional andpredicate logic, comparison of propositional and predicate logic. Resolution, refutation, deduction, theorem proving, inferencing, monotonic and non-monotonic reasoning	7
III	Probabilistic reasoning, Baye's theorem, semantic networks scripts schemas, frames, conceptual dependency and fuzzy logic, forward and backward reasoning	7
IV	Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing	8
V	Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems.	8
	Total	37

Reference Books:

1. E.Rich, K Knight-Artificial Intelligence, Tata McGraw Hills.

2. S.Russell, P.Norving-Artificial Intelligence-A Modern Approach, Pearson Education, Asia.

3. Thomas Dean-Artificial Intelligence-Theory & Practice, Pearson Education, Asia.

4. Alison Caursey - The Essence of Artificial Intelligence, Pearson Education, Asia.

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YEAR: III   **SEMESTER: V**

CS-506.1   ADVANCED DATA STRUCTURE   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	ADVANCED TREES: Definitions Operations on Weight Balanced Trees (Huffman Trees), 2-3 Trees and Red-BlackTrees. Augmenting Red-Black Trees to Dynamic Order Statistics and Interval Tree Applications. Operations on Disjointsets and its union-find problem Implementing Sets. Dictionaries, Priority Queues and Concatenable Queues using 2-3Trees	7
II	MERGEABLE HEAPS: Merge able Heap Operations, Binomial Trees Implementing Binomial Heaps and itsOperations, 2-3-4. Trees and 2-3-4 Heaps. Amortization analysis and Potential Function of Fibonacci HeapImplementing Fibonacci Heap. SORTING NETWORK: Comparison network, zero-one principle, bitonic sorting andmerging network sorter.	7
III	GRAPH THEORY DEFINITIONS: Definitions of Isomorphic Components. Circuits, Fundamental Circuits, Cut-sets.Cut-Vertices Planer and Dual graphs, Spanning Trees, Kuratovski's two Graphs	7
IV	GRAPH THEORY ALGORITHMS: Algorithms for Connectedness, Finding all Spanning Trees in a Weighted Graphand Planarity Testing Breadth First and Depth First Search, Topological Sort, Strongly Connected Components andArticulation Point. Single Min-Cut Max-Flow theorem of Network Flows. Ford-Fulkerson Max Flow Algorithms	8
V	NUMBER THEORITIC ALGORITHM: Number theoretic notation, Division theorem. GCD recursion, Modulararithmetic, Solving Linear equation, Chinese remainder theorem, power of an element. RSA public key Cryptosystem,primality Testing and Integer Factorization	8
	Total	37

Reference Books:

1. NarsinghDeo-Graph Theory with Application to Engineering and Computer Science, Prentice Hall of India.

2. Baase-Computer Algorithms, Pearson Education.

3. Cormen-Introduction to Algorithms, Prentice Hall of India.

4. Aho A.V., Hopcrptt J.E. and Ullman J.D.-The Design and Analysis of Computer Algorithms, Pearson Education.

5. Horowitz and Sawhni-Fundamentals of Data Structures Galgotia Book Source.

YEAR: III   **SEMESTER: V**

CS-506.2   E-COMMERCE   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Business Strategy in an Electronic Age: Value Chain-supply chains, Proter's value chain, model and Inter-Organizational value chains. Competitive Advantage-Competitive strategy. Proter's Model, First Mover advantage andcompetitive advantage using e-commerce Business strategy. Introduction to Business Strategy, Strategic Implicationsof IT technology e-commerce Implementation and evaluation	7
II	Business to Business Electronic Commerce: Inter-organizational Transactions, The credit Transaction Trade cycle.A variety of transactions, Electronic markets-markets and electronic markets, usage of electronic markets, Advantagesand disadvantages of electronic markets	7
III	Electronic Data Interchange (EDI): Definition and benefits of EDI. EDI technology, standards, communications,implementation, agreements and securities. EDI trading patterns and transactions.	7
IV	Building an E-Commerce Site: Introduction to object behavior, components, active scripting. Object models,Infrastructure objects, service object and data objects, choosing the objects. Building a scalable application, Additionthe configure method, connecting to the database, Accessing and versioning the database. Building the catalog objectwith example. Creating shopping basket-Holding state, creating the tables for a shopping basket, modifying the objectmodel and making the basket accessible	8
V	J2EE Architecture Overview: Enterprise components, Information technology in the enterprises, Introduction toenterprise objects and enterprise component model. The J2EE model features, J2EE components-container architecture.Enterprises Java and J2EE architecture.	8
	Total	37

Reference Books:

1. David Whiteley - E-Commerce Strategy, Technology and Application, Tata McGraw Hill.

2. Mathew Reynolds - Beginning E-commerce with Visual Basic ASP, SQL Server 7.0 and MTS, Shroff Publishers & Distributors Pvt.

3. Perrone&Chaganti - Building Java Enterprises System with J2EE, Techmedia.

4. Kalakota - Frontiers of Electronic Commerce, Pearson Education.

YEAR: III   **SEMESTER: V**

CS-506.3   SOFT COMPUTING   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Overview of Crisp sets and fuzzy sets : Basic concepts of crisp sets and fuzzy sets, Basic types of fuzzy sets, Fuzzy setsverses crisp sets, Representation and extension principle for fuzzy sets, Operations on Fuzzy sets Fuzzy Relations andFuzzy Logic: Crisp versus Fuzzy relations, Binary relations on fuzzy sets, Equivalence, compatibility and orderingrelations, Morphemes and compositions of relations, Fuzzy relations equations, Fuzzy measures and possibilitytheory, Classical logic and multivolume logics, Fuzzy propositions and approximate reasoning Fuzzy systems andneuron fuzzy systems : Relevance of integration between fuzzy sets and neural networks – pros and cons, Fuzzyneurons, Fuzzy neural networks, Neuron fuzzy systems, Fuzzy associative memories.	7
II	Introduction to Genetic Algorithms : What are genetic algorithms?, Robustness of traditional optimization and searchmethods, The Goals of optimization, A simple genetic algorithm, Genetic algorithms at work – a Simulation by hand,Grist for the Search Mill – Important Similarities, Similarity Templates (Schemata), Learning the Lingo. GeneticAlgorithms Revisited : Mathematical Foundations,	7
III	The fundamental Theorem, Schema processing at work: An example by hand revisited. The two-armed and karmedbandit problem, The building block hypothesis, Another perspective: The minimal deceptive problem,Schemata revisited: similarity templates as hyper planes.	7
IV	Computer Implementation of A Genetic Algorithm : Data Structures, Reproduction, Crossover, and mutation, ATime to reproduce, a time to cross, Get with the main program, Mapping objective functions to fitness form, Fitnessscaling, Codlings, A multiparameter, Mapped, Fixed-Point coding, Discrimination, Constraints.	8
V	Introduction To Genetic-Based Machine Learning : Genetics-Based machine learning, Rule and message system,Apportionment of credit: The bucket brigade, Genetic algorithm, A simple classifier system in Pascal, Results using thesimple classifier system.	8
	Total	37

Reference Books:

1.   Neuro-Fuzzy and *Soft Computing by* Mohammad Jamshidi

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YEAR: III   **SEMESTER: V**

CS-507   NETWORK LAB   **(L, T, P) = 3 (0+0+3)**

1. The lab is to be conducted in Perl programming language, Perl works on all platforms (including windows)
2. Write few basic programs of Perl.
   a. A Hello World Program
   b. Write a program to add to 10 numbers.
   c. Write a program of reading input from the keyboard and displaying them on monitor.
   d. Write a program to take two strings as input and compare them
3. To understand advance constructs of Perl
   a. Write a program to create a list of your course (all theory courses in current semester) using array and print them.
   b. Write a program to accept ten number, store it into a hash table (Perl have itself) and when asked by user tell him that number exists or not. (do not store duplicate numbers).
   c. Write a program to compute the number of lines in a file.
4. Find the IP address of a host or turn an IP address into a name.
5. Connect to an FTP server and get or put files. Automate the one-time transfer of many files to download the file everyday, whichhave changed since yesterday. (use Net: FTP)
6. Write a program to send mail. The programs should monitor system resources like disk space and notify admin by mail when diskspace becomes dangerously low. (use Net: mail)
7. Fetch mail from a POP3 server (use Net: pop 3)
8. Find out who owns a domain (use Net: whois, Whois is a service provided by domain name registration authorities to identify ownersof domain names)
9. Test whether a machine is alive. machine can be specified using IP address or domain name of machine.
10. You have a URL that fetch its content from a Perl script, convert it to ASCII text (by stripping html tags) and display it.
11. Writing a TCP Client, Writing a TCP Server and communicate some data over TCP

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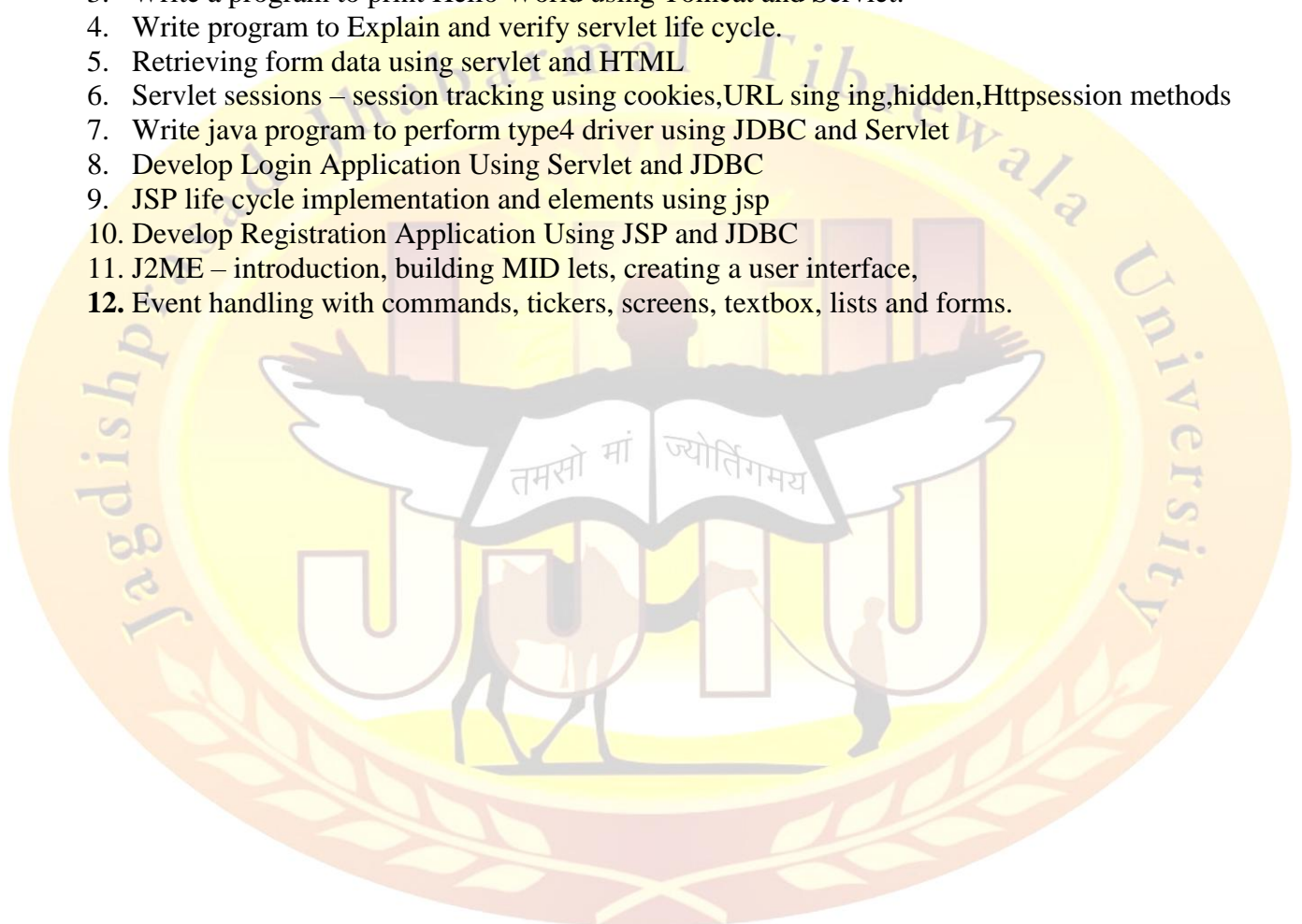**YEAR: III**   **SEMESTER: V**

CS-508   ADVANCED JAVA PROGRAMMING LAB   (L, T, P) = 3 (0+0+3)

1. Installation and configuration of Apache Tomcat server.
2. Deploy and Setup the Environment for web Application in tomcat server.
3. Write a program to print Hello World using Tomcat and Servlet.
4. Write program to Explain and verify servlet life cycle.
5. Retrieving form data using servlet and HTML
6. Servlet sessions – session tracking using cookies,URL sing ing,hidden,Httpsession methods
7. Write java program to perform type4 driver using JDBC and Servlet
8. Develop Login Application Using Servlet and JDBC
9. JSP life cycle implementation and elements using jsp
10. Develop Registration Application Using JSP and JDBC
11. J2ME – introduction, building MID lets, creating a user interface,
12. Event handling with commands, tickers, screens, textbox, lists and forms.

YEAR: III   **SEMESTER: V**

CS-509   UML LAB   **(L, T, P) = 3 (0+0+3)**

Students are required to prepare various UML diagrams for any case study like Microwave Oven operation.
1.   Following diagrams should be prepared:
2.   Use case static structure diagram
3.   Object and Class diagram
4.   Sequence Diagram
5.   Collaboration Diagram
6.   State Chart Diagram
7.   Activity Diagram
8.   Component Diagram
9.   Deployment Diagram

YEAR: III   **SEMESTER: V**

CS-510   MINER PROJECT – I   **(L, T, P) = 3 (0+0+3)**

S. No.	List of Experiments	Hrs.
1.	Undertaking a project on an assigned recent topic of the latest technical field.	18

YEAR: III   **SEMESTER: VI**

CS-601   **THEORY OF COMPUTATION**   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Finite Automata & Regular Expression: Basic Concepts of finite state system, Deterministic and non-deterministicfinite automation and designing regular expressions relationship between regular expression & Finite automataminimization of finite automation mealy & Moore Machines	7
II	Regular Sets of Regular Grammars: Basic Definition of Formal Language and Grammars. Regular Sets and RegularGrammars closure proportion of regular sets, Pumping lemma for regular sets, decision Algorithms for regular sets,Myhell_Nerod Theory & Organization of Finite Automata	7
III	Context Free Languages& Pushdown Automata: Context Free Grammars – Derivations and Languages –Relationshipbetween derivation and derivation trees – ambiguity – simplification of CEG – Greiback Normal form –Chomskynormal forms – Problems related to COMPUTER NETWORK F and GNF Pushdown Automata: Definitions – Moves –Instantaneous descriptions – Deterministic pushdown automata – Pushdown automata and CFL - pumping lemma forCFL - Applications of pumping Lemma.	7
IV	Turing Machines: Turing machines – Computable Languages and functions – Turing Machine constructions –Storagein finite control – multiple tracks – checking of symbols – subroutines – two way infinite tape.Undecidability:Properties of recursive and Recursively enumerable languages – Universal Turing Machines as anundecidable problem – Universal Languages – Rice's Theorems	8
V	Linear bounded Automata Context Sensitive Language: Chomsky Hierarchy of Languages and automata BasicDefinition& descriptions of Theory & Organization of Linear bounded Automata Properties of context-sensitivelanguages.	8
	Total	37

Reference Books:

1. John E.Hopcroft, Rajeev Motwani and J.D. Ulman, Introduction to Automata theory Languages and Computation, Pearson Education

2. John C. Martin, Introduction to Languages and the Theory of Computation, TMH.

3. Cohen, Introduction to Computer Theory, Pearson Education Asia.

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YEAR: III   **SEMESTER: VI**

CS-602   **DESIGN AND ANALYSIS OF ALGORITHMS**   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	BACKGROUND: Review of Algorithm Complexity and Order Notations and Sorting Methods. DIVIDE ANDCONQUER METHOD: Binary Search, Merge Sort, Quick sort and strassen's matrix multiplication algorithms.GREEDY METHOD: Knapsack Problem, Job Sequencing, Optimal Merge Patterns and Minimal Spanning Trees	7
II	DYNAMIC PROGRAMMING: Matrix Chain Multiplication. Longest Common Subsequence and 0/1 KnapsackProblem. BRANCH AND BOUND: Traveling Salesman Problem and Lower Bound Theory. Backtracking Algorithmsand queens problem.	7
III	PATTERN MATCHING ALGORITHMS: Naïve and Rabin Karp string matching algorithms, KMP Matcher and BoyerMoore Algorithms. ASSIGNMENT PROBLEMS: Formulation of Assignment and Quadratic Assignment Problem	7
IV	RANDOMIZED ALGORITHMS. Las Vegas algorithms, Monte Carlo algorithms,randomized algorithm for Min-Cut,randomized algorithm for 2-SAT. Problem definition of Multicommodity flow, Flow shop scheduling and Networkcapacity assignment problems	8
V	PROBLEM CLASSES NP, NP-HARD AND NP-COMPLETE: Definitions of P, NP-Hard and NP-Complete Problems.Decision Problems. Cook's Theorem. Proving NP-Complete Problems - Satisfiability problem and Vertex CoverProblem. Approximation Algorithms for Vertex Cover and Set Cover Problem.	8
	Total	37

Reference Books:

1. Aho A.V. J.E. Hopcroft, J.D. Ullman: Design and Analysis of Algorithms, Pearson Education.

2. Rivest and Cormen, Introduction to Algorithms, Prentice Hall of India.

3. Baase, Computer Algorithms, Pearson Education.

4. Brassard, Algorithmics, Prentice Hall.

5. Bazaraa, Linear Programming & Network Flows, John Wiley & Sons.

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YEAR: III   **SEMESTER: VI**

CS-603   **ASP.NET USING C#**   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	**Asp .Net Basics -** Understanding the .Net framework – principal, feature, design, gole, Benefits of .Net framework, EventLogging, Performance Counter, Tracing, CTS, CLS, CLR, .Net class library, GIT, Type of GIT, Assemblies - version, culture,strong name, Type of Assemblies, Metadata, Manifest, MSIL, Managed and Unmanaged code, Memory Management,Garbage Collection, Security, Reflection, WPF, WCF, Window Card Space, GAC, CASPOL, REGEN, ILASM, ILDASM.DLL HELL Problem, Page life cycle.	7
II	**Introduction Ado.NET -** Ado.Net Basics, Ado.Net object model, Ado.Net class for OLE DB data source, SQL Server,DataSet, Data View, Data Reader, Data Adapter, Data Table, Data Column, Data Row, Difference between Ado and Ado.Net,Communication with OLEDB data source using Ado.Net.	7
III	**Understanding Caching -** Overview, Introduction to Caching, Client dedicated server, Reverse proxy, Absolute expirationand Relative expiration, Http Cache Policy, HttpCacheability, @ Output Cache, HttpCacheVaryByParams,HttpCacheVaryByHeaders, CachingPageOutput, Data caching, PageFragment Caching, PageOutput caching.	7
IV	**State Management -** Client state management- View state, Hidden field, Cookies, QueryStringServer state management- Application state, Session state, Advantage and Disadvantage of database support.	8
V	**Web Services and XML -** Introduction to xml, Advantage of xml, xml Element, Naming Rules, AttributesIntroduction to web service, web service Infrastructure, SOAP, UDDI, WSDL.	8
	Total	37

Reference Books:

1. Beginning ASP.NET 3.5 in C# 2008: From Novice to Professional, Second Edition by Matthew MacDonald

2. ASP .NET Programming with C# & SQL Server (The Web Technologies) by Don Gosselin

3. Developing Web Applications with ASP.NET and C# by Hank Meyne and Scott Davis

4. Beginning ASP.NET 2.0 with C# (Wrox Beginning Guides) by Chris Hart, John Kauffman, David Sussman, and Chris Ullman

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YEAR: III   **SEMESTER: VI**

CS-604   COMPILER CONSTRUCTION   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Compiler, Translator, Interpreter definition, Phase of compiler introduction to one pass &Multipasscompilers,Bootstrapping, Review of Finite automata lexical analyzer, Input, buffering, Recognition of tokens. Idea about LEX: Alexical analyzer generator, Error handling	7
II	Review of CFG Ambiguity of grammars, Introduction to parsing. Bottom up parsing Top down parsing techniques,Shift reduce parsing, Operator precedence parsing, Recursive descent parsing predictive parsers. LL grammars &passers error handling of LL parser. LR parsers, Construction of SLR, Conical LR & LALR parsing tables, parsing withambiguous grammar. Introduction of automatic parser generator: YACC error handling in LR parsers.	7
III	Syntax directed definitions; Construction of syntax trees, L-attributed definitions, Top down translation. Specification ofa type checker, Intermediate code forms using postfix notation and three address code, Representing TAC using triplesand quadruples, Translation of assignment statement. Boolean expression and control structures	7
IV	Storage organization, Storage allocation, Strategies, Activation records, Accessing local and non local names in a blockstructured language. Parameters passing, Symbol table organization, Data structures used in symbol tables	8
V	Definition of basic block control flow graphs, DAG representation of basic block, Advantages of DAG, Sources ofoptimization, Loop optimization, Idea about global data flow analysis, Loop invariant computation, Peepholeoptimization, Issues in design of code generator, A simple code generator, Code generation from DAG	8
	Total	37

Reference Books:

1.   A.V. Aho-Compilers principles, techniques and tools, Pearson Education Asia.

2.   N.Wirth-Compiler Construction, Pearson Education Asia.

3.   Charles N.Fischer-Crafting a Computer in C, Pearson Education Asia.

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YEAR: III   **SEMESTER: VI**

CS-605   SOFTWARE PROJECT MANAGEMENT   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Conventional Software Management: Conventional software Management performance. Evolution of SoftwareEconomics: Software Economics, pragmatic software cost estimation.	7
II	Improving Software Economics: Reducing Software product size, improving software processes, improving teameffectiveness, improving automation, Achieving required quality. The old way and the new: The principles ofconventional software Engineering, principles of modern software management. Life cycle phases: Engineering andproduction stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets,Management artifacts, Engineering artifacts, programmatic artifacts.	7
III	Model based software architectures: A Management perspective and technical perspective. Work Flows of the process:Software process workflows, Iteration workflows.	7
IV	Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments. Iterative ProcessPlanning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process,Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and evolution of Organizations. Process Automation: Automation Building blocks, The Project Environment.	8
V	Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, lifecycle expectations, pragmatic Software Metrics, Metrics automation. Future Software Project Management: ModernProject Profiles, Next generation Software economics, modern process transitions.	8
	Total	37

Reference Books:

1. Software Project Management, Walker Royce: Pearson Education, 2005.

2. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.

3. Software Project Management, Joel Henry, Pearson Education.

4. Software Project Management in practice, PankajJalote, Pearson Education.2005.

YEAR: III   **SEMESTER: VI**

CS-606.1   ADVANCED COMPUTER ARCHITECTURE   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	INTRODUCTION**:** Parallel Computing, Parallel Computer Model, Program and Network Properties, ParallelArchitectural Classification Schemes, Flynn's & Fang's Classification, Performance Metrics and Measures, SpeedupPerformance Laws: Multiprocessor System and Interconnection Networks; IEEE POSIX Threads: Creating and ExitingThreads, Simultaneous Execution of Threads, Thread Synchronization using Semaphore and Mutex, CancelingtheThreads.	7
II	PIPELINING AND MEMORY HIERARCHY: Basic and Intermediate Concepts, Instruction Set Principle; ILP: Basics, Exploiting ILP, Limits on ILP; Linear and Nonlinear Pipeline Processors; Super Scalar and Super. Pipeline Design;Memory Hierarchy Design: Advanced Optimization of Cache Performance, Memory Technology and Optimization, Cache Coherence and Synchronization Mechanisms.	7
III	THREAD AND PROCESS LEVEL PARALLEL ARCHITECTURE: Introduction to MIMD Architecture,Multithreaded Architectures, Distributed Memory MIMD Architectures. Shared Memory MIMD Architecture, Clustering, Instruction Level Data Parallel Architecture, SIMD Architecture, Fine Grained and Coarse Grained SIMDArchitecture, Associative and Neural Architecture. Data Parallel Pipelined and Systolic Architectures, Vector Architectures	7
IV	Parallel Algorithms: PRAM Algorithms: Parallel Reduction, Prefix Sums, Preorder Tree Traversal, Merging two Sortedlists; Matrix Multiplication: Row Column Oriented Algorithms, Block Oriented Algorithms; Parallel Quick sort, HyperQuick sort; Solving Linear Systems: Gaussian Elimination, Jacobi Algorithm; Parallel Algorithm Design Strategies	8
V	Developing Parallel Computing Applications: OpenMP Implementation in 'C': Execution Model, Memory Model; Directives: Conditional Compilation, Internal Control Variables, Parallel Construct, Work Sharing Constructs,Combined Parallel Work-Sharing Constructs, Master and Synchronization Constructs; Run-Time Library Routines:Execution Environment Routines, Lock Routines, Timing Routines; Simple Examples in 'C'. Basics of MPI	8
	Total	37

Reference Books:

1.   Hawang& Briggs-Computer Architecture & Parallel Processing, McGraw Hill.
2.   Subrata Das-Advanced Computer Architecture, Vol I & II.

YEAR: III   **SEMESTER: VI**

CS-606.2   ERP SYSTEMS   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Enterprise wide information system, Custom built and packaged approaches, Needs and Evolution of ERP Systems,Common myths and evolving realities, ERP and Related Technologies, Business Process Reengineering andInformation Technology, Supply Chain Management, Relevance to Data Warehousing, Data Mining and OLAP,ERP Drivers, Decision support system.	7
II	ERP Domain, ERP Benefits classification, Present global and Indian market scenario, milestones and pitfalls, Forecast, Market players and profiles, Evaluation criterion for ERP product, ERP Life Cycle: Adoption decision, Acquisition, Implementation, Use & Maintenance, Evolution and Retirement phases, ERP Modules.	7
III	Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in evaluating ERP, Selection of Weights, Role of consultants, vendors and users in ERP implementation; Implementation vendors evaluation criterion, ERP Implementation approaches and methodology,	7
IV	ERP implementation strategies, ERP Customization, ERP-A manufacturing Perspective. Critical success and failurefactors for implementation, Model for improving ERP effectiveness, ROI of ERP implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Strategic Grid: Useful guidelines for ERP Implementations.	8
V	Technologies in ERP Systems and Extended ERP, Case Studies Development and Analysis of ERP Implementations in focusing the various issues discussed in above units through Soft System approaches or qualitative Analysis tools, Learning and Emerging Issues, ERP and E- Commerce. Concept of E-Governance : Concept, E-Governance frame work, area of application like public sector, service industry.	8
	Total	37

Reference Books:

1.   *ERP* A Managerial

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CS-606.3   NETWORK PROGRAMMING   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Introduction TCP/IP:, internetworking concepts and architecture, ARP, RARP, Internet protocol (Datagram delivery, routing, (ICMP), CIDR, introduction of UDP and TCP, EGP, BGP, RIP, OSPF, HELLO, NAT, VPN, client server model, BOOTP, DHCP, NFS	7
II	Socket Programming: Socket Fundamentals, Elementary TCP & UDP sockets, I/O multiplexing, socket options, elementary name and address conversion.	7
III	Advanced Sockets: Introduction to IPV6, IPV4 AND IPV6 interoperability Advanced name and address conversion, Daemon processes and intend, Advanced I/O and non blocking I/O,Broadcasting, Threads and IP options.	7
IV	X/OPEN Transport Interface (XTI): TCP client and servers name and address functions, UDP client and servers, streams and virtual. Private Networks.	8
V	Advanced Topics: Inter-process communication-Introduction, POSIX IPC & System V IPC, Introduction to pipes & FIFOS, Doors and Sun RPC (Introduction only).	8
	Total	37

Reference Books:

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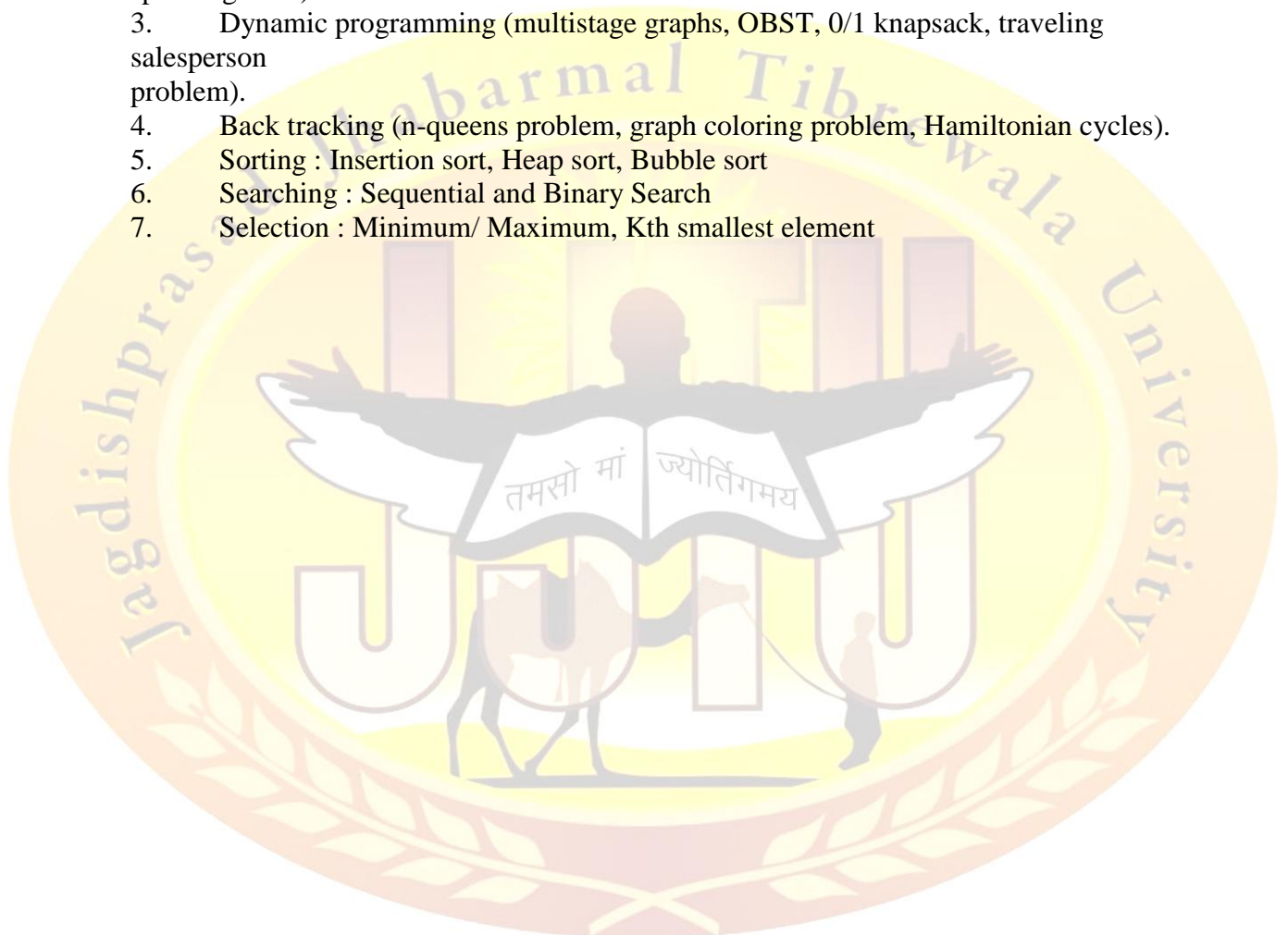**YEAR: III**   **SEMESTER: VI**

CS-607DESIGN AND ANALYSIS OF ALGORITHMS LAB   (L, T, P) = 3 (0+0+3)

Programming assignments on each algorithmic strategy:
1.   Divide and conquer method (quick sort, merge sort, Strassen's matrix multiplication),
2.   Greedy method (knapsack problem, job sequencing, optimal merge patterns, minimal spanning trees).
3.   Dynamic programming (multistage graphs, OBST, 0/1 knapsack, traveling salesperson
problem).
4.   Back tracking (n-queens problem, graph coloring problem, Hamiltonian cycles).
5.   Sorting : Insertion sort, Heap sort, Bubble sort
6.   Searching : Sequential and Binary Search
7.   Selection : Minimum/ Maximum, Kth smallest element

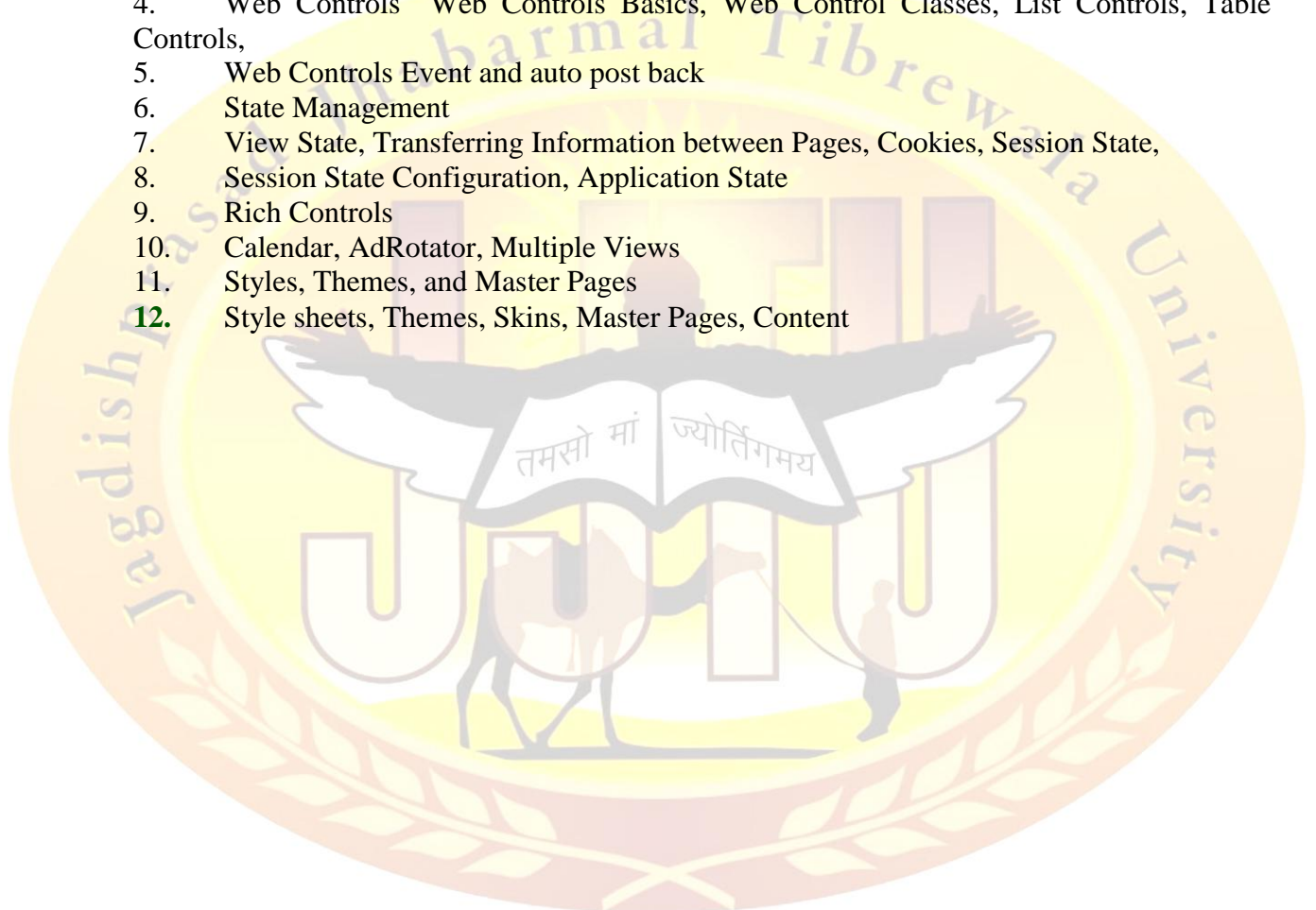**YEAR: III**   **SEMESTER: VI**

CS-608   ASP.NET & C# LAB   (L, T, P) = 3 (0+0+3)

1.   Web Form Fundamentals
2.   The Anatomy of an Asp.Net Application, Server Controls, HTML Control
3.   Access, Page Class, Application Events, Asp.Net Configuration
4.   Web Controls Web Controls Basics, Web Control Classes, List Controls, Table Controls,
5.   Web Controls Event and auto post back
6.   State Management
7.   View State, Transferring Information between Pages, Cookies, Session State,
8.   Session State Configuration, Application State
9.   Rich Controls
10.   Calendar, AdRotator, Multiple Views
11.   Styles, Themes, and Master Pages
12.   Style sheets, Themes, Skins, Master Pages, Content

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CS-609   COMPILER LAB   (L, T, P) = 3 (0+0+3)

Program Writing in C/C++

1.   Write a Program to identify data storage statements in an 8086 assembly language program and estimate the size of data segment.
2.   Write a program to identify macro definitions in an assembly language program.
3.   Extend the above program to implement simple and recursive macro expansion.
4.   Write a program to process 'include' and 'define' macro in C language.
5.   Write a program to parse source code string of C-language and identify token in terms of keywords and identifiers.
6.   Construct parse tree of arithmetic statements in C language program.
7.   Write a program to optimize the source program for 'operator strength reduction', 'dead code elimination' and frequency reduction'
8.   transformation.
9.   Design a simple high level language containing arithmetic and logic operations pointers, branch and loop instructions. Write its
10.   lexicalanalyzer using lex.

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CS-610   MINER PROJECT – II   (L, T, P) = 3 (0+0+3)

S.No.	List of Experiments	Hrs.
1.	Undertaking a project on an assigned recent topic of the latest technical field.	18

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YEAR: IV   **SEMESTER: VII**

CS-701CRYPTOGRAPHY & NETWORK SECURITY(L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Introduction to security attacks, services and mechanism, introduction to cryptography. Conventional Encryption:Conventional encryption model, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block ciphers. Modern Block Ciphers: Block ciphers principals, Shannon's theory of confusion and diffusion, fiestal structure, data encryption standard(DES), strength of DES, differential and linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption, strength of IDEA, confidentiality using conventional encryption, traffic confidentiality, key distribution, random number generation.	7
II	Introduction to graph, ring and field, prime and relative prime numbers, modular arithmetic, Fermat's and Euler's theorem, primality testing, Euclid's Algorithm, Chinese Remainder theorem, discrete logarithms. Principals of public key crypto systems, RSA algorithm, security of RSA, key management, Diffle-Hellman key exchange algorithm, introductory idea of Elliptic curve cryptography, Elganel encryption.	7
III	Message Authentication and Hash Function: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions and MACS, MD5 message digest algorithm, Secure hash algorithm(SHA). Digital Signatures: Digital Signatures, authentication protocols, digital signature standards (DSS), proof of digital signature algorithm.	7
IV	Authentication Applications: Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP), S/MIME.	8
V	IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management. Web Security: Secure socket layer and transport layer security, secure electronic transaction (SET). SystemSecurity: Intruders, Viruses and related threads, firewall design principals, trusted systems.	8
	Total	37

Reference Books:

1.   Stallings -Network Security Essentials ,Pearson Eduction Asia , 2003 Nick Galbreath -Cryptography for database and Internet applications, Wiley-Dreamtech, 2002
2.   Stallings - Cryptography & Network Security ,PearsonEduction Asia , 2nd Ed.

YEAR: IV   **SEMESTER: VII**

CS-702 WIRELESS COMMUNICATION & NETWORKS   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Introduction to Wireless Communication Systems: Evolution of mobile Radio Communications, Applications of mobile communication, Mobile Radio Systems Around the World, Example of Wireless Communication Systems, Second Generation(2G) Cellular Networks, ThirdGeneration(3G) Wireless Networks, Frequency Reuse, Channel Assignment Strategies, HandoffStrategies, Interference and System Capacity, Improving Coverage and Capacity in Cellular Systems .Frequencies for radio transmission & regulations . Introduction to signals, analog& digital data transmission, transmission impairments, effect ofmultipath propagation, type of fading & error compensation .	7
II	Medium access control: need for specialized MAC, hidden and exposed terminal, near and farterminals, MAC schemes: Fixed TDMA, Aloha, CSMA, DAMA, PRMA, reservation TDMA,MACA, polling, ISMA, CDMA- SAMA, comparisons. Telecommunication systems: GSM: mobile services, system architecture, radio interface, protocols,localization and calling, handover, security, new data services-HSCSD, introduction to GPRS .	7
III	Wireless LAN: advantages, disadvantages and design goals, infra-red v/s radio transmission,infrastructure and ad-hoc network, IEEE 802.11: System architecture, protocol architecture,physical layer, medium access control layer, MAC management and functions, brief idea of - 802.11b, 802.11a, newer developments.HIPERLAN: HIPERLAN 1, Bluetooth: user scenarios, architecture, radio layer, base band layer,link manager protocol, L2CAP, security, SDP, profiles, IEEE 802.15 .	7
IV	Mobile network layer: mobile IP - Goals, assumptions and requirements, entities and terminology,IP packets delivery, agent discovery, registration, tunneling and encapsulation, optimizations, reverse tunnelling, DHCP. Mobile Ad hoc network – usage & routing- global state routing (GSR),Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA) .Mobile transport layer: Implications of mobility in Traditional TCP, classical TCP improvements:indirect TCP, snooping TCP, mobile TCP, fast retransmit/fast recovery, transmission/time-outfreezing, selective retransmission, transaction-oriented TCP .	8
V	Support for mobility: File systems - Introduction to coda, little work, Ficus, MIo-NFS, rover. Worldwide web - hypertext transfer protocol, hypertext language, system architecture. WirelessApplication Protocol - architecture, wireless datagram protocol, wireless transport layer security,wireless transaction protocol, wireless session protocol, wireless application environment, wirelessmarkup language, WML Script, wireless telephony application, push architecture, push/pullservices, example stacks with WAP1.x .	8
	Total	37

Reference Books:

1.   Mobile Communications, Schiller, 2nd Ed., Pearson.
2.   Wireless Communications, Theodore S. Rappaport, 2Ed., PHI.
3.   Wireless Communications, William Stallings, Prentice Hall
4.   WIRELESS COMMUNICATIONS & NETWORKING, Vijay Garg, The Morgan Kaufmann Series in Networking

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YEAR: IV   **SEMESTER: VII**

CS-703   **DATA MINING AND WARE HOUSING**   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Overview, Motivation(for Data Mining),Data Mining-Definition & Functionalities,Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, NoisyData, (Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data CubeAggregation, Dimensionality reduction, Data Compression, Numerosity Reduction,Clustering, Discretization and Concept hierarchy generation.	7
II	Concept Description: Definition, Data Generalization, Analytical Characterization,Analysis of attribute relevance, Mining Class comparisons, Statistical measures inlarge Databases. Measuring Central Tendency, Measuring Dispersion of Data, GraphDisplays of Basic Statistical class Description, Mining Association Rules in LargeDatabases, Association rule mining, mining Single-Dimensional Boolean Associationrules from Transactional Databases– Apriori Algorithm, Mining MultilevelAssociation rules from Transaction Databases and Mining Multi- DimensionalAssociation rules from Relational Databases.	7
III	What is Classification & Prediction, Issues regarding Classification and prediction,Decision tree, Bayesian Classification, Classification by Back propagation, Multilayerfeed-forward Neural Network, Back propagation Algorithm, Classification methodsK-nearest neighbour classifiers, Genetic Algorithm. Cluster Analysis: Data types incluster analysis, Categories of clustering methods, Partitioning methods. HierarchicalClustering- CURE and Chameleon. Density Based Methods-DBSCAN, OPTICS. GridBased Methods- STING, CLIQUE. Model Based Method –Statistical Approach,Neural Network approach, Outlier Analysis	7
IV	Data Warehousing: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi-Dimensional Data Model, Data Cubes,Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3Tier Architecture, Data Mining.	8
V	Aggregation, Historical information, Query Facility, OLAP function and Tools.OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backupand Recovery, Tuning Data Warehouse, Testing Data Warehouse.	8
	Total	37

Reference Books:

1.   Data Warehousing in the Real World – Anahory and Murray, Pearson Education.

2.   Data Mining – Concepts and Techniques – Jiawai Han and MichelineKamber.

3.   Building the Data Warehouse – WH Inmon, Wiley.

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CS-704COMPUTER GRAPHICS & MULTIMEDIA TECHNIQUES (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Introduction: Introduction to Raster scan displays, Storage tube displays, refreshing,flicking, interlacing, color monitors, display processors, resolution, Introduction toInteractive. Computer Graphics: Picture analysis, Overview of programmer's modelof interactive graphics, Fundamental problems in geometry. Scan Conversion: point,line, circle, ellipse polygon, Aliasing, and introduction to Anti Aliasing (No antialiasing algorithm).	7
II	2D & 3D Co—ordinate system Homogeneous Co-ordinates, Translation, Rotation,Scaling, Reflection, Inverse transformation, Composite transformation. PolygonRepresentation, Flood Filling, Boundary filling. Point Clipping, Cohen-Sutherland Line Clipping Algorithm, Polygon Clippingalgorithms.	7
III	Hidden Lines & Surfaces: Image and Object space, Depth Buffer Methods, HiddenFacets removal, Scan line algorithm, Area based algorithms. Curves and Splines: Parametric and Non parametric Representations, Bezier curve, BSplineCurves.	7
IV	Rendering: Basic illumination model, diffuse reflection, specular reflection, phongshading, Gourand shading, ray tracing, color models like RGB, YIQ, CMY, HSV	8
V	Multimedia: Multimedia components, Multimedia Input/Output Technologies: Storage and retrieval technologies, Architectural considerations, file formats.Animation: Introduction, Rules, problems and Animation techniques.	8
	Total	37

Reference Books:

1.   J. Foley, A. Van Dam, S. Feiner, J. Hughes: Computer Graphics- Principles and Practice, Pearson

2.   Hearn and Baker: Computer Graphics, PHI

3.   Multimedia Systems Design, PrabhatAndleigh and Thakkar, PHI.

4.   Multimedia Information Networking, N.K.Sharda, PHI..

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CS-705   SOFTWARE TESTING   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Introduction: Software Quality, Role of testing, v & v, objectives and issues of testing, Testing activities and levels, Sources of Information for Test Case Selection, White-Box and Black-Box Testing , Test Planning and Design,Monitoring and Measuring Test Execution, Test Tools and Automation, Test Team Organization and Management. Unit Testing: Concept, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation Testing , Debugging.	7
II	Control Flow & Data Flow Testing: Outline of CFT, CF Graph, Paths in a Control Flow Graph, Path Selection Criteria,Generating Test Input, Examples of Test Data Selection. Overview of Dynamic Data Flow Testing, Data Flow Graph, Data Flow Testing Criteria, Comparison of Testing Techniques.	7
III	System Integration Testing & Test Design: Concept of Integration Testing, Different Types of Interfaces and InterfaceErrors, Granularity of System Integration Testing, System Integration Techniques, Test Plan for System Integration,Off-the-Shelf Component Testing, System Test Categories.	7
IV	System Test Planning, Automation & Execution: Structure of a System Test Plan, Test Approach, Test Suite Structure,Test Environment, Test Execution Strategy, Test Effort Estimation, Scheduling and Test Milestones, System TestAutomation, Selection of Test Automation Tools, Test Selection Guidelines for Automation, Structure of an Automated Test Case, Test Automation Infrastructure Metrics for Tracking System Test, Metrics for Monitoring Test Execution,Beta Testing, System Test Report, Measuring Test Effectiveness. Acceptance Testing:	8
V	Software Quality: Five Views of Software Quality, McCall's Quality Factors and Criteria, Quality Factors QualityCriteria, Relationship between Quality Factors and Criteria, Quality Metrics, ISO 9126 Quality Characteristics, ISO9000:2000 Software Quality Standard ISO 9000:2000 Fundamentals, ISO 9001:2000 Requirements	8
	Total	37

Reference Books:

1. "Software Testing and Quality Assurance: Theory and Practice", SagarNaik, University of Waterloo, PiyuTripathy, Wiley , 2008
2. "Effective methods for Software Testing "William Perry, Wiley.
3. "Software Testing - A Craftsman's Approach", Paul C. Jorgensen, CRC Press, 1995.
4. "The Art of Creative Destruction", RajnikantPuranik, SPD.
"Software Testing", SrinivasanDesikan and Gopalaswamy Ramesh - Pearson Education 2006.
5. "Introducing to Software Testing", Louis Tamres, Addison Wesley Publications, First Edition.
6. "Software Testing", Ron Patton, SAMS Techmedia Indian Edition, Pearson Education 2001.
7. "The Art of Software Testing", Glenford J. Myers, John Wiley & Sons, 1979.
8. "Testing Object-Oriented Systems: Models Patterns and Tools", Robert V. Binder, Addison
9. ."Software Testing Techniques", Boris Beizer, 2nd Edition, Van Nostrand Reinhold, 1990.
10. ."Software Quality Assurance", Daniel Galin, Pearson Education.

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YEAR: IV   **SEMESTER: VII**

CS-706.1   DATA COMPRESSION TECHNIQUES   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	Compression Techniques: Lossless, lossy, measure of performance, modeling&coding. Lossless compression: Derivation of average information, data models, uniquelydecodable codes with tests, prefix codes, Kraft-McMillan inequality.Huffman coding: Algorithms, minimum variance Huffman codes, optimality, lengthextended codes, adaptive coding, Rice codes, using Huffman codes for lossless imagecompression.	7
II	Arithmetic coding with application to lossless compression. Dictionary Techniques:Dictionary Techniques:Dictionary Techniques:Dictionary Techniques: LZ77, LZ78, LZW Predictive coding:Predictive coding:Predictive coding: Burrows-Wheeler Transform and move-to-front coding, JPEG-LS ,Facsimile Encoding: Run length, T.4 and T.6	7
III	Lossy coding- Mathematical preliminaries: Distortion criteria, conditional entropyaverage mutual information, differential entropy, rate distortion theory, probabilityand linear system models.Scalar quantization: The quantization problem, uniform quantizer, Forward adaptivequantization, non-uniform quantization-Formal adopting quantization, CompandedQuantizationVector quantization ,ntization: Introduction, advantages, The Linde-Ruzo-Grey algorithmlattice vector quantization.	7
IV	Differential encoding – Introduction, Basic algorithm, Adaptive DPCM, Delta modulation, speech and image coding using delta modulation.Sampling in frequency and time domain, z-transform, DCT, DST, DWHT,quantization and coding of transform coefficient.	8
V	Sub band coding: Introduction, Filters, Basic algorithm, Design of Filter banks, G.722, MPEG.Wavelet based compression: Introduction, wavelets multi-resolution analysis and thescaling function implementation using filters.	8
	Total	37

Reference Books:

1.   Sayood K: Introduction to Data Compression: ELSEVIER 2005.

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CS-706.2   WEB SERVICES   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	SOA Fundamentals: Defining SOA, Business Value of SOA, Evolution of SOA, SOA characteristics, concept of a service in SOA, misperceptions about SOA, Basic SOAarchitecture, infrastructure services, Enterprise Service Bus (ESB), SOA Enterprise Softwaremodels, IBM On Demand operating environment.	7
II	Web services Technologies: XML technologies – XML, DTD, XSD, XSLT, XQuery, XPath Web services technologies - Web services and SOA, WSDL, SOAP, UDDI WSStandards (WS-*) - Web services and Service- oriented enterprise (SOE), WS-Coordinationand WS-Transaction, Business Process Execution Language for Web Services (BPEL4WS),WS-Security and the Web services security specifications, WS-Reliable Messaging, WS-Policy, WS-Attachments.	7
III	SOA Planning and Analysis: Stages of the SOA lifecycle, SOA Delivery Strategies, serviceorientedanalysis,CaptureandassessbusinessandITissuesanddrivers,determining Non-functional requirements(e.g.,technicalconstraints,businessconstraints,runtimequalities,non-runtimequalities),businesscentricSOAanditsbenefits,Servicemodelling,Basic modelling buildingblocks,servicemodelsforlegacyapplicationintegrationandenterpriseintegration, Enterprisesolutionassets(ESA)	7
IV	SOA Design and implementation: service-oriented design process, design activities,determine services and tasks based on business process model, choosing appropriatestandards, articulate architecture, mapping business processes to technology, designingservice integration environment (e.g., ESB, registry), Tools available for appropriate designing, implementing SOA, security implementation, implementation of integration patterns, services enablement, quality assurance.	8
V	Managing SOA Environment: Distributing service management and monitoring concepts,operational management challenges, Service-level agreement considerations, SOA governance(SLA, roles and responsibilities, policies, critical success factors, and matrices), QoScompliance in SOA governance, role of ESB in SOA governance, impact of changes toservices in the SOA lifecycle.	8
	Total	37

Reference Books:

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CS-706.3   **REAL TIME SYSTEMS**   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Introduction: Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, ReferenceModels for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload. Periodic TaskModel, Precedence Constraints and Data Dependency.	7
II	Real Time Scheduling: Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First(EDF) and Least-Slack-Time-First (LST) Algorithms, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems	7
III	Resources Access Control: Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols. Stack Based Priority-Ceiling Protocol, Useof Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in MultipleUnitResources,ControllingConcurrentAccessestoDataObjects	7
IV	Multiprocessor System Environment: Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End PeriodicTasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems,Scheduling of Tasks with Temporal Distance Constraints	8
V	Real Time Communication: Model of Real Time Communication. Priority-Based Service and Weighted Round- RobinService Disciplines for Switched Networks. Medium Access Control Protocols for Broadcast Networks, Internet andResource Reservation Protocols, Real Time Protocols, Communication in Multicomputer System, An Overview of RealTime Operating Systems	8
	Total	37

Reference Books:

1.   W.S.Liu-Real-Time Systems, Pearson Education Asia.

2.   Raymond A.Buhr-Introduction to Real-Time Systems, Pearson education Asia.

3.   Alan Burns-Real-Time Systems and Programming Languages, Pearson Education.

YEAR: IV   **SEMESTER: VII**

CS-707   COMPUTER GRAPHICS & MULTIMEDIA LAB   (L, T, P) = 3 (0+0+3)

1.   Implementation of line generation using slope's method, DDA and Bresenham's algorithms.
2.   Implementation of circle generation using Mid-point method and Bresenham's algorithm.
3.   Implementation of ellipse generation using Mid-point method.
4.   Implementation of polygon filling using Flood-fill, Boundary-fill and Scan-line algorithms.
5.   Implementation of 2D transformation: Translation, Scaling, Rotation, Mirror Reflection and Shearing (write a menu driven
program).
6.   Implementation of Line Clipping using Cohen-Sutherland algorithm and Bisection Method.
7.   Implementation of Polygon Clipping using Sutherland-Hodgman algorithm.
8.   Implementation of 3D geometric transformations: Translation, Scalind and rotation.
9.   Implementation of Curve generation using Interpolation methods.
10.   Implementation of Curve generation using B-spline and Bezier curves.
11.   Implementation of any one of Back face removal algorithms such as Depth-Buffer algorithm, Painter's algorithm, Warnock's
algorithm, Scan-line algorithm)

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CS-708   DATA MINING AND WARE HOUSING LAB   (L, T, P) = 3 (0+0+3)

The objective of the lab exercises is to use data mining techniques to use standard databases available to understandDM processes using any DM tool)
1.   Gain insight for running pre- defined decision trees and explore results using MS OLAP Analytics.
2.   Using IBM OLAP Miner – Understand the use of data mining for evaluating the content of multidimensional cubes.
3.   Using Teradata Warehouse Miner – Create mining models that are executed in SQL.
(Portal work : The objective of this lab exercises is to integrate pre-built reports into a portal application)

4.   Publish and analyzea business intelligence portal.
Metadata & ETL Lab: The objective of this lab exercises is to implement metadata import agents to pull metadata fromleading business intelligence tools and populate a metadata repository. To understand ETL processes
5.   Import metadata from specific business intelligence tools and populate a meta data repository.
6.   Publish metadata stored in the repository.
7.   Load data from heterogeneous sources including text files into a pre-defined warehouse schema.

YEAR: IV   **SEMESTER: VII**

CS-709   MAJOR PROJECT - I   (L, T, P) = 3 (0+0+3)

S.No.	List of Experiments	Hrs.
1.	Undertaking a project on an assigned recent topic of the latest technical field.	18

YEAR: IV   **SEMESTER: VII**

CS-710   PRACTICAL TRAINING SEMINAR   (L, T, P) = 3 (0+0+3)

YEAR: IV   **SEMESTER: VIII**

CS-801   **SYSTEM SOFTWARE ENGINEERING**   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Overview: Comparison of machine language, assembly language and high level languages. External and internal representation of instructions and data. Data allocation structures, search structures and addressing modes. Activities andsystem software for program generation, translation and execution. Editors for source code and object code/executable code files	7
II	Assemblers: Assembly language specification. Machine dependent and independent features of assembler. Classification of assemblers. Pass structure of assemblers (problem and associated for IBM-PC.	7
III	Loader and Linkers: Functions and classification. Machine dependent and independent features of loaders. Design of bootstrap, absolute and relocatable loaders, Design of linker. Case study of MS-DOS linker	7
IV	Macro processors: Macro definition, call and expansion. Macro processor algorithm and data structure. Machineindependent features (parameters, unique labels, conditional expansion, nesting and recursion). Pass structure and design of microprocessor and macro assembler, Case study of MASM macro processor	8
V	High level language processor: HLL specification: Grammars and parse trees, expression and precedence. Lexical analysis: Classification of tokens, scanning methods, character recognition, lexical ambiguity. Syntactic analysis:Operator precedence parsing, recursive descent parsing. Symbol Table Management: Data structure for symbol table, basing functions for symbols, overflow technique, block structure in symbol table	8
	Total	37

Reference Books:

1.   D.M. Dhamdhere-System programming & operating system. Tata McGraw Hill.
2.   L.L. Beck-System Software, Pearson Education
3.   J.J. Donovan-System programming Tata McGraw Hill.

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YEAR: IV   **SEMESTER: VIII**

CS-802   **MOBILE COMPUTING**   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channelstructure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.	7
II	Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols,TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, applicationenvironment, applications.	7
III	Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, Filesystem, Disconnected operations.	7
IV	Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.	8
V	Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.	8
	Total	37

Reference Books:

1.   J. Schiller, Mobile Communications, Addison Wesley.

2.   Mehrotra , GSM System Engineering.

3.   M. V. D. Heijden, M. Taylor, Understanding WAP, Artech House.

4.   Charles Perkins, Mobile IP, Addison Wesley.

5.   Charles Perkins, Ad hoc Networks, Addison Wesley.

YEAR: IV   **SEMESTER: VIII**
CS-803   **DISTRIBUTED SYSTEMS**   **(L, T, P) = 4 (3+1+0)**

Unit	Contents of Course	Hrs.
I	Distributed Systems: Features of distributed systems, nodes of a distributed system, tributecomputation paradigms, Model of distributed systems, Types of Operating systems: Centralized Operating System, Network Operating Systems, Distributed Operating Systemsand Cooperative Autonomous Systems, design issues in distributed operating systems.Systems Concepts and Architectures:Systems Concepts and Architectures:Systems Concepts and Architectures: Goals, Transparency, Services, Architecture Models,Distributed Computing Environment (DCE).Theoretical issues in distributed systems: Notions of time and state, states and events in adistributed system, time, clocks and event precedence, recording the state of distributed systems.	7
II	Concurrent Processes and Programming: Processes and Threads, Graph Models for ProcessRepresentation, Client/Server Model, Time Services, Language Mechanisms forSynchronization, Object Model Resource Servers, Characteristics of Concurrent ProgrammingLanguages (Language not included). Inter—process process Communication and Coordination: Message Passing, Request/Reply andTransaction Communication, Name and Directory services, RPC and RMI case studies.	7
III	Distributed Process Scheduling: A System Performance Model, Static Process Scheduling withCommunication, Dynamic Load Sharing and Balancing, Distributed ProcessImplementation.Distributed File Systems:Transparencies and Characteristics of DFS, DFS Design andimplementation, Transaction Service and Concurrency Control, Data and FileReplication.Case studies: Sun network file systems, General Parallel file System and Window's filesystems. Andrew and Coda File Systems	7
IV	Distributed Shared Memory: Non-Uniform Memory Access Architectures, Memory Consistency Models, Multiprocessor Cache Systems, Distributed Shared Memory,Implementation of DSM systems.Models of Distributed Computation: Preliminaries, Causality, Distributed Snapshots, Modellinga Distributed Computation, Failures in a Distributed System, Distributed Mutual Exclusion,Election, Distributed Deadlock handling, Distributed termination detection.	8
V	Distributed Agreement:Concept of Faults, failure and recovery, Byzantine Faults, Adversaries,Byzantine Agreement, Impossibility of Consensus and Randomized Distributed Agreement.Replicated Data Management: concepts and issues, Database Techniques, Atomic Multicast, and Update Propagation. CORBA case study: Introduction, Architecture, CORBA RMI, CORBA Services.	8
	Total	37

Reference Books:

1. Distributed operating systems and algorithm analysis by Randy Chow and T. Johnson, Pearson

2. Operating Systems A concept based approach by DM Dhamdhere, TMH

3. Distributed Systems- concepts and Design, Coulouris G., Dollimore J, and Kindberg T.,

YEAR: IV   **SEMESTER: VIII**

CS-804.1   ADVANCED DATABASE MANAGEMENT SYSTEMS (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	**Database Security** Introduction; Discretionary Access Control; Mandatory Access Control; StatisticalDatabases; Data Encryption.	7
II	**Optimization:** Introduction; Query Processing; Expression Transformation; Databases Statistics; Divide andconquer strategy.	7
III	**Type Inheritance:** Introduction; Type Hierarchies; Polymorphism and Substitutability; Variables andAssignments; Specialization by Constraint.	7
IV	**Distributed Databases:** Introduction; the twelve objectives; Problems of distributed systems; client/ serversystems; DBMS independence.	8
V	**Decision Support:** Introduction; Aspects of Decision Support; Database Design for Decision Support; Data preparation.Data Warehouses and Data mart: Online Analytical processing; Data Mining. Logic Based Databases :Introduction; Propositional Calculus; Predicate Calculus; A Proof Theoretic View ofDatabases; Deductive database systems; recursive query processing	8
	Total	37

Reference Books:

1.   C.J. Date, An introduction to Database Systems, 7th Ed. Pearson Education, New Delhi, 2004.

2.   H. Korth et al. Database Management System concepts, 3rd Ed. TMH, New Delhi 2002

3.   B.Desai, Database Management Systems Galgotia Publications, New Delhi, 1998

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YEAR: IV   **SEMESTER: VIII**

CS-804.2   STORAGE AND INFORMATION MANAGEMENT   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	**Introduction to Storage Technology:** Data proliferation and the varying value of data with time & usage, Sources of data and states of data creation, Data center requirements and evolution to accommodate storage needs, Overview of basic storage management skills and activities, The five pillars of technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations.	7
II	**Storage Systems Architecture:** Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays,Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hot sparing, Physical vs.logical disk organization, protection, and back end management, Array caching properties and algorithms, Frontend connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation,Interaction of file systems with storage, Storage system connectivity protocols.	7
III	**Introduction to Networked Storage:** JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS)environments: elements, connectivity, & management, Storage Area Networks (SAN): elements &connectivityFibre Channel principles, standards, & network management principles, SAN management principles, NetworkAttached Storage (NAS): elements, connectivity options, connectivity protocols (NFS, CIFS, ftp), &managemenprinciples, IP SAN elements, standards (SCSI, FCIP, FCP), connectivity principles, security, and managementprinciples, Content Addressable Storage (CAS): elements, connectivity options, standards, and managemenprinciples, Hybrid Storage solutions overview including technologies like virtualization & appliances.	7
IV	**Introduction to Information Availability:** Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques.	8
V	**Managing & Monitoring:** Management philosophies (holistic vs. system & component), Industry managemenstandards (SNMP, SMI-S, CIM), Standard framework applications, Key management metrics (thresholds,availability, capacity, security, performance), Metric analysis methodologies & trend analysis, Reactive and proactive management best practices, Provisioning & configuration change planning, Problem reporting, prioritizationand handling techniques, Management tools overview.	8
	Total	37

Reference Books:

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YEAR: IV   **SEMESTER: VIII**

CS-804.3   DIGITAL IMAGE PROCESSING   (L, T, P) = 4 (3+1+0)

Unit	Contents of Course	Hrs.
I	**INTRODUCTION:** Imaging in ultraviolet and visible band. Fundamental steps in image processing. Components in image processing. Image perception in eye, light and electromagnetic spectrum, Image sensing and acquisition using sensor array.	7
II	**DIGITAL IMAGE FUNDAMENTALS:** Image sampling and quantization, Representing digital images, Spatial and gray-level resolution, Aliasing and Moiré patterns, Zooming and Shrinking digital images.	7
III	**IMAGE RESTORATION:** Image restoration model, Noise Models, Spatial and frequency properties of noise, noise probability density functions, Noise - only spatial filter, Mean filter Statistic filter and adaptive filter, Frequency domain filters - Band reject filter, Band pass filter and Notch filter.	7
IV	**IMAGE COMPRESSION:** Compression Fundamentals - Coding Redundancy, Interpixel redundancy, Psychovisual redundancy and Fidelity criteria. Image Compression models, Source encoder and decoder, Channel encoder and decoder, Lossy compression and compression standards. color space formats, scaling methodologies (like horizontal, vertical up/down scaling). Display format (VGA, NTSC, PAL).	8
V	**EXPERT SYSTEM AND PATTERN RECOGNITION:** Use of computers in problem solving, information representation, searching, theorem proving, and pattern matching with substitution. Methods for knowledge representation, searching, spatial, temporal and common sense reasoning, and logic and probabilistic inferencing. Applications in expert systems and robotics	8
	Total	37

Reference Books:

1.   Rafael C. Gonzalez-Digital Image Processing, Pearson Edcation Asia.

2.   Kenneth R. Castleman-Digital Image Processing, Pearson Education Asia.

3.   Nick Effard-Digital Image Processing, Pearson Education Asia.

4.   Jain A.K.-Digital Image Processing, Prentice hall of India.

5.   Sonka, Hlavac& Boyle-Image Processing. analysis and machine Vision, Thomas Learning.

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CS-805   SYSTEM SOFTWARE LAB   **(L, T, P) = 3 (0+0+3)**

In this lab we will practice how source code is processed by compiler/ assembler/ pre-processor.

All programs have to be written in C++

1.   Write a class for file handling, having functions to open/ read/ write/ close/ reset. (2-5) Develop a program which take input a file of C language

a.   Print Lines of Codes and print signature of all function (including main)

b.   Print number of variables in every function (with type)

c.   Generate a new file without the comments. (/* */ and //)

d.   Process all #define (i.e. #define MAX 100, than replace every occurrence of MAX with 100).

(Macro value 100 can be an expression also.)

2.   Write a program to create a symbol table.

3.   Write a program which can parse a given C file and store all variables and functions in symbol table.

(4-6). Write a program to convert given C program into RTL code.

Assumption

1.   input C file will have only main function,

2.   only two type of statements, either variable declaration statements

(int sub1=23;) OR mathematical expression (sub1=sub2-sub3 ;).

3.   system have 16 registers (R1 to R16)

4.   RTL opcode available are: ADD, LOAD, MOVE, SUB, MULTIPLY, DIVIDE

5.   No control-flow (i.e. if-else, loop, jump etc.) expression is there in input code e.g.

```
int main()
{
int sub1=72, sub2=85, sub3=63;
float per;
per=(sub1+sub2+sub3)/(100+100+100);
}
```

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CS-806   INTERNET TECHNOLOGY LAB   **(L, T, P) = 3 (0+0+3)**

1.   Create a bio-data of self using HTML with a photograph on the page and containing marks in a table.
2.   Develop your web page with the following properties.
(1)   2 Photographs display at the same place, which can flip on mouse over.
(2)   Link to separate HTML file for academics, sports and other interests.
3.   Enhance your Web page using style sheets, frames and setup a hyper link to your friend's page.
4.   Make a form for submission of Querying about the interest rates of bank (use Text fields of HTML) and submit buttons of HTML.
5.   Make a local query form, which takes in the input the range of marks through Text fields and display the list of students
6.   having marks in that range in another window.
7.   Enhance the above query through password protection.
8.   Build a shopping Cart page in which items of 10 types are picked and quantity and a bill is generated by the web page.
9.   Enhance the above page for making a payment through electronic billing system.
10.   Associate guest book in your web page.
11.   Setup a Counter to count the number of visitors on your web page.

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CS-807   UNIX LAB   (L, T, P) = 3 (0+0+3)

1.   Practice commands: cp, mv, rm, ln, ls, who, echo, cat, mkdir, rmdir. Wildcards (? *) , I/O redirection (<, >, >>), pipelines (|)
2.   Practice commands: xargs, alias, set-unset, setenv-unsetenv, export, source, ps, job, kill.
3.   Practice commands: head, tail, cut, paste, sed, grep, sort, uniq, find, locate, chmod.
4.   Writing a simple shell script to echo who is logged in.
5.   Write a shell script to display only executable files in a given directory.
6.   Write a shell script to sort a list of file either in alphabetic order or largest file first according to user response.
7.   Write a shell script to count the lines. Words and characters in its input (Note: Don't use wc).
8.   Write a shell script to print end of a glossary file in reverse order using array. (Hint: use awk tail).
9.   Modify cal command to accept more than one month (e.g. $cal Oct, Nov,) (Hint : use alias too)
10.   Write a shell script to check whether Ram logged in, continue checking every 60 seconds until success.

CS-808   MAJOR PROJECT - II   (L, T, P) = 3 (0+0+3)

S.No.	List of Experiments	Hrs.
1.	Undertaking a project on an assigned recent topic of the latest technical field.	18

CS-809   SEMINAR   (L, T, P) = 3 (0+0+3)

S.No.	List of Experiments	Hrs.
1.	Undertaking a seminar on an assigned recent topic of the latest technical field.	18