CHOICE BASED CREDIT SYSTEM

EVALUATION SCHEME

AND

COURSE OF STUDY

IN

B.TECH

ELECTRONICS AND COMMUNICATION ENGINEERING

(w.e.f. 2015-2016)

FACULTY OF ENGINEERING AND TECHNOLOGY

GURUKUL KANGRI VISHWAVIDYALAYA

HARIDWAR-249404

JUNE 2015

Revised Syllabus (Effective from the session 2015-16)

GURUKULA KANGRI VISHWAVIDYALAYA, HARIDWAR

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. First Year

SEMESTER-I

DSC/SEC/DSE/ AEC	SUBJECT	PERIODS			EVALUATION SCHEME					SUBJECT TOTAL
					SESSIONAL EVALUATION				EXAMESE	
		L	T	P	Credit	CT	TA	TOTAL		
THEORY										
BAC-C101	Engineering Chemistry	3	1	0	4	20	10	30	70	100
BEM-C101	Engineering. Mathematics– I	3	1	0	4	20	10	30	70	100
BME-C101	Fundamental of Mechanical Engineering	3	1	0	4	20	10	30	70	100
BCE-C101	Problem Solving Through 'C'	3	1	0	4	20	10	30	70	100
BHU-S101	Vedic Science & Engineering	3	1	0	2	20	10	30	70	100
BEN-A101	Environmental Studies	3	1	0	2	20	10	30	70	100
PRACTICAL										
BAC-C151	Engineering Chemistry Lab	0	0	2	2	20	10	30	70	100
BME-C151	Basic Mechanical Engineering Lab	0	0	2	2	20	10	30	70	100
BCE-C151	Computer Programming Lab	0	0	2	2	20	10	30	70	100
BME-C153	Engineering Graphics	0	0	2	2	20	10	30	70	100
BSP-S151	Physical training and yoga	0	0	2	0	0	100	100	0	100
TOTAL		18	6	8	28	200	100	300	700	1000

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GURUKULA KANGRI VISHWAVIDYALAYA, HARIDWAR

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. First Year

SEMESTER-II

DSC/SEC/DSE/ AEC	SUBJECT	PERIODS			EVALUATION SCHEME					SUBJECT TOTAL
					SESSIONAL EVALUATION				EXAMESE	
		L	T	P	Credit	CT	TA	TOTAL		
THEORY										
BAP-C201	Engineering Physics	3	1	0	4	20	10	30	70	100
BEM-C201	Engineering Mathematics – II	3	1	0	4	20	10	30	70	100
BEE-C201	Basic Electrical Engineering	3	1	0	4	20	10	30	70	100
BET-C201	Basic Electronics Engineering	3	1	0	4	20	10	30	70	100
BME-C202	Basic Manufacturing Process	3	1	0	4	20	10	30	70	100
PRACTICAL										
BAP-C251	Engineering Physics Lab	0	0	2	2	20	10	30	70	100
BEG-A251	Technical communication Lab	0	0	2	2	20	10	30	70	100
BEE-C251	Basic Electrical Engineering Lab	0	0	2	2	20	10	30	70	100
BET-C251	Basic Electronics Engineering Lab	0	0	2	2	20	10	30	70	100
BME-C252	Workshop Practice	0	0	2	2	20	10	30	70	100
TOTAL		15	5	10	30	200	100	300	700	1000

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GURUKULA KANGRI VISHWAVIDYALAYA, HARIDWAR

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. Second Year

SEMESTER-III

DSC/SEC/DSE/ AEC	SUBJECT	PERIODS			EVALUATION SCHEME					SUBJECT TOTAL
					SESSIONAL EVALUATION				EXAM ESE	
		L	T	P	Credit	CT	TA	TOTAL		
THEORY										
BEM-C301	Engineering Mathematics- III	3	1	0	4	20	10	30	70	100
BET-C301	Electronic Devices and Circuits	3	1	0	4	20	10	30	70	100
BET-C302	Digital Electronics	3	1	0	4	20	10	30	70	100
BCE-C301	Data Structure-I	3	1	0	4	20	10	30	70	100
BCE-C304	Computer Organization and Operating System	3	1	0	4	20	10	30	70	100
BET-C304	Analog Communication and System	3	1	0	4	20	10	30	70	100
PRACTICAL										
BET-C351	Electronic Devices and Circuits Lab	0	0	2	2	20	10	30	70	100
BET-C352	Digital Electronics Lab	0	0	2	2	20	10	30	70	100
BET-C353	Analog Communication Lab	0	0	2	2	20	10	30	70	100
BCE-C351	Data Structure-I Lab	0	0	2	2	20	10	30	70	100
TOTAL		18	6	8	32	200	100	300	700	1000

Revised Syllabus (Effective from the session 2016-17)

GURUKULA KANGRI VISHWAVIDYALAYA, HARIDWAR

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. Second Year

SEMESTER-IV

DSC/SEC/DSE/ AEC	SUBJECT	PERIODS			EVALUATION SCHEME					SUBJECT TOTAL
					SESSIONAL EVALUATION				EXAM ESE	
		L	T	P	Credit	CT	TA	TOTAL		
THEORY										
BEM-C401	Discrete Mathematics	3	1	0	4	20	10	30	70	100
BET-C401	VLSI Technology	3	1	0	4	20	10	30	70	100
BEM-C402	Numerical Analysis	3	1	0	4	20	10	30	70	100
BEE-C403	Network Analysis and Synthesis	3	1	0	4	20	10	30	70	100
BET-C402	Microprocessor and Microcontroller	3	1	0	4	20	10	30	70	100
BET-C403	Electromagnetic Field Theory	3	1	0	4	20	10	30	70	100
BKT-A401	Bharteeya Jnanaparampara	3	1	0	2	20	10	30	70	100
PRACTICAL										
BET-C451	Microprocessor Lab	0	0	2	2	20	10	30	70	100
BEM-C452	Numerical Analysis Lab	0	0	2	2	20	10	30	70	100
BET-C452	Circuit Simulation Lab	0	0	2	2	20	10	30	70	100
BET-C481	Seminar	0	0	2	2	20	10	30	70	100
TOTAL		18	6	8	32	200	100	300	700	1000

Revised Syllabus (Effective from the session 2017-18)

GURUKULA KANGRI VISHWAVIDYALAYA, HARIDWAR

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. Third Year

SEMESTER-V

DSC/SEC/DSE/ AEC	SUBJECT	PERIODS			EVALUATION SCHEME					SUBJECT TOTAL
					SESSIONAL EVALUATION				EXAMESE	
		L	T	P	Credit	CT	TA	TOTAL		
THEORY										
BET-C501	Digital Communication	3	1	0	4	20	10	30	70	100
BET-C502	Embedded System Design	3	1	0	4	20	10	30	70	100
BEE-C503	Automatic Control System	3	1	0	4	20	10	30	70	100
BET-C503	Applied Electromagnetic Field Theory	3	1	0	4	20	10	30	70	100
BET-C504	Signals and Systems	3	1	0	4	20	10	30	70	100
BCE-C506	Object Oriented Programming Using C++	3	1	0	4	20	10	30	70	100
PRACTICAL										
BET-C551	Digital Communication Lab	0	0	2	2	20	10	30	70	100
BET-C552	System Engineering Lab	0	0	2	2	20	10	30	70	100
BCE-C554	Object Oriented Programming Lab	0	0	2	2	20	10	30	70	100
BET-C554	Embedded System Engg. Lab	0	0	2	2	20	10	30	70	100
TOTAL		18	6	8	32	200	100	300	700	1000

Revised Syllabus (Effective from the session 2017-18)

GURUKULA KANGRI VISHWAVIDYALAYA, HARIDWAR

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. Third Year

SEMESTER-VI

DSC/SEC/DSE/ AEC	SUBJECT	PERIODS			EVALUATION SCHEME					SUBJECT TOTAL
					SESSIONAL EVALUATION				EXAM ESE	
		L	T	P	Credit	CT	TA	TOTAL		
THEORY										
BET-C601	Analog Integrated Circuits	3	1	0	4	20	10	30	70	100
BET-C602	Antenna and Wave Propagation	3	1	0	4	20	10	30	70	100
BET-C603	Process Instrumentation	3	1	0	4	20	10	30	70	100
BET-C604	Switching Theory and Logic Design	3	1	0	4	20	10	30	70	100
BET-C606	Microwave Engineering	3	1	0	4	20	10	30	70	100
BCE-C607	JAVA Programming	3	1	0	4	20	10	30	70	100
PRACTICAL										
BET-C651	Analog Integrated Circuits Lab	0	0	2	2	20	10	30	70	100
BET-C652	Microwave Lab	0	0	2	2	20	10	30	70	100
BET-C653	Instrumentation and Process Lab	0	0	2	2	20	10	30	70	100
BCE-C655	JAVA Programming Lab	0	0	2	2	20	10	30	70	100
TOTAL		18	6	8	32	200	100	300	700	1000

Revised Syllabus (Effective from the session 2018-19)

GURUKULA KANGRI VISHWAVIDYALAYA, HARIDWAR

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. Fourth Year

SEMESTER-VII

DSC/SEC/DSE/ AEC	SUBJECT	PERIODS			EVALUATION SCHEME					SUBJECT TOTAL
					SESSIONAL EVALUATION				EXAM ESE	
		L	T	P	Credit	CT	TA	TOTAL		
THEORY										
BHU-S701	Industrial Economics and Business Administration	3	1	0	2	20	10	30	70	100
BET-C701	Digital Signal Processing	3	1	0	4	20	10	30	70	100
BET-C702	VLSI Design	3	1	0	4	20	10	30	70	100
BET-C703	Optical Fiber Communication	3	1	0	4	20	10	30	70	100
BET-C704	Satellite Communication	3	1	0	4	20	10	30	70	100
BCE-C710	Computer Network	3	1	0	4	20	10	30	70	100
PRACTICAL										
BET-C751	Digital Signal Processing Lab	0	0	2	2	20	10	30	70	100
BCE-C752	Computer Network Lab	0	0	2	2	20	10	30	70	100
BET-C771	Minor Project	0	0	4	4	20	10	30	70	100
TOTAL		18	6	8	30	180	90	270	630	900

Revised Syllabus (Effective from the session 2018-19)

GURUKULA KANGRI VISHWAVIDYALAYA, HARIDWAR

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. Fourth Year

SEMESTER-VIII

DSC/SEC/DSE/ AEC	SUBJECT	PERIODS			EVALUATION SCHEME					SUBJECT TOTAL
					SESSIONAL EVALUATION				EXAM ESE	
		L	T	P	Credit	CT	TA	TOTAL		
THEORY										
	Elective –I	3	1	0	4	20	10	30	70	100
	Elective –II	3	1	0	4	20	10	30	70	100
	Elective –III	3	1	0	4	20	10	30	70	100
	Elective – IV	3	1	0	4	20	10	30	70	100
PRACTICAL										
BET-C861	Major Project	0	0	8	8	0	100	100	300	400
TOTAL		12	4	8	24	80	140	220	580	800

Revised Syllabus (Effective from the session 2018-19)

Gurukula Kangri Vishwavidyalaya, Haridwar

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. Fourth Year

SEMESTER-VIII

List of Electives

S. No	CODE	SUBJECT
1	BET-E801	Wireless and Mobile Communication
2	BET-E802	Fundamental of Radar and Navigation
3	BET-E803	Principles of Secure Communication
4	BET-E804	Adaptive Signal Processing
5	BET-E805	Filter Design
6	BET-E806	Digital Image Processing
7	BET-E807	Digital System Design
8	BET-E808	Random Signal Theory
9	BET-E809	Biomedical Signal Processing
10	BET-E810	Speech Processing
11	BET-E811	Soft Computing and Expert Systems
12	BET-E812	Telecommunication Switching Network and Protocols

NOTE: Electives will be offered depending upon the availability of teaching staff and minimum thirty students should opt for a particular elective.

Effective from the session 2015-16

BAC-C101
ENGINEERING CHEMISTRY

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Periodicity & Chemical Bonding: Atomic radii, Ionization potential, Electro negativity, Electro positivity, Electron affinity and their periodicity. Hybridization involving s, p and d orbital, partial ionic character, dipole moment and its applications, hydrogen bond and Vander Waal's forces, elementary treatment of M.O. theory and its application to homo nuclear diatomic molecules of I and II period elements.

Phase Rule: Gibbs phase rule (without derivation). Applications of Phase rule to one component system (H_2O and S) and two component system (KI- H_2O system).

UNIT II

Chemical kinetics: Arrhenius equation, determination of activation energy, theories of reaction rates (collision and absolute reaction rate theory).

Photochemistry: Laws of Photochemistry, Quantum yield, Fluorescence, Phosphorescence, Chemiluminescence, Jabolinski diagram.

UNIT III

Water Analysis: Hard & soft water, Specification of water, Analysis of water-alkalinity, hardness (EDTA Method only) of water for domestic use, Water softening-soda-lime process, anion exchangers, Boiler-feed water, Boiler problems-scale and sludge, priming & forming, Caustic embittlement & corrosion, their cause and prevention (Removal of dissolved gases, carbonate treatment, Phosphate conditioning, Colloidal conditioning), numerical problems based on hardness. Solid impurities (filterable, non-filterable), pH, D.O, B.O.D., C.O.D.

Polymers: Polymers, thermoplastics, thermosetting plastic, linear, branched & cross linked polymers etc., industrial application of polymers, addition, condensation polymerizations.

(I)Plastics: Structure, properties and uses of thermoplastic (Polyvinyl chloride, Teflon, Nylons and Polymethyl methacrylate) and thermosetting (Bakelite) materials. (II)Rubber: natural Rubber and it's preparations, vulcanization, mechanism of vulcanization, synthetic rubber (General).

UNIT IV

Fuels: Definition and classification, Calorific value; Gross & Net calorific value and their determination by Bomb calorimeter.(I)Solid fuels: Coke-it's manufacture by Otto Hoffman oven and uses. (II) Liquid fuels: Conversion of coal into liquid fuels (Bergius process & Fischer Tropsch process and mechanism), Petroleum- its chemical composition and fractional distillation. Cracking of Heavy oil residues (Thermal cracking and catalytic cracking), Knocking & Anti knocking agents, octane and cetane numbers and their significance. (III)Gaseous fuels: Natural Gas, Producer gas, Water gas, Carburetted water gas, Coal gas and Oil gas. (IV)Nuclear fuels: Nuclear fission and nuclear fusion. Nuclear reactor.

Corrosion: Definition and types of corrosion, Electrochemical Theory of corrosion, laws of oxide film, different theories of corrosion, Atmospheric corrosion, stress corrosion water line, pitting and soil corrosion. Protective measures against corrosion

UNIT V

Lubricants: Principle of Lubrication, types of Lubrication, Lubricating oil, fraction from crude oil, de-waxing of oil fraction, acid and solvent, refining of lubricating oils, properties of refined oils (viscosity, viscosity index, acid value, saponification value & iodine value, pour point and cloud point, flash point and fire point, aniline point, and their determination, Lubricant greases (Semi solid) and their Penetration and drop point tests, solid lubricants.

Name Reactions: Reimer Tieman reaction, Aldol Condensation, Diel's Alder Reaction, Wurt'z Reaction and Claisen Reaction.

References

1. Principales of Physical chemistry : B.R. Puri, L.R. Sharma, M. Pathania
2. Advanced inorganic chemistry : Cotton
3. A text book of organic chemistry : S.K. Jain
4. Principals of Physical Chemistry : Samuel Glastone
5. A text book of Engineering chemistry : S.S. Dara
6. A text book of Engineering chemistry : Jain

Effective from the session 2015-16

BEM-C101
ENGINEERING MATHEMATICS I

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Differential Calculus I : Successive differentiation, Leibnitz theorem, Taylor's & Maclaurin's Expansion, Indeterminate forms, Radius of curvature, Asymptotes, Double points and their classification, Tracing of curves.

UNIT II

Differential Calculus II : Partial Differentiation of functions, Normal to surfaces and tangent plane, Change of variables, Jacobian, Taylor's series of two variables, Truncation errors, Extrema of function of two and more variables, Method of Lagrange's multipliers.

UNIT III

Multiple Integrals : Fundamental Theorem of integral calculus, Differentiation under the integral sign, Double and triple integrals, Change of order of integration, change of variables. Application to arc length, area , volume, centroid and moment of inertia. Gamma and Beta functions, Dirichlet's integral.

UNIT IV

Vector Calculus : Differentiation of a vector, Scalar and vector fields, Gradient, Divergence, Curl and their physical meanings, Differential operator and identities, Line, Surface and Volume integrals, Green's theorem in plane. Gauss and Stoke's theorems (without proof). Simple applications.

UNIT V

Matrices : Elementary row/ column operations, Rank of a matrix and its applications, Eigen-values and Eign vectors, Cayley-Hamilton theorem, Diagonalisation of Matrices, Linear dependence and independence, Normal matrices, Complex matrices and unitary matrices.

References

1. Prasad C., A first course in mathematics for Engineers, Prasad Mudranalaya
2. Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999
3. Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
4. Srivastava R.S.L., Engineering Mathematics Vol.I

Effective from the session 2015-16

BME-C101

FUNDAMENTAL OF MECHANICAL ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Thermodynamics I: Introduction to SI units, Definition of thermodynamic system, Surrounding and Universe, Quasi static process, Energy interaction Zeroth law, Concept of temperature First law of thermodynamics, Application to closed and open system, Concept of Enthalpy, steady flow energy equation, Throttling process.

UNIT II

Thermodynamics II: Second law, reversible and irreversible process, Thermal reservoir, heat engines and thermal efficiency, COP of heat pump and refrigerator, Carnot cycle, Clausius inequality, Concept of entropy, Entropy change for ideal gases.

UNIT III

Thermodynamics III: Generation of steam at constant pressure, Properties of steam, Use of property diagram, Process of vapor in closed and open system, Rankine cycle. Stroke clearance ratio, Compression ratio, Definition and calculation of mean effective pressure (no proof) for air standard cycles (Otto and diesel cycles)

UNIT IV

Mechanics: Trusses: Plane structure, (Method of Joints and Sections only) Beams: Bending moment and shear force diagram for statically determinate beams.

UNIT V

Strength of Materials: Simple stresses and strain, strain energy, stress- strain diagram, elastic constants. Compound stress and strain: state of stress at a point, Simple tension, pure shear,general two dimensional stress system, principal planes, principal stresses and strains, Mohr's stress circle, Poisson's ratio, maximum shear stress

References

1 Kumar DS (2/e), Thermal Science and Engineering, S.K.Kataria, New Delhi,2001
2 P.K.Nag (2/e), Engineering Thermodynamics, TMH, New Delhi,2001
3 R.Yadav(7/e), Thermal Engineering, Central Publishing House, Allahabad, 2000
4 Shames Irving H.(4/e), Engineering Mechanics, PHI, New Delhi, 1994
5 Hibler (1/e), Statics and Dynamics, Pearson Education, Singapore, 2000
6 Pytel & Singer (1/e), Strength of Materials, Addison Wesley, 1999

Effective from the session 2015-16

BCE-C101
PROBLEM SOLVING THROUGH 'C'

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Computers: Block diagram of computers, functions of its important components, Memory and I/O devices. Concept of assembler, interpreter, compiler & generation of languages.

Number System: Decimal, Binary, Octal, and Hexadecimal numbers and their arithmetic (addition, subtraction, multiplication, and division): 1's and 2's complements

UNIT II

Programming in C: History, Introduction to C Programming Languages, Structure of C Programs, Compilation and Execution of C Programs, Debugging techniques, Data Type and sizes, Declarations of variables, Modifiers, Identifiers and keywords, Symbolic Constants, Storage classes(automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor.

Operators: Unary operators, Arithmetic & Logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, Precedence and order of evaluation.

Control Statements: If-else, switch, break, continue, the coma operator, goto statement. **Loops:** while, do-while, for loop.

UNIT III

Arrays: One-dimensional arrays: declaration, initialization and application. Two-dimensional array: declaration, initialization and application, Multidimensional arrays.

Handling of Character Strings: Declaring and initializing string variables, Reading strings, Writing strings, Arithmetic operation on strings, comparison of two strings and string handling functions.

Pointers: Accessing the address of the variable, Declaring and initializing pointers, accessing a variable through its pointer expression, pointer increment and scale factor, pointers and array, pointers and character strings.

UNIT IV

Functions: Need for user defined function, Return value and its type, function calls, No argument and No return values function, Argument and No return values functions, argument and return value functions. Handling of non integer function, Scope and life time of variable in functions.

Recursion: Recursive Definition and processes, recursion in C, example of recursion, Tower oh Hanoi Problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

UNIT V

Structures: Structures definition, giving value to members, structure initialization, array of structures, array within structures, structures within structures, structures and functions, Structure Pointrers.

File Handling: Creating and Deleting a File, Updating File, Copying File, Searching & Sorting in a File.

References:

1. Rajaraman V.(3/e), Fundamental of Computers, PHI, New Delhi, 1999
2. Sanders,D.H., Computers Today, Mcgraw Hill, 1998
3. Kris Jamsa, DOS the complete reference, Tata McGraw Hill
4. J.Peek Tim O'reilly & M.Locekides, UNIX POWER TOOLS, BPB Publication
5. Yashwant Kanetkar, Let Us C, BPB
6. Yashwant Kanetkar, C In Depth, BPB

Effective from the session 2015-16

BHU-S101
VEDIC SCIENCE & ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 2**
2 0 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Science in Vedic literature and Indian Philosophy-I : Kanad's atomic theory, concept of parmanu, Formation of molecules, Parimandal, Comparison with Dalton's atomic theory and models of Thompson, Rutherford and Bhor. Concept of SAMATA and VISHAMTA vs Maxwell-Boltzmann's distribution of velocities and energies.

UNIT II

Science in Vedic literature and Indian Philosophy-II : First and Second Law of thermodynamics in daily life. Law of helplessness of mankind in thermodynamics and Indian philosophy. Entopy in life and concept of pralaya. Dhananjay Vs concept of Radioactivity-life after death. Atomic spectrum Vs concept of Kundalini.

UNIT III

Vedic Mathematics : Measurements in Vedic Times, ancient scale of length, mass, time and temperature, Number system, Geometry according to sulba Sutra. Overview of Vedic Mathematical Rules (ekadhiken pooren, Nikhil navtascharaman dashatah, oordhavatriyagyabhyam)

UNIT IV

Electrical, Electronics & Aeronautical Engineering in Vedas : Concept of electrical Engineering, type of electricity – Tadit, Saudamini, Vidyut, Shatakoti, Haradini, Ashani. Electronics Engineering in Vedic literature. Aeronautical Engineering in Vedic literature, Types of Vimanas and their construction and working, Shakun viman, Rukma viman, Tripura viman, concept of calculator and ancient ways of computation.

UNIT V

Mechanical, Chemical, Civil & Architectural engineering in Vedic Literature : Mechanical & Chemical Engineeering in ancient India,Art of Alchemy,Types of Iron and steel.Civil and Architectural engineering in Vedic literature.Concept of cryptography & Art of secret writing.

Suggested Readings :

1. Science in Vedas by Acharya Vaidyanath Sashtri.
2. Science in the Vedas by Hansraj, Shakti Publications, Ludhiana.
3. Vedic Mathematics by Swamisri Bharati Krishana Teerathaji, Motilal Banarasi Das, Delhi.
4. Brahad Viman shastra by Maharishi Bhardwaj.
5. Vymanika shastra, English translation by G. R. Josyer.
6. Alchemy and Metallic Medicines in Ayurveda by : Vaidya Bhagwan Das.
7. History of Hindu Chemistry by : P. C. Raya
8. Indian Alchemy by : Dr. S. Mahdihassan.
9. Ancient Scientist of Indian by Satya Prakash.
10. Vaishaishik Darshan by Maharishi Kanad.
11. Vedas : The sources of ultimate science by S. R. Verma, Nag Publisher, New Delhi.

Effective from the session 2015-16

BEN-A101
ENVIRONMENTAL STUDIES

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 2**
2 0 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Multidisciplinary Nature of Environmental Studies & Ecosystems: (a) definition, scope and importance of ecology and environment (b) ecological components: (i) abiotic components: soil, water, light and temperature (ii) biotic components & their relationships- symbiosis, commensalisms, parasitism, predation and antibiosis (c) concept of an ecosystem (d) structure and function of an ecosystem (e) producers, consumers and decomposers (f) energy flow in the ecosystem (g) ecological succession (h) food chains, food webs and ecological pyramids (i) introduction, types, characteristic features, structure and function of the following ecosystems: (i) forest ecosystem (ii) grassland ecosystem (iii) desert ecosystem (iv) aquatic ecosystems (pond, river, ocean) (j) Need for public awareness

UNIT II

Natural Resources: (a) forest resources: use and over-exploitation, deforestation, timber extraction, mining; dams and their effects on forest and tribal people (b) water resources: use and over-utilization of surface and ground water, benefits and problems of dams (c) mineral resources: use and exploitation, environmental effects of extracting and using mineral resources (d) energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources (e) land resources: land as a resource, land degradation, man induced landslides, soil erosion and desertification (f) biodiversity & its conservation: definition- genetic, species and ecosystem diversity, values of biodiversity- consumptive use, productive use, social, ethical, aesthetic and option values (g) India as a mega-diversity nation, hot-spots of biodiversity, threats to biodiversity- habitat loss, poaching of wildlife, man-wildlife conflicts; endangered and endemic species of India, conservation of biodiversity: *in-situ* & *ex-situ* methods (h) bio-geographical classification of India (i) role of an individual in conservation of natural resources (j) equitable use of resources for sustainable lifestyles

UNIT III

Environmental Pollution: (a) Definition, causes, effects and control measures of: air pollution, water pollution, soil pollution, noise pollution, thermal pollution and nuclear hazards (b) solid

waste management- causes, effects and control measures of urban and industrial wastes (c) role of an individual in prevention of pollution (d) disaster management: floods, earthquake, drought & landslides

UNIT IV

Social Issues and the Environment: (a) from unsustainable to sustainable development (b) urban problems related to energy (c) rain water harvesting (d) resettlement & rehabilitation of people- problems and concerns (e) environmental ethics- issues and possible solutions (f) wasteland reclamation (g) population growth and family welfare programme (h) environment and human health, human rights, value education (i) HIV/AIDS (j) role of information technology (IT) in environment and human health (k) global environmental issues: global warming, acid rain, ozone layer depletion

UNIT V

Environmental policies and laws: (a) salient features of following acts i. Environment Protection Act 1986 ii. Air (Prevention and Control of Pollution) Act 1981 iii. Water (Prevention and Control of Pollution) Act 1974 iv. Wildlife Protection Act 1972 v. Forest Conservation Act 1980 (b) issues involved in enforcement of environmental legislation (c) public awareness

References

1. Agarwal, K.C. *Environmental Biology*, Nidhi Publ. Ltd., Bikaner.
2. Bharucha E. *The Biodiversity of India*, Mapin Publishing Pvt. Ltd., Ahmedabad.
3. Clark R.S. *Marine Pollution*, Clanderson Press Oxford.
4. Cunningham, W.P., Cooper, T.H., Gorhani, E. & Hepworth, M.T. *Environmental Encyclopedia*, Jaico Publ. House, Mumabai.
5. De A.K. *Environmental Chemistry*, Wiley Eastern Ltd.
6. Gleick, H.P. *Water in Crisis*, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press.
7. Hawkins R.E. *Encyclopedia of Indian Natural History*, Bombay Natural History Society, Bombay.
8. Heywood, V.H & Waston, R.T. *Global Biodiversity Assessment*, Cambridge Univ. Press.
9. Odum, E.P. *Fundamentals of Ecology*, W.B. Saunders Co. USA.
10. Rao M N. & Datta, A.K. *Waste water treatment*, Oxford & IBH Publ. Co. Pvt. Ltd.
11. Sharma B.K. *Environmental Chemistry*, Geol Publ. House, Meerut.
12. Trivedi R.K. *Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards*, Vol. I and II, Enviro Media.
13. Trivedi R. K. and Goel, P. K. *Introduction to air pollution*, Techno-Science Publication.
14. Wanger K.D. *Environmental Management*, W.B. Saunders Co. Philadelphia, USA.

Effective from the session 2015-16

BAC-C151
ENGINEERING CHEMISTRY LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. Find out the surface tension of given liquid by stalagnometer.
2. Find out the viscosity of given liquid by Ostwald's viscometer.
3. Find out pH of given acid/base solution by using pH meter.
5. Determine Na^+ and K^+ concentration using flame photometer.
6. Determine the turbidity of given solution/water sample by turibidimeter.
7. Determination of D.O. of water sample.
8. Find out distribution constant for the distribution of I_2 between CCl_4 and water.
9. Separate the given mixture indicator by using TLC.
10. Separate the given mixture by using paper chromatography
11. Determine the angle of rotation of given solution by using polarimeter.
12. Determination of strength of oxalic acid/Mohr salt by $KMnO_4$.
13. Determination of strength of oxalic acid/Mohr salt by $K_2Cr_2O_7$.
14. Determine the refractive index of given liquid by using Abbe's refractrometer.
15. Determine conductivity of given compound.
16. Determine absorption maxima and concentration of given $KMnO_4$ solution.
17 To observe fluorescence of fluorescent materials.
18. Determine acid value of given oil sample.
19. Determine iodine value of given oil sample.
20. Determine saponification value of given oil sample.

REFERENCES

1. Advanced practical physical chemistry : J.B. Yadav
2. Analytical chemistry Vol. I, II, III : Subhash, Satish
3. Applied chemistry : Virmani and Narula

NOTE

1. In practical examination the student shall be required to perform two experiments.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BME-C151
BASIC MECHANICAL ENGINEERING LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. To conduct the tensile test on a UTM and determine ultimate tensile strength, percentage elongation for a steel specimen.
2. To conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To determine the hardness of the given specimen using Brinell / Rockwell / Vicker testing machine.
4. To study the 2-stroke I.C. Engine models.
5. To study the 4-stroke I.C. Engine model.
6. To study close loop system example (Turbine)
7. To study model of Locomotive boiler.
8. To study model of Bibcock boiler.
9. Study of Fire Tube boiler
10. Study of water Tube boiler

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BCE-C151
COMPUTER PROGRAMMING LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. Practice of all internal and external DOS commands.
2. Write simple batch program.
3. Giving exposure to windows environment.
4. File and program management in windows.
5. Practice of all UNIX commands.
6. Introduction to text editing and word processing.
7. Net surfing.
8. Creation and usage of E-mail account.
9. Write a program in C to perform different arithmetic operations.
10. Write a program in C to greater of two numbers.
11. Write a program in C to check whether no. is odd or even.
12. Write a program in C to check whether no. is prime or not.
13. Write a program in C to print Fibonacci series.
14. Write a program in C to print factorial of a no.
15. Write a program in C to add two matrices.
16. Write a program in C to search a no. in array.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BME-C153
ENGINEERING GRAPHICS

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 3

LIST OF EXPERIMENTS

1. To understand graphics as a tool to communicate ideas, lettering and dimensioning, construction of geometrical figures.
2. To understand orthographic projection: principles of orthographic projections.
3. To understand principle and auxiliary planes.
4. To understand first and third angle projections.
5. To draw a sheet on projections of points.
6. To make two sheets based on projection of lines parallel to both the planes, parallel to one and inclined to other, inclined to both the planes, true length and traces of a line.
7. To make a sheet based on projection of planes, traces of planes, angles of inclinations of planes, parallel planes.
8. To make a sheet projection of solid in simple position, axis or slant edge inclined to one and parallel to other plane, solids lying on a face.
9. To make a sheet using section of solids lying in various positions, true shape of the section.
10. To make a sheet on development of lateral surfaces.
11. To understand isometric projection: principle of isometric projection, isometric projection using box and offset methods.
12. To practice two exercises using computer aided drawing: basic concepts and application.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BSP-S151

Physical training and Yoga

MM : 100 **Sessional :100**

L T P **Credit : 0**

0 0 2

1. Sports Activites and Development of motor abilities
   Track and field events
   Game events

2. Yogic Exercises and Pranayam

   Surya namaskar
   Bhujangasana
   Shalabhasana
   Shrishasana
   Anuloma-viloma
   Kapal Bhati
   Shitali
   Bhramari

Effective from the session 2015-16

BAP-C201
ENGINEERING PHYSICS

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Optics: Interference of light, Coherence, Fresnel's Biprism, Interference in thin films & wedge shaped film, Newton's rings. Diffraction of light, Diffraction at a single slit, Double slits, Plane transmission grating. Polarization of light, Brewester's Law, Mauls law, Double refraction, Nicol Prism, Production and analysis of polarized light.

UNIT II

Electromagnetics: Gauss' law and its applications.Maxwell's equations, Poynting theorem, Electromagnetic wave equation (elementary idea of each, no derivation). Magnetic induction, Magnetic field intensity, Magnetic permeability and susceptibility (definitions only), Dia, Para,& ferromagnetic materials (Qualitative idea only). Motion of charged particle in uniform electric and magnetic field, Magnetic and electrostatic focusing, Function and block diagram of CRO.

UNIT III

Special Theory of Relativity & Quantum Theory: Inertial & non-inertial frames of reference, Galilean transformation, Lorentz transformation equation of space and time, Michelson-Morlay experiment, Postulates of special theory of relativity, Length contraction, Time dilation, Addition of velocities, Mass energy equivalence& variation of mass with velocities.

Quantum theory of radiations, Planck's law, Photoelectric effect, de-Broglie concept of matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle and its applications, Schrodinger wave equation and its solution for a particle in a box.

UNIT IV

Atomic & Nuclear Physics: Bohr's atomic model and energy level diagram, Sommerfeld relativistic atomic model, Vector atom model, Franck-Hertz experiment, Quantum numbers, general properties of nucleus, Mass defect and packing fraction, Nuclear binding energy, Semi-empirical mass formula.

UNIT V

Solid State Physics: Crystal structure, Miller indices, Separation between lattice planes, Different kinds of crystal bonding, Formation of energy bands in solids (energy level approach), classification of solids, Basic idea of conduction mechanism in semiconductors, Hall effect, X-ray diffraction & Bragg's Law.

References

1. Vasudeva AS, Modern Engineering Physics, S Chand, New Delhi, 1998.
2. Ghatak Ajoy, Optics, TMH, New Delhi, 1999.
3. K.K. Tiwari, Text book of Electricity and Magnetism, S.Chand, New Delhi, 2001
4. Rajam JB.,Atomic Physics, SChand, New Delhi;2000.
5. Beiser Arthur,Concepts of Modern Physics, TMH, New Delhi,1999
6. Mani HS, Modern Physics, New Delhi,1999
7. Kittel Charles(7/e), Introduction to Solid State Physics, John Wiley, Singapore, 1996
8. Murugeshan R (8/e), Modern Physics, S.Chand,New Delhi,2001
9. Kaplan lrving , Nuclear Physics, Narosa ,New Delhi,1998
10. Schiff (3/e), Quantum Mechanics, McGraw, Auckland
11. S.R.Verma, Engg. Physics Vol-I & Vol-II, 2009.

Effective from the session 2015-16

BEM-C201
ENGINEERING MATHEMATICS II

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Differential Equation : Ordinary differential equations of first order, orthogonal trajectories, linear differential equations with constant coefficients, Euler- Cauchy equations, Equations of the form $y'' = f(y)$. Solution of second order differential equations by change of dependent and independent variables, Method of variation of parameters for second order differential equations. Simple applications.

UNIT II

Partial Differential Equations and its Applications : Introduction of partial differential equations, Linear partial differential equations of II order with constant coefficients and their classifications - parabolic, elliptic and hyperbolic with illustrative examples, Method of separation of variables. Wave and Heat equation up to two-dimensions.

UNIT III

Solution in Series : solution in series of second order linear differential equations, Bessel's and Legendre's equations and their solutions, Properties of Bessel function and Legendre's polynomials, Recurrence relations, Generating functions, Jacobi series, Integral representation of Bessel's functions.

UNIT IV

Fourier Series : Fourier series, Dirichlet's condition and convergence. Half range series, Harmonic analysis.

UNIT V

Statistics : Moments, Moment generating functions. Binomial, Poisson and Normal distributions. Correlation and Regression. Method of least squares and curve fitting - straight line and parabola.

References

1. Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
2. Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999
3. Prasad C.,Advanced Mathematics for Engineers, Prasad Mudranalaya
4. Kapur J. N. & Saxena H.C., Mathematical Statistic.

Effective from the session 2015-16

BEE-C201
BASIC ELECTRICAL ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

D.C. Network Theory: Concept of elements**,** Circuit theory concepts- Mesh and node analysis, Star-Delta transformation. Network Theorems- Super-position theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, DC Transients- RL, RC circuits.

UNIT II

Steady State Analysis of A.C. Circuits: Sinusoidal and Phasor representation of voltage and current, average and rms value, form and peak factor of sinusoidal and different waveforms, single -phase A.C. circuit- behavior of resistance, inductance and capacitance and their combination in series & parallel and power factor, series parallel resonance-band width and quality factor.
Three Phase A.C. Circuits: Star-Delta connections, line and phase voltage/current relations, three -phase power and its measurement.

UNIT III

Magnetic Circuits: Ampere turns, magnetomotive force, permeability, reluctance, composite magnetic circuits, comparison between magnetic and electric circuits.
Transformer: Principle of operation, types of construction, phasor diagram, equivalent circuit, efficiency and voltage regulation of single-phase transformer, O.C. and S.C. tests.

UNIT IV

D. C. Machines : Principle of electromechanical energy conversion, types of D.C. machines, E.M.F. equation, Magnetization and load characteristics, losses and efficiency, speed control of D.C. motors and applications.
Measuring Instruments: Principle of working and constructional features of Permanent Magnet Moving Coil and Moving Iron ammeters and voltmeters, Electrodynamic Wattmeter, Induction type single-phase Energy meter.

UNIT V

Three-phase Induction Motor: Principle of operation, types and methods of starting, slip-torque characteristics and applications.
Single-phase Induction Motor: Principle of operation, methods of starting.
Three-phase Synchronous Machines: Principle of operation and application of synchronous motor.

Text Books

1. V. Del Toro, Principles of Electrical Engineering, Prentice Hall International.
2. H. Cotton, Advanced Electrical Technology, Wheeler Publishing.
3. E. Huges, Electrical Technology.

References

1. B. L., Theraja, Electrical Technology, Vol-1, S. Chand Publisher, New Delhi.
2. W.H. Hayt & J.E. Kennedy, Engineering circuit Analysis, Mc Graw Hill.
3. I.J. Nagrath, Basic Electrical Engineering, Tata Mc Graw Hill.
4. A.E. Fitgerald, D.E., Higginbotham and A Grabel, Basic Electrical Engineering, Mc Graw Hill.
5. Ashfaq Hussain, Fundamentals of Electrical Engineering, Dhanpat Rai Publish.

Effective from the session 2015-16

BET-C201
BASIC ELECTRONICS ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Semiconductors, energy band description of semiconductors, effect of temperature on semiconductors, intrinsic and extrinsic semiconductors, donor and acceptor impurities, electron and hole concentration, conductivity of a semiconductor, mobility, Hall effect, Fermi level, mass action law, charge densities in a semiconductor, diffusion and continuity equation

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UNIT II

P-N junction and its properties, V-I characteristics of P-N junction, semiconductor-diode, depletion layer, equivalent circuits of junction diode, diode equation, diode resistance and capacitance, application of junction diode as clippers, clampers and rectifiers (Half-wave, Full-wave and bridge), efficiency of rectifiers, ripple factor, filter circuits, Zener and avalanche breakdown mechanism, Zener diode and its characteristics, equivalent circuit of Zener diode, Zener diode as a voltage regulator.

UNIT III

Bipolar junction transistor(BJT) and its action, Transistor configurations (CB, CE and CC) and their characteristics, cut-off, active and saturation regions. Transistor as a switch, operating point, dc load line, Transistor biasing and its necessity, thermal runaway, types of biasing and their analysis, stability factors, Transistor as a regulator.

UNIT IV

Concept of Transistor amplifier, graphical analysis of CE amplifier, dc and ac equivalent circuits, Emitter follower and its ac model. Basic idea of operational amplifier and OP-AMP parameters, inverting, non-inverting and unity gain configurations. Application of OP-AMP as adder, subtractor, differentiator and integrator.

UNIT V

Number system, conversion of bases (decimal ,binary, octal and hexadecimal), addition and subtraction, BCD numbers, Boolean algebra, logic gates, concept of universal gate, canonical forms, Minimization using K-map, don't care conditions.

Text Book

1. Integrated Electronics: Jacob Millman & C.C. Halkias

References

1. Malvino and leach "Digital principle and applications.
2. Streetman Ben.G, "Solid state electronic devices" (3/e), PHI
3. Millman and grabel, "Microelectronics" PHI
4. Robert Bolyestad "Electronic devices and circuit", PHI

Effective from the session 2015-16

BME-C202
BASIC MANUFACTURING PROCESS

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction : Classification of Manufacturing Process, Composition , Properties and uses of wrought iron, cast iron, Malleable iron ,Carbon and alloy steels, Copper, Aluminum, lead, brass, bronze, duralumin, bearing metals, high temperature metals , Properties of metals: Strength , Elasticity, Stiffness , Plasticity, Malleability , Ductility, Brittleness, Toughness, Hardness, Impact Strength, Fatigue.

UNIT II

Metal Casting: Scope of moulding, moulding sands, Principles of metal casting, pattern materials, types and allowances: classification of moulds, roles of gate, runner and riser, core, core box, and core print. Introduction of dicasting, permanent mould casting, investment casting, casting defects.

UNIT III

Metal Joining: Welding Principles, Classification of welding techniques, oxy-acetylene gas welding, Electric Arc welding, Electric resistance welding, Spot, Seam, Butt welding, Flux: composition, properties and function, Brazing and soldering, types of joints

UNIT IV

Machine Shop and Metal Cutting : Brief description of Lathe, drilling, shaping, planning, milling machines, Cutting tools used and their materials and geometry. Introduction & Profile Programming to CNC machines.

UNIT V

Carpentry: Characteristics of Soft Wood & Hard Wood, object & Methods Seasoning. Cutting, Drilling, Boring, Striking, Miscellaneous & Shaving tools. Types of Saw, Chisels & Planes.

Fitting: Operation of the Fitting Shop. Type of Vices & Clamps. Marking , Cutting, Drilling & Boring tools. Classification of Files, Hacksaw, Scrapers, Hammer, Taps, Dies, Drill, Surface Plate.

References

1 Hazra and Chowdhary (11/e), Workshop Technology (Vol 1 and 2), Media, Mumbai, 2000
2 B.S.Raghuvanshi (9/e),Workshop Technology (Vol 1 and 2), Dhanapat Rai, Delhi, 2001
3 Lindeberg Ray A, (4/e), Process & Materials of Manufacturing, PHI, New Delhi, 1995
4 Degarmo, Materials and Processes in Manufacturing, PHI, New Delhi, 2000
5 Begmen , Manufacturing Processes

Effective from the session 2015-16

BAP-C251
ENGINEERING PHYSICS LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. To determine the value of Stefan's constant by electrical method.
2. To determine the focal points, principal points and focal length of a combination of by lenses Newton's method and its verification.
3. To determine the focal length of a combination of two lenses by Nodal Slide method and to locate the position of cardinal points.
4. To determine the dispersive power of the material of the given prism.
5. To determine the wavelength of spectral lines by plane transmission grating.
6. To determine the wavelength of monochromatic light with the help of Newton's ring method.
7. To determine the wavelength of monochromatic light with the help of Fresnel's Biprism.
8. To study the variation of magnetic field along the axis of the current carrying coil and then to estimate the radius of the coil.
9. To determine the e/m of electron by magnetron method.
10. To study the characteristics of a photocell.
11. To determine the value of Plank's constant by photoelectric effect.
12. To study the Energy band gap of a semi conducting sample by Four Probe method.
13. To study the Hall effect using Hall effect set up.
14. To determine the susceptibility by Quink's method.
15. To determine the specific resistance of the material of the given wire using C.F. bridge.
16. To study the nature of polarization of Laser light& to verify malus Law.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BEG-A251
TECHNICAL COMMUNICATION LAB.

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 2**
2 0 0

Experiments related to the following:

Objectives:

1. To expose the learners to English sound system and acquire phonetic skill and speech rhythm.
2. To help the learners use grammar correctly.
3. To train the learners to speak English, clearly, intelligibility and effectively.
4. To equip the learners to compete for a career, and enable them to function effectively in careers which demand good communication skills.

Contents:

i) Non - verbal communication

- Use of hands
- Posture of shoulders
- Eye contact
- Weight of the body
- Movement of the body

ii) Applied Phonetics

- Sound of English-consonants and Vowels
- Phonemic Transcription
- Stress, Rhythm and Intonation

Remedial Grammar

- Some useful expression (introduction, greetings etc.) that are used frequently.
- Common mistakes in the use of nouns, pronouns, adjectives, adverb, prepositions and conjunctions.
- Use of who and whome, much and many, still and yet, so as and so that, make and do.
- Tense and their use.
- Confusion of participles.
- Tag Questions

Reading and Speaking skills, Listening and Writing skills

- Presentation and addresses
- Group discussion
- Interviews
- Role playing

Reading and Writing skills, Listening and Writing skills

- Letter writing-formal and informal
- Real life social situations
- Curriculum vitae
- Agenda, notice and minutes

List of recommended Books (Latest editions unless specified)

1). T. Balsubramaniam. "Phonetics for Indian students", Macmillan India Ltd.
2). Jones, Daniel. "English Pronouncing Dictionary", Cambridge Univ. Press.
3). Oxford Advanced Learners Dictionary.
4). Taylor, Grant. "Conversation Practice", TMH, New Delhi.
5). F.T.A. Wood. "Remedial English Grammar", Macmillan India Ltd.
6). Berry, Thomas Elliot. "The most common errors in English usage", TMH, New Delhi.
7). N. Krishnaswamy. "Modern English", Macmillan India Ltd.
8). Desmond. "People Watching".

Effective from the session 2015-16

BEE-C251

BASIC ELECTRICAL ENGINEERING LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. Verification of Kirchoff's laws.
2. Verification of Thevenin's theorems.
3. Verification of Norton's theorem
4. Verification of Superposition theorem.
5. Verification of maximum power transfer theorem.
6. Measurement of power in three-phase circuit by two wattmeter method.
7. Determination of efficiency of a single-phase transformer by load test.
8. To perform open circuit test on single-phase transformer & find equivalent circuit parameters.
9. To perform short circuit test on single-phase transformer & find equivalent circuit parameters.
10. D.C. generator characteristics
    (a) Shunt generator
    (b) Series generator
    (c) Compound generator
11. Speed control of D.C. shunt generator.
12. To study running and reversing of a three-phase Induction Motor.
13. To study & calibration of a single-phase Energy Meter.
14. Calibration of voltmeter and ammeter.
15. To study of resonance in RLC circuit.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BET-C251
BASIC ELECTRONICS ENGINEERING LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. To draw the V-I characteristics of PN junction diode.
2. To draw the V-I characteristics of Zener diode.
3. To study junction diode as half wave and full wave rectifier.
4. To study junction diode as clipper and clamper.
5. To study the Zener diode as voltage regulator.
6. To draw the input and output characteristics of a transistor in CE configuration.
7. To draw the input and output characteristics of a transistor in CB configuration.
8. To find the small signal h-parameters of a transistor.
9. To study various logic gates.
10. To study Op-Amp as inverting and non- inverting amplifier.
11. To study Op-Amp as adder and subtractor.
12. To study Op-Amp as differentiator and integrator.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BME-C252
WORKSHOP PRACTICE

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

Carpentry Shop

1. To prepare a half T joint of given dimensions.
2. To prepare a wooden pattern of given dimensions.

Moulding Shop

3. To prepare a mould of half bearing.
4. To prepare a mould using core.

Metal Joining.

5. To prepare a butt joint of MS strips using Arc welding.
6. To prepare a T joint of MS strips using Oxy Acetylene gas welding.

Fitting Shop

7. To prepare a rectangular piece with slant edge of given size from M.S. flat.

Machine Shop

8. To prepare a job on Lathe machine of given shape and size.
9. To prepare a job on Shaper machine of given shape and size.
10. To prepare a job on Milling machine of given shape and size.
11. To prepare a job on CNC train master of given shape and size.
12. To prepare a job on drilling machine of given shape and size.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BEM-C301
ENGINEERING MATHEMATICS- III

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Laplace Transform: Laplace transform of elementary functions. Shifting theorems. Transform of derivatives. Differentiation and Integration of transforms. Heaviside unit step and Dirac Delta functions. Convolution theorem. Solution of ordinary linear differential equations used in Mechanics, Electric circuits and Bending of beams.

UNIT II

Fourier Transforms : Definition of Fourier transform, Fourier sine and cosine transforms. Fourier integral formula. Applications to solutions of boundry value problems.

UNIT III

Z - transform : Definition, Linearity property, Z - transform of elementary functions, Shifting theorems, Initial and final value theorem, Convolution theorem, Inversion of Z - transforms, Solution of difference equations by Z - transforms.

UNIT IV

Functions of a Complex Variable - I : Analytic functions, C-R equations and harmonic functions, Line integral in the complex plane, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic functions, Liouville's theorem.

UNIT V

Functions of a Complex Variable - II : Representation of a function by power series, Taylor's and Laurent's series, Singularities, zeroes and poles, Residue theorem, evaluation of real integrals of type $\int_{o}^{2\pi} f(\cos\theta, \sin\theta)d\theta$ and $\int_{-\infty}^{\infty} f(x)/F(x)dx$, Conformal mapping and bilinear transformations.

References

1. Prasad C., Advanced mathematics for Engineers, Prasad Mudranalaya
2. Schaum outline Series, Integral Transform,TMH
3. Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
4. Brancewel, Fourier Transforms and their applications, McGraw
5. Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999

Effective from the session 2016-17
BET-C301
ELECTRONIC DEVICES AND CIRCUITS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Varactor, tunnel, Schottkey barrier, LED, Photodiode and their characteristics, p-n-p-n diode and their characteristics, SCR, UJT. Ebers-Moll model of BJT, T model of BJT, Hybrid model of BJT at low frequency, computation of voltage gain, current gain and power gain, Z_i and Z_o and approximate formulas, high frequency transistor hybrid $\boldsymbol{\pi}$ model.

UNIT II

Field Effect Transistor: JFET and its characteristics, biasing of JFET, small signal low frequency and high frequency model of JFET amplifier, configurations of JFET, MOSFET, MESFET (Enhancement & depletion types) their construction and characteristics, configuration of MOSFET, AND, OR, NAND, and NOR Gates using PMOS, NMOS and CMOS.

UNIT III

Multistage Amplifier: Effect of coupling and by-pass capacitors, types of coupling (DC, RC and TC), Darlington connection, cascode amplifier, coupling schemes for multistage amplifier and frequency response of transistor amplifier.

Power amplifiers: ClassA, Class B, Class C and Class AB amplifiers and their efficiencies, harmonic distortion, push-pull amplifier. Basic idea of tuned amplifier.

UNIT IV

Feedback Amplifiers: Principles of feedback in amplifiers, advantages of negative feedback, classification of feedback(voltage-series, voltage-shunt, current-series, current-shunt)amplifiers, effect of negative feedback on gain, stability of gain, input and output impedances, bandwidth and gain-bandwidth product.

UNIT V

Oscillators: Positive feedback, Berkhausen criterion for sinusoidal oscillation, Phase-shift oscillator, Weinbridge oscillator, Tuned oscillator, Hartley, Colpitts and Crystal oscillator.

Text Book

J.Millman & A. Grabel, 'Microelectronics', TMH

References

1. R.L. Boylestad L. Nashelsky, 'Electronics Devices & Circuit Theory. Prentice hall
2. J.Millman & Halkias, 'Integrated Electronics', MGH
3. Sedra & smith, "Microelectronics circuit."

Effective from the session 2016-17
BET-C302
DIGITAL ELECTRONICS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Number System: Representation of negative numbers, 9's and 1's complement, 10's and 2's complement, arithmetic using 2's complement. BCD Code, Gray Code, Excess-3 Code, Introduction to Boolean algebra, Truth table verification of various gates, Realization of Switching functions with gates.

UNIT II

K- Map: Representation up to 4 variables, simplification and realization of various functions using gates, Tabular Method, Combinational logic and design procedure.

UNIT III

Combinational logic Circuits: Arithmetic circuits, Half and Full adder, Subtractors, BCD adders, Code Conversion, 4 bit Magnitude Comparator (IC -7485), Cascading of IC 7485, Decoder, Multiplexer, Demultiplexers, Encoders.

UNIT IV

Sequential Logic Circuits: Flip Flops, S-R latch, gated latches, Edge triggered Flip Flops, Master-slave Flip Flops, Conversion of flip flops, Analysis of clocked sequential circuits, Design of synchronous circuits, State transition diagram, state reduction and assignment.

UNIT V

Counters: Design of Asynchronous and Synchronous Counters, Two bits & four bits up & down counters and their design, Shift registers, Serial & Parallel data transfer, Shift left/Right register, Shift Register applications.

Text Book

M.Morris Mano, Digital Design, PHI

Reference Books

1. R.P.Jain, Modern Digital electronics, TMH
2. A.Anand Kumar, Fundamentals of Digital Circuits, PHI
3. Lee S.C, Modern Switching Theory and Digital design, PHI
4. Greenfield J.D., Practical Digital design using ICs, John Wiley.

Effective from the session 2016-17
BCE-C301
DATA STRUCTURE – I

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

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UNIT I

Structures: Structures definition, giving value to members, structure initialization, array of structures, array within structures, structures within structures, structures and functions,Structure Pointrers.
File Handling: Creating and Deleting a File, Updating File, Copying File, Searching & Sorting in a File.
Complexity: Algorithm Complexity and Time-Space trade-off.

UNIT II

Stack: Array representation and Implementation of stack, Operations on stack: Push & Pop, Array representation of Stack, Linked representation of Stack, Operation associated with stacks, Application on stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of Postfix expression using stack.
Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, Deque and Priority Queue.

UNIT III

Linked List: Representation and Implementation of Singly Linked List, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and Deletion to/from Linked List, Insertion and Deletion Algorithms, Doubly linked List, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

UNIT IV

Trees: Basic terminology, Binary Trees, Binary Tree Representation, Algebraic Expressions, Complete Binary Tree. Extended Binary Trees, Array and Linked representation of Binary trees, Traversing Binary trees.
Binary Search Tree: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of search algorithm, Path Length, AVL Tree, B-trees.

UNIT V

Searching and Hashing: Sequential Search, Comparison and Analysis, Hash table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.
Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting.
File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree

index Files, Indexing and Hashing Comparisons.

References

1. Horowitz and Sahani, Fundamentals of Data Structure, Galgotia.
2. R.Kruse etal, Data Structures and Program Design in C, Pearson Education.
3. A M Tenenbaum etal, Data Structure using C & C++, PHI.
4. Lipschutz, Data Structure, TMH.
5. K. Loudon, Mastering Algorithms with C, Sheoff Publisher & Distributors.
6. Bruno R Preiss, Data Structures and Algorithms with Object Oriented Design Pattern in C++, John Wiley & Sons, Inc.
7. Yashwant Kanetkar, Pointers in C, BPB

Effective from the session 2016-17

BCE-C304

COMPUTER ORGANIZATION AND OPERATING SYSTEM

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Micro-operation, Arithmetic Logic Shift Unit, Arithmetic Algorithms (addition, subtraction, Booth's Multiplication), IEEE standard for Floating point numbers.

UNIT II

Control Design: Hardwired & Micro Programmed Control Unit, Fundamental Concepts (Register Transfers, Performing of arithmetic or logical operations, Fetching a word from memory, storing a word in memory), Execution of a complete instruction, Multiple-Bus organization, Microinstruction, Microprogram sequencing, Wide-Branch addressing, Microinstruction with Next-address field, Prefetching Microinstruction.

UNIT III

Processor Design: Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, Reduced Instruction Set Computer (RISC), Complex Instruction Set Computer (CISC).

UNIT IV

Process Management : Process Concept, Process Scheduling, Operation on Process, Cooperating Processes, Interprocess Communication, Threads, Overview – Multithreading Models, Process Synchronization, The Critical Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Deadlocks, System Model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

UNIT V

CPU Scheduling And Memory Management : CPU Scheduling, Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real Time Scheduling, Algorithm Evaluation, Memory Management Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging.

References

1. M. Mano, Computer System Architecture, PHI
2. Vravice, Zaky & Hamacher, Computer Organization, TMH Publication
3. Tannenbaum, Structured Computer Organization, PHI
4. Silberschatz,Galvin,Gagane, Operating System Concepts , Sixth edition, John wile & Sons, INC, 2002.
5. D.M.Dhamdhere, Operating Systems, Tata McGraw Hill, 2002.
6. Charles Crowley, Operating Systems: A Design Oriented Approach, Tata McGraw Hill, 1999.

Effective from the session 2016-17
BET-C304
ANALOG COMMUNICATION AND SYSTEM

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Signals and its Representation: Review of Fourier transform, Signal transmission through linear system, Signal distortion in transmission, Time domain versus Frequency Domain, Application of Delta function in Fourier Transform calculations Fourier transform of periodic signals.

UNIT II

Linear Modulation, Amplitude modulation, generation and demodulation of AM, Wave, suppressed carrier modulation, DSB-SC modulation, and its generation and demodulation, SSB-SC modulation, Exponential modulation, modulation F.M. waves, generation of F.M. waves, De-emphasis and Pre-emphasis filtering.

UNIT III

A.M. and F.M. transmitters, SSB transmission, F.M. transmitter, IC AM and FM standard transmitter.

UNIT IV

A.M. and F.M. Receivers, Superhetrodyne receivers, the complete A.M. receiver system, SSB receiver, F.M. receiver, Introduction To Television, Different Modulations Used In Television Transmission.

UNIT V

Pulse Analog Modulation, Practical Sampling, Analog pulse modulation, Time Division multiplexing (TDM) Synchronization in pulse modulated system, Noise in Continuous-wave modulation, baseband system, noise calculation in communication system noise in A.M and angle modulated system.

Books Recommended :

1. Chakrabarti------ Analog and digital Communication-Dhanpatrai & Com.
2. Wayne Tomasi---Electronic Communications Systems-Pearson Education Asia Publisher.
3. Taub, H., Shillmg D.L. ---Principles of Communication Systems-Tata-McGraw Hill, N.D.
4. B.P. Lathi, “Modern Digital & Analog Communication Systems”, Oxford University Press.
5. A.B. Carlson / “Communication Systems” / Tata McGraw-Hill.
6. Simon Haykin / “Communication Systems” / John Wiley / 4th Ed.

Effective from the session 2016-17

BET-C351

ELECTRONICS DEVICES AND CIRCUITS LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS:

1. To draw the input and output characteristics of FET and to measure the pinch off voltage.
2. To draw the drain and transfer characteristic curve of MOSFET.
3. To draw the frequency response of FET amplifier.
4. To design and study various logic gates using MOS.
5. To draw the frequency response curve of RC Coupled Amplifier.
6. To draw the frequency response curve of Transformer Coupled Amplifier.
7. To draw the frequency response curve of Emitter Follower.
8. To find the efficiency of A, B & AB Push pull Amplifier.
9. To find the frequency of oscillation of Hartley Oscillator.
10. To find the frequency of oscillation of Colpitt Oscillator.
11. To find the frequency of oscillation of R-C phase shift oscillator.
12. To find the frequency of oscillation of Wein Bridge Oscillator
13. To find the frequency of oscillation of Crystal Oscillator.
14. To draw the characteristic of SCR.
15. To draw the characteristic of UJT.

NOTE

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1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BET-C352
DIGITAL ELECTRONICS LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS :

1. To verify the truth tables of various types of gates using IC 7400.
2. To verify the truth tables of Multiplexer & also implement a function using Multiplexer.
3. To design & verify the truth table of half & full adder.
4. To design & verify the truth table SR flip-flop using NOR/NAND gates.
5. To design & verify the truth table JK flip-flop using NOR/NAND gates.
6. To design & study Counters.
7. To design & study Shift registers.
8. To verify the truth tables of de Multiplexer.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BET-C353
ANALOG COMMUNICATION LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. To study Amplitude modulation using a transistor and determine depth of modulation.
2. To study envelope detector for demodulation of AM signal and observe diagonal peak clipping effect.
3. To study frequency modulation using reactance modulator.
4. Study of frequency modulation using varactor modulator.
5. Narrow band FM generator using Armstrong method.
6. Study of Foster- Seely discriminator.
7. Generation of DSB-SC signal using balanced modulator.
8. Generation of single side band signal.
9. Study of phase lock loop and detection of FM signal using PLL.
10. Measurement of noise figure using a noise generator.
11. Study of super heterodyne AM receiver and measurement of sensitivity, selectivity & fidelity.
12. Study and demonstration of active filter (low pass, high pass, and band pass type).

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BCE-C351
DATA STRUCTURE – I LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

Write Program in C

1. Array implementation of Stack.
2. Array implementation of Queue.
3. Array implementation of Circular Queue.
4. Implementation of Linked List.
5. Implementation of Stack using list.
6. Implementation of Queue using list.
7. Implementation of Binary Search Tree, Tree Traversal.
8. Insertion and Deletion in BST.
9. Implementation of Searching and Sorting Algorithms.
10. Sort a double linked list.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BEM-C401
DISCRETE MATHEMATICS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Sets and Propositions: Introduction. Combination of sets, Finite and Infinite sets, Uncountably Infinite sets, Mathematical Induction, Principle of Inclusion and Exclusion. Propositions.

UNIT II

Relations and Functions: Introduction. Relation, Properties of primary relations, Equivalence relations and partitions, Partial ordering relations and lattices. Functions and the Pigeonhole principle.

UNIT III

Graphs and Planar Graphs: Basic terminology, Multigraphs and weighted graphs, Paths and circuits, Shortest paths in weighted graphs. Eulerian Paths and circuits, Hamiltonian paths and circuits, Planar Graphs.

UNIT IV

Trees and Cut sets : Trees, Rooted trees, Path lengths in rooted trees, Prefix codes, Spanning trees and cut sets. Minimum spanning trees.

UNIT V

Generating Functions and Recurrence Relations : Introduction. Manipulation of numeric Functions, Generating functions, Recurrence relations, Linear Recurrence relations with constant coefficients. Homogeneous solutions, Particular solutions, Total solutions. Solution by the method of generating functions.

References

1. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
2. Liu,C.L(2/e)., Elements of Discrete Mathematics, TMH, New Delhi, 2000
3. Tremblay J.P. and Manohar R., Discrete Mathematical structures with application to Computer Science, McGraw, Singapore, 1988
4. Kolman & Busby(3/e), Discrete Mathematical structures for Computer Science, PHI, New Delhi, 2001

Effective from the session 2016-17
BET-C401
VLSI TECHNOLOGY

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Crystal growth: Crystal growth for pure (bulk), N& P type semi-conductors, float zone process, CZ-process, Bridgeman process. Processing considerations for wafer preparation; Chemical & mechanical cleaning, wafer shaping operations . Fabrication & material defects in wafer.

UNIT II

Epitaxy: Vapour phase epitaxy, LPE, MBE. safety considerations, epitaxial defects, film characteristics. Burried layer. SOI structure. **Oxidation**; properties of oxide layer, growth mechanism & kinetics, silicon oxidation model, interface considerations, oxidation rates in thin oxide, oxidation techniques & systems, dry & wet oxidation.

UNIT III

Diffusion & Ion Implantation: selection of N & P type dopants ,diffusion mechanism & techniques. Diffusion profile like; complementary error function, limited source diffusion solution of diffusion equation. Ion implantation process system, implantation mechanism, implantation defects.

UNIT IV

Lithography: resist coating, pre-baking of photo-resist, mask transfer, resist development, post-baking resist, selective removal of material, resolution, registration, throughput. Optical lithography; shadow & projection printing, properties of photo resist materials. Electron beam lithography. X-ray lithography. Ion beam lithography. Etching; techniques of etching.

UNIT V

Metallization: properties of metallization, application of Metallization. Metal film fabrication; physical vapour deposition, chemical vapour deposition. Aluminium Metallization. Metallization with silicides. Fabrication of active & passive components in IC. The teacher should at least utilize 10 % time to discuss latest trends and industrial development by following IEEE and IET (UK) transcations.

Text book

1. S. M. Sze "VLSI technology"
2. Chen , VLSI technology

Reference Books

1. Simon Sze, "Semiconductor devices & Technology" McGraw HillScience/Engineering/Math; 2 Edition
2. C. Y. Chang, "ULSI Technology" McGraw-Hill Higher Education; International Ed edition
3. Wai-Kai Chen, "VLSI Technology (Principles and Applications in Engineering, 8)" CRC; 1 edition.

Effective from the session 2016-17
BEM-C402
NUMERICAL ANALYSIS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Errors and Roots of Equations: Absolute, relative, round-off and truncation errors. Significant digits. Algebraic and Transcendental Equations, Numerical solution, Method of bisection, Newton-Raphson method, Direct iterative method, convergence.

UNIT II

Linear Simultaneous Algebric Equations: Method of Gauss elemination, LU - decomposition Jacobi's and Gauss- Seidal methods, Largest eigen value and corresponding eigen vector (Powers method).

UNIT III

Interpolation: Finite difference operators, Greogory- Newton, Stirling, Bessel and Lagrange's formula. Errors in interpolation. Divided differences.

UNIT IV

Numerical Differentiation and Integration: Differentiation, Newton- Cotes formula of Inegration, Gaussian Quadrature formula. Extension of Trapezodial and Simpson's rules to multiple integration.

UNIT V

Ordinary Differential Equations : Picard, Taylor, Eulers, Runge-Kutta, Adams-Bash forth and Milne's method. System of ordinary differential equations, Partial Differential Equations: Numerical solutions of Laplace and Poisson equations by finite difference method.

References

1. Jain M.K, Iyengar S.R.K., Jain R.K., Numerical Methods for scientific & Engineering Computation, Wiley ,1987
2. Grewal, B.S., Numerical Methods in Engineering & Sciences, Khanna, New Delhi,
3. Sastry B., Introductory Method of Numerical Analysis, PHI
4. Flowers, Numerical Methods in C++, Oxford
5. Gerald C.F. (5/e), Applied Numerical Analysis, Addison Wesley, 1994

Effective from the session 2016-17
BEE-C403
NETWORK ANALYSIS AND SYNTHESIS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Graph Theory : Graph of a Network, definitions, tree, co tree , link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Node methods of analysis.

UNIT II

Network Theorems: Applications to ac networks- Super-position theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, Reciprocity theorem. Millman's theorem, compensation theorem, Tellegen's theorem.

UNIT III

Network Functions: Concept of Complex frequency , Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot, frequency response and Bode plots.

UNIT IV

Two Port Networks: Characterization of LTI two port networks Z, Y, ABCD and h parameters, reciprocity and symmetry. Inter-relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks. T and Π Representation.

UNIT V

Network Synthesis: Positive real function; definition and properties; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms.

Filters: Image parameters and characteristics impedance, passive and active filter fundamentals, low pass, high-pass, band pass, band elimination filters.

Text Books

1. M.E. Van Valkenburg, Network Analysis, Prentice Hall of India.
2. D. Roy Chaudhary, Networks and Systems, Wiley Eastern Ltd.
3. Donald E. Scott, An Introduction to Circuit analysis: A System Approach, McGraw Hill Book Company.

Reference Books

1. M.E. Van Valkenburg, An Introduction to Modern Network Synthesis, Wiley Eastern Ltd.
2. W.H. Hayt & Jack E-Kemmerly, Engineering Circuit analysis, Tata McGraw Hill.
3. Soni, Gupta , Circuit Analysis, Dhanpat Rai & Sons.
4. A. Chakrabarti, Circuit Theory, Dhanpat Rai & Co.

Effective from the session 2016-17
BET-C402
MICROPROCESSOR & MICROCONTROLLER

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Microprocessors and assembly language, 8085 μp architecture, addressing modes of 8085, basics of memory interfacing, 8085 instruction set and programming techniques, timing diagrams.

UNIT II

Counters, time delays, stacks and subroutines, programming of basic arithmetic operations: addition, subtraction, multiplication, division, code conversion etc interrupts, interfacing I/o devices: Data converters, Switches, LED'S, Seven segment LED display, printer.

UNIT III

Programmable interface devices: 8155A I/O & timer, 8279 programmable keyboard / display interface, general-purpose programmable peripheral devices: PPI-8255, Programmable interrupt controller (8259), DMA & DMA controller (8237), Serial I/O and data communication.

UNIT IV

Introduction to 16 bit microprocessors, architecture of 8086, Physical address, segmentation, memory organization, addressing modes.

UNIT V

Introduction to 8051 microcontroller, architecture, Addressing modes, timer/counter, interrupts. The class should have some component of design/interface problem discussion.

Text Book

Microprocessor, architecture, programming and applications with 8085 R.S Gaonkar.

Reference Books

1. 8086 microprocessor: programming and interfacing the pc- K.J Ayala
2. 8051 microcontroller architecture programming and applications-K. J Ayala
3. Microprocessors and interfacing: Douglas hall.

Effective from the session 2016-17
BET-C403
ELECTRO MAGNETIC FIELD THEROY

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

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UNIT I

Electrostatics – Fundamentals: Electric charges – Coulomb's Law – Electric Field Intensity – Linear, Surface and Volume charge density – Gauss Law and its application – electric Scalar Potentials and potential difference – Potential due to uniformly charged disc and uniformly charged line, potentials between two coaxial cylinders and between two conducting spherical shell – Electric field lines and equipotential contours – Potential gradient and electric field due to electric dipoles – Conservative nature of electric field.

UNIT II

Dielectrics & Capacitance: Dielectric boundaries – Capacitance – Capacitance of system of conductors Overhead lines and underground cables – Methods of images and its application Electrostatic energy and energy density – Force between charged conductors dielectric strength and breakdown. Divergence and curl of vector fields . Divergence theorem – Stokes theorem – solutions of electrostatic problems – Examples on Laplace's equation.

UNIT III

Magnetostatics Fundamentals: Magnetic field intensity and magnetic flux density, Biot Savarat law, Force between current carrying wires. Torque on closed circuits, Ampere's law Magnetic scalar and vector potentials – Boundary conditions at magnetic surfaces.

UNIT IV

Magnetic Circuits and Inductance: Faraday's law of electromagnetic induction , Inductor and inductance Inductance of solenoids, toroids, transmission lines and cables, Mutual inductance, Inductors in series and parallel, energy stored in magnetic field, Pull of an electromagnet magnetic circuits.

UNIT V

Electro Magnetic Waves: Maxwell's equations, Equation of continuity, displacement current , Maxwell's equation in point and integral forms ,The wave equations, Uniform plane wave , relation between electric and magnetic field intensities in a uniform plane wave, Poynting vector , Poynting theorem, boundary conditions.

Text Books

1. Gangodhar, K.A., ' Field Theory', Khanna Pub. Delhi 11th edition, 1994.
2. William H. Hayt, ' Engineering electromagnetics', Tata- McGraw Hill, 5th edition, 1992.

References

1. Sarwate, V.V., ' Electromagnetic Fields and Waves', Wiley Eastern Limited, New Delhi, 1993.
2. Mahajan, A.S. and Rangawala, A.A. 'Electricity and Magnetism, Tata-McGraw Hill Publishing Company, Ld, New Delhi, 1989.
3. Seely, S., Introduction to electromagnetic Fields', McGraw Hill.

4. Joseph, a. Edminister, ‘ Electromagnetic – Schaum’s outline Series’, International Edition, McGraw Hill Inc., New York, 1993.
5. Narayana Rao, N., ‘Elements of Engineering Electromagnetics’, Prentics Hall of India, 1991.

Effective from the session 2016-17
BET-C451
MICROPROCESSOR LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. Addition of 8 bit hexadecimal numbers without carry.

Addition of 8 bit hexadecimal numbers with carry.

3. To calculate 2's compliments of a 8 bit number.
4. Subtraction of two 8 bit hexadecimal number.
5. Interfacing with 8255 in I/O mode & BSR mode.
6. Verification of all interrupts.
7. Multiplication of 8 bit hexadecimal number by 2.
8. Division of 8 bit hexadecimal numbers.
9. Addition of two 8 bit decimal numbers.
10. Transfer the block from one memory location to another.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BEM-C452
NUMERICAL ANALYSIS LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

Roots of Algebraic and transcendental equations

1. Bisection method
2. Newton Raphson method
3. Direct iterative method

Solutions of simultaneous equations-

4. Gauss Elimination method
5. LU – Decomposition method
6. Jacobi method
7. Gauss Seidel method

Interpolation

8. Lagrange's Interpolation method
9. Newton Forward's interpolation method and Newton Backward's interpolation method

Numerical differentiation and integration

10. first and second order differential coefficient
11. Trapezoidal formula composite
12. Simpson's 1/3 formula composite
13. Simpson's 3/8 formula
14. Lagendre Gaussian Quadrature

Solution of differential equations

15. Picards method
16. Euler's method
17. Runge-Kutta method
18. Milne's method

Statistics

19. Method of least square curve fitting
20. Regression analysis
21. Linear square fit and polynomial fit.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BET-C452
CIRCUIT SIMULATION LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

Electronic Workshop & PCB

1. Winding Shop: Step down transformer winding of less than 5VA.
2. Soldering Shop: Fabrication of DC unregulated power supply.
3. PCB Lab: (a) Artwork & printing of a simple PCB.
(b) Etching & drilling of PCB.

Wiring & Fitting Shop: Fitting of Power Supply along with a meter in cabinet.

4. Testing of Power Supply fabricated.

Electronics CAD Lab

5. Design, simulation and Analysis of following circuits using circuit simulator:
(i) Push pull Amplifier.
(ii) NMOS & CMOS inverter.
(iii) Two input NAND Gate.
(iv) Two input NOR Gate.

6. Layout design of NMOS & CMOS inverter using Layout Generator.
7. Layout design of two input NAND Gate.

MATLAB Excersices

8.(i) Write a MATLAB program to find the roots of a quadratic equation.
(ii) Write a MATLAB program to find the factorial.
(iii) Simulate an RC circuit in MATLAB.
(iv) Write a MATLAB program to draw I-V characteristic of a MOSFET.
(v) Write a MATLAB program to find the average with a dynamic array.
(vi) Plot one and two-dimensional graphs using various MATLAB 2-D Plot types.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17

BET-C481

SEMINAR

MM : 100 **Sessional :100**

L T P **Credit : 2**

0 0 2

Objective: To increase the communication ability on students and to prepare then for presenting seminar on advanced topics of their branch.

The students will be required to deliver a seminar on a topic of general interest in or any advanced technical topics related to the theory papers studied. The topic will be decided by mutual consent of the Faculty- in- charge and students.

* Total 100 marks include 25 marks for report and 75 marks for presentation.

Effective from the session 2017-18

BET-C501
DIGITAL COMMUNICATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Elements of Digital Communication and Information Theory: Model of a Digital Communication, System, Probability Theory and Random Variables, Logarithmic Measure of Information, Entropy and Information Rate, Conditional Entropy and Redundancy, Source Coding, Fixed and Variable Length Code Words, Source Coding Theorem, Prefix Doing and Kraft Inequality, Shannon-Fanno and Huffman Coding.

UNIT II

Digital Base band Transmission: PCM Coding, DM, DPCM, ADCM, Data Transfer Rate, Line Coding and Its Properties, NRZ & RZ Types, Signaling Format For Unipolar, Polar, Bipolar (AMI) & Manchester Coding and Their Power Spectra (No Derivation) Matched Filter Receiver, Derivation of Its Impulse Response and Peak Pulse Signal to Noise Ratio. Correlation Detector Decision Threshold and Error Probability For Binary, Unipolar (ON-OFF) Signalling, ISI, Nyquist Criterion For Zero ISI & Raised Cosine Spectrum.

UNIT III

Digital Modulation Techniques: Gram-Schmidt Orthogonalization Procedure, Types of Digital Modulation, Wave forms for Amplitude, Frequency and Phase Shift Keying, Method of Generation and Detection of Coherent & Non-Coherent Binary ASK, FSK & PSK Differential Phase Shift Keying, Quadrature Modulation Techniques QPSK, Probability of Error and Comparison of Various Digital Modulation Techniques.

UNIT IV

Digital Multiplexing: Fundamentals of Time Division Multiplexing, Electronic Commutator, Bit, Byte Interleaving T1 Carrier System, Synchronization and Signaling of T1, TDM, PCM Hierarchy, T1 to T4 PCM TDM System (DS1 to DS4 Signals).

UNIT V

Error Control Coding: Error Free Communication Over a Noise Channel, Hamming code, Relation Between Minimum Distance and Minimum Distance Error Correcting Capability, Linear Block Codes, Encoding and Syndrome Decoding, Cyclic Codes, Encoder and Decoder For Cyclic Codes, Convolution Codes, Tree diagram state diagram and Trellis Diagram, Viterbi and Sequential Decoding, Comparison of Performance.

Text Book

Haykin, Simon / "Communication Systems" / John Wiley / 4th Ed.

References Books

1. Singh, R.P. & Sapre, S.D. / "Communication Systems: Analog & Digital" / Tata McGraw- Hill.
2. Lathi, B.P / "Modern Digital & Analog Communication Systems" / Oxford University Press .
3. Taub & Schilling / "Principles of Communication Systems" / Tata McGraw-Hill /
4. A.B. Carlson / "Communication Systems" / Tata McGraw-Hill.
5. Charkrabarti, P. / "Analog Communication Systems" / Dhanpat Rai & Co.

Effective from the session 2017-18

BET-C502
EMBEDDED SYSTEM DESIGN

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Embedded systems and its applications, Embedded Operating system, Design parameters of an embedded system and its significance, design life cycle, tools introduction, hardware and software partitioning and co-design. Hardware Fundamentals for the embedded developers Digital circuit parameters. Open collector outputs Tristate outputs I/O sinking and Sourcing, PLD's, Watchdog Timers, Hardware design and development.

UNIT II

Custom Single Purpose Processors: Optimizing program, FSMD, Data path & FSM. General purpose processors and ASIP's (Application Specific Instruction set Programming): Software and operation of general purpose processors-Programmers View Development Environment-ASIPs Microcontrollers- DSP Chips.

UNIT III

Introduction to Microcontrollers and Micoprocessors, Embedded versus external memory devices, CISC and RISC processors, Harvard and Von Neumann Architectures. 8051 Microcontrollers-Assembly language, architecture, registers, Addressing modes, Instruction set, I/O ports and memory organization Interrupts Timer/counter and serial communication.

UNIT IV

RTOS-Tasks, states, Data, Semaphores and shared data, Operating system services, Message queues, Mailboxes. Advanced Processor-(only architectures) 80386, 80486 and ARM (References)

UNIT V

Communication basics, Microprocessor Interfacing I/O Addressing, Direct memory access, Arbitration, multilevel bus architecture, Serial protocols, Parallel protocols and wireless protocols. Real world Interfacing: LCD, Stepping Motor, ADC, DAC, LED, Push Buttons, Key board, Latch Interconnection, PPI.

Text Book

Embedded System Design-Frank Vahid/Tony Givargis, John Willey, 2005.

References Books

1. The 8051 Microcontroller and embedded systems-Muhammad Ali Mazidi and Janice Gillispie.
2. Microcontrollers (Architecture, Implementation & Programming) Kenneth Hintz, Daniel Tabak, Tata McGraw-Hill, 2005.
3. 8051 Microcontrollers & Embedded Systems 2nd Edition-Sampath Kr, Katson Books, 2006.
4. Microcontroller (Theory and Applications) Ajay V Deshmukh, Tata McGraw-Hill, 2005.
5. An Embedded Software Primer-David E.Simon, Pearson Education, 1999.

Effective from the session 2017-18

BEE-C503
AUTOMATIC CONTROL SYSTEM

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Control System: Open loop & closed control; servomechanism, Physical examples. Transfer functions, Block diagram algebra, Signal flow graph, Mason's gain formula Reduction of parameter variation and effects of disturbance by using negative feedback.

UNIT II

Time Response Analysis: Standard test signals, time response of first and second order systems, time response specifications, steady state errors and error constants Design specifications of second order systems: Derivative error, derivative output, integral error and PID compensations, design considerations for higher order systems, performance indices.

UNIT III

Control System Components: Constructional and working concept of ac servomotor, synchros and stepper motor.

Stability and Algebraic Criteria: Concept of stability and necessary conditions, Routh- Hurwitz criteria and limitations.

Root Locus Technique: The root locus concepts, construction of root loci.

UNIT IV

Frequency Response Analysis: Frequency response, correlation between time and frequency responses, polar and inverse polar plots, Bode plots.

Stability in Frequency Domain: Nyquist stability criterion, assessment of relative stability: gain margin and phase margin, constant M&N circles.

UNIT V

Introduction to Design: The design problem and preliminary considerations lead, lag and lead-lag networks, design of closed loop systems using compensation techniques in time domain and frequency domain.

Review of State Variable Technique: Review of state variable technique, conversion of state variable model to transfer function model and vice-versa, diagonalization, Controllability and observability and their testing.

Text Books

1. Nagrath & Gopal, Control System Engineering, 4th Edition, New age International.
2. K. Ogata, Modern Control Engineering, Prentice Hall of India.

Reference Books

1. Norman S. Mise, Control System Engineering 4th edition, Wiley Publishing Co.
2. M.Gopal, Control System; Principle and design, Tata McGraw Hill.
3. M.Gopal, Modern Control system, Tata McGraw Hill.
4. D.Roy Choudhary, Modern Control Engineering, Prentice Hall of India.

Effective from the session 2017-18

BET-C503

APPLIED ELECTROMAGNETICS FIELD THEORY

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT-I

Maxwell's equations, Wave equation, Poynting vector, Standing waves, VSWR, impedance, Planner transmission lines, Transmission line problem solving using smith chart.

UNIT-II

Waveguides, Parallel plate waveguides, TEM, TE and TM modes, wave impedance, rectangle, Cylindrical wave guides, excitation of waveguides, Quasi TEM mode and propagation in metamaterial structure.

UNIT-III

Resonators rectangular and cylindrical and their application, wave propagation in an isotropic media, ferrites, Faraday rotation ferrite devices, isolators, Circulators, and phase shifters.

UNIT- IV

Microwave components, S-parameters and their applications to Tee network, Magic Tee, Directional Couplers, Isolators, Attenuators, Wave meters.

UNIT- V

Microwave filters, matching networks, Quarter and half wave filters, Measurement of low and high microwave powers, Equivalent circuit and analysis of wave guide and resonator.

Books Recommended :

1. Krauss E.---Electromagnetic Theory-Mc-Graw Hill.
2. Leo S.---Solid State Microwave Devices-Prentice Hall.

Effective from the session 2017-18

BET-C405/BET-C504
SIGNALS AND SYSTEMS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Signals and Systems: Continuous-time and discrete-time Signals, Transformations of the Independent Variable, Exponential and Sinusoidal Signals, Continuous-Time and Discrete-Time LTI Systems and their properties, convolution sum and convolution integrals, LTI System described by differential and difference equations.

Z-Transform: Z-Transform, Region of convergence, Inverse Z-transform, analysis and characterization of LTI system, Block diagram representation, Unilateral Z-transform.

UNIT II

Fourier Series and Fourier Transform: The response of LTI Systems to Complex Exponentials, Fourier Series Representation of Continuous-time Periodic Signals and their Properties, Continuous time and discrete time Fourier Transforms and their properties, System Characterized by Linear Constant Coefficient Differential equations and Difference equations.

UNIT III

Time and Frequency Characterization of Signals and Systems: Magnitude Phase Representation of the Fourier Transform, Magnitude Phase Representation of the Frequency response of LTI systems, Time domain Properties of Ideal Frequency Selective filter, Time Domain and Frequency Domain aspects of Non ideal filters, First Order and Second Order Continuous Time and Discrete time Systems.

UNIT IV

Sampling and Laplace Transform: Signal representation by samples, sampling theorem, Impulse train sampling, sampling of discrete time signals, discrete time processing of continuous time signals. Laplace Transform, Region of convergence, inverse Laplace Transform, Analysis and characterization of LTI System, Block diagram representation, Unilateral Laplace transform.

UNIT V

Random variable, random process correlation functions, cumulative distribution function, probability density function, joint-cumulative distribution, probability density function. Expectation, mean, variance, covariance, auto-correlation, power spectral density, Gaussian Pdf and Rayleigh Pdf.

Text Book

V. Oppenheim, A.S. Willsky and S. Hamid Nawab, 'signals & System', Pearson Education, Second Edition, 2003.

Reference Books:

1. Roberts, "Signals and Systems" Tata McGraw Hills.
2. P. Ramesh Babu, R. Ananda Natarajan,"Signals and Systems", SCITECH Publications.
3. Charles L. Phillips, John M.PARR and EVEA. RISKIN, "Signals, Systems and Transforms", PEARSON Education, Third Edition.
4. Chen 'Signals & Systems, Oxford University, Press.

Effective from the session 2017-18

BCE-C506

OBJECT ORIENTED PROGRAMMING USING C++

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Review of C, Difference between C and C++, Cin, Cout, new ,delete operators, abstraction, encapsulation, inheritance, polymorphism, Structured versus object-oriented development, elements of object-oriented programming.

Class Overview: Class specification, class objects, accessing class members, defining member functions, outside member functions as inline, accessing member functions within a class, data hiding, access boundary of objects revisited, empty classes, pointers within a class, passing objects as arguments, returning objects from functions, friend functions and friend classes, constant parameters and member functions, structures and classes, static data and member functions, class, objects and memory resource, class design steps.

UNIT II

Object Initialization and Cleanup: Class revisited, constructors, parameterized constructors, destructor, constructor overloading, order of construction and destruction, constructors with default arguments, dynamic initialization through constructors, constructors with dynamic operations, copy constructor, static data members with constructors and destructors.

Operator overloading: Introduction, over loadable operators, unary operator overloading, operator keyword, operator return values, limitations of increment/decrement operators, binary operator overloading, arithmetic operators, overloading of new and delete operators, data conversion, conversion between basic data types, conversion between objects and basic types, conversion between objects of different classes, overloading with friend functions.

UNIT III

Inheritance : Introduction, class revised, derived class declaration, forms of inheritance, inheritance and member accessibility, constructors in derived classes, destructors in derived classes, constructors invocation and data members initialization, overloaded member functions, multilevel inheritance, multiple inheritance, hierarchical inheritance, multi-path inheritance and virtual base classes, hybrid inheritance.

UNIT IV

Virtual Functions and Classes: Introduction, need for virtual functions, static and dynamic binding, pointer to derived class objects, definition of virtual functions, pure virtual functions, abstract classes, virtual destructors.

Generic programming with templates: Introduction, function templates, overloaded function templates, multiple arguments function templates, user defined template arguments, class templates, class template with overloaded operators.

UNIT V

Streams Computation with Streams: Predefined console streams, hierarchy of console stream classes, unformatted I/O operations, formatted console I/O operations, manipulators, custom/user-defined manipulators, stream operator with user-defined classes.

Stream computation with files: Introduction, hierarchy of file stream classes, opening and closing of files, testing for errors, file modes, file pointers and their manipulators, sequential access to a file, ASCII and binary files, saving and retrieving of objects, file input/output with stream class, random access to a file, in-memory buffers and data formatting, error handling during file manipulations, filter utilities.

Exception handling: Introduction, error handling, exception handling model, exception handling constructs.

References

1. E.Balagurusamy, Object Oriented Programming with C++, TMH
2. R.Lafore, Object Oriented Programming using C++, Galgotia
3. S.B.Lippman & J.Lajoie, C++ Primer, Addison Wesley
4. G.Booch, Object Oriented Design & Applications, PHI

Effective from the session 2017-18

BET-C551
DIGITAL COMMUNICATION LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. Study of Sample and hold circuit using Op-amp.
2. Study of PAM generation and detector and observe characteristics of both single and dual polarity pulse amplitude modulation.
3. Study of pulse width modulation and demodulation.
4. Study of pulse position modulation demodulation.
5. Study of delta modulation and demodulation and observe effect of slope overload.
6. Study of pulse data coding techniques for NRZ formats.
7. Data decoding techniques for NRZ formats.
8. Study of amplitude shift keying modulator and demodulator.
9. Study of frequency shift keying modulator and demodulator.
10. Study of phase shift keying modulator and demodulator .
11. Study of single bit error detection and correction using Hamming code.
12. Study of Pulse code modulation and demodulation.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BET-C552
SYSTEM ENGINEERING LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. To measure frequency and level of a given unknown signal.
2. To measure harmonics of SINE WAVE.
3. To check Frequency response of a 'LOW PASS' filter.
4. To check Frequency response of a 'HIGH PASS' filter.
5. To check Frequency response of a 'BAND PASS' filter.
6. To construct a triangular wave with the help of fundamental frequency and its harmonic components.
7. To construct a rectangular sawtooth wave with the help of fundamental frequency and its harmonic components.
8. To construct square wave with the help of fundamental frequency and its harmonic components.
9. To construct Half sine wave with the help of fundamental frequency and its harmonic components.
10. Study of signal sampling and reconstruction techniques.
11. To calculate and verify time response of low pass filter.
12. To calculate and verify time response of high pass filter.

NOTE

1. A teacher shall be assigned 20 students for daily practical work in laboratory.
2. No batch for practical class shall consist of more than 20 students.
3. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
4. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BCE-C554

OBJECT ORIENTED PROGRAMMING LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

Programming exercise on the following topics.

Functions in C++, parameter passing, call and return by reference, friend functions, inline functions, function overloading.

Classes and objects: arrays within a class, memory allocation for objects, static members, returning objects, constructor and destructors, operator overloading.

Inheritance: derived classes, single and multiple inheritance, hierarchical inheritance, constructors in derived classes, classes containing objects of other classes.

Polymorphism: pointers to objects, this pointer, pointer to derived classes, virtual functions.

Templates: class and function templates, template arguments, exception handling; use of files, learning to use Visual C++ environment.

NOTE

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1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BET-C554
EMBEDDED SYSTEM DESIGN LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1.Program to interface LCD data pins to port P1 and display a message on it.

2 .Program to interface keypad. Whenever a key is pressed, it should be displayed on LCD.

3.Program to interface seven segment display unit.

4.Program to interface LED display unit

5.Program to toggle all the bits of Port P1 continuously with 250 mS delay.

6.Program to toggle only the bit P1.5 continuously with some delay. Use Timer 0, mode 1 to create delay.

7.Program to interface ADC0808

8.program to clear 16 RAM locations starting at RAM address 60H

9. prgram to find the sum of the values 79H, F5H and E2H . put the sum in registers R0 (low bytes) and R5(high bytes)

10. write a program to copy a block of 10 bytes of data from RAM locations , starting at 35H to RAM locations starting at 60H

NOTE

1.Minimum of 8 experiments have to be conducted.
2.The programs have to be tested on 8051/89C51 Development board/equivalent using Embedded C Language/Assembly Language on Keil IDE or Equivalent
3. In practical examination the student shall be required to perform one experiment.
4. A teacher shall be assigned 20 students for daily practical work in laboratory.
5. No batch for practical class shall consist of more than 20 students.
6. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
7. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BET-C601
ANALOG INTEGRATED CIRCUITS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

IC OP-AMP Applications: OP-AMP Fundamentals (brief review of differential amplifier, current mirror, active load, level shifter, output stage; ac and dc characteristics) Basic building blocks using OP-AMPS. Inverting/ Non-inverting VCVS, Integrators, Differentiators, CCVS and VCCS, Instrumentation Amplifiers.

UNIT II

Waveform Generator: Square wave generators: 555Timer, Crystal controlled Oscillator Ramp Generator: Triangle generator, Sawtooth generator, Sine wave generator: Requirement for sinusoidal oscillations, Wien-bridge and twin-T oscillators. Function Generators: Multi op-amp function generators, IC function generators PLL Fundamentals.

UNIT III

Active Filters: Introduction to filtering: Frequency response, Characteristics and terminology, Active versus passive filters, Low pass filter: First order low pass active filter, second order active filter model, second order low pass filter characteristics, Sallen-Key unity gain filter, Sallen-Key equal component filter, Higher order filters.High pass active filter. Band pass filter: single op-amp band pass filter, multistage band pass filter,State variable filter

UNIT IV

Non-linear Circuits: Logarithmic Amplifiers, Log/Antilog Modules, Precision Rectifier, Peak Detector, Sample and Hold Circuits. OP-AMP as Comparator, Schmitt Trigger, Square and Triangular Wave Generator, Monostable Multivibrator. IC Analog Multiplier applications OTA

UNIT V

Voltage Regulators: OP-AMP Regulators, IC Regulators, Fixed Voltage Regulators (78/79, XX), SMPS.

Text Book

Gayakwad, R.A, Op-Amp and LINEAR INTEGRATED CIRCUITS, PHI

Reference Books

1. Sedra and Smith, Microelectronic Circuits", Oxford University press, 5th Edition, 2005.
2. J. Michael Jacob, Applications and design with Analog Integrated Circuits", PHI, 2nd Edition, 2004
3. B.P. singh and Rekha Singh, Electronic Devices an Integrated Circuits; Pearson Education, 1st Edition 2006.

Effective from the session 2017-18

BET-C602

ANTENNA AND WAVE PROPAGATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Antenna Principles: Potential Functions & Electromagnetic Field, Current Elements, Radiation from Monopole & Half Wave Dipole, power radiated by current element, radiation resistance. Network Theorems Directional Properties of Dipole Antenna. Antenna Gain, Effective Area, Antenna Terminal Impedance, Practical Antennas and Methods of Excitation, Antenna Temperature and Signal to Noise Ratio.

UNIT II

Antennas Arrays: Two Element Array, Horizontal Patterns in Broadcast Arrays, Linear Arrays, Multiplication of patterns, effect of the earth on vertical patterns, Binomial array, Chebyshev Array.

UNIT III

Practical Antennas: VLF and LF transmitting antennas, effect of antenna height, Field of short dipole, electric field of small loop antenna, Directivity of circular loop antenna with uniform current, Yagi-Uda array: Square corner yagi-uda hybrid, circular polarization Rhombic Antenna: Weight and Leg length Parabolic Reflectors: Properties, Comparison with corner reflectors Horn Antenna: Length and Aperture, Introduction to metamaterial, Use of metamaterial in antenna application.

UNIT IV

Antenna Measurements: Radiation Pattern measurement, Distance requirement for uniform phase, uniform field amplitude requirement, Introduction to phase measurement; Gain Measurement: Comparison method, Near field method, Introduction to current distribution measurement, Measurement of antenna efficiency, measurement of Noise figure and noise temperature of an antenna polarization measurement.

UNIT V

Wave Propagation: Modes of Propagation, Plane Earth Reflection, Space wave and Surface Wave, Reflection and refraction waves by the Ionosphere Tropospheric Wave. Ionosphere Wave Propagation in the Ionosphere, Virtual Height, MUF Critical frequency, Skip Distance, Duct Propagation, Space wave. Antenna theory to supported with antenna Lab. So antenna equipments are to be procured.

Text Books

1. Jordan Edwards C. and Balmain Keith G./ "Electromagnetic Waves and Radiating Systems"/ Prentice Hall (India)
2. Kraus, John D. & Mashefka, Ronald J. / "Antennas: For All Applications" / Tata McGraw Hill, 3rd Ed.

Reference Books:

1. Prasad, K.D./ "Antennas and Wave Propagation"/ Khanna Publications
2. Collin, R. / "Antennas and Radiowave Propagation" / Tata McGraw-Hill

3. Hayt Jr. William H./ “Engineering Electromagnetics “/ Tata McGraw-Hill
4. Das, Annaparna & Das, Sisir K. / “Microwave Engineering”/ Tata McGraw Hill.
5. V. Sharma & S.S. Pattnaik, “Microwaves, metamaterial & skin cancer detection” / Lambert academic publishing, Germeny.

Effective from the session 2017-18

BET-C603
PROCESS INSTRUMENTATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Theory of Measurement: Introduction, Performance Characteristics: static & dynamic standards, Error analysis: Sources, types and statistical analysis,Transducers: Passive transducers: Resistive, Inductive and capacitive, Active transducers: Thermoelectric, piezoelectric & photoelectric. Bridges: Direct current and alternating current bridges, LCR bridges.

UNIT II

Analog Meters: AC analog meters: Average, Peak and RMS responding voltmeters, sampling voltmeters. Electronics Analog meters, Electronics analog DC and AC voltmeters and ammeters, Electronic analog ohmmeter and multimeter.

UNIT III

Digital Meters: Analog to digital converter: Transfer characteristics, A/D Conversion technique, Simple potentiometric & servo method, successive approximation, ram type, Integrating & dual-slope integrating method. D/A Converter: Transfer characteristics, D/A conversion techniques digital mode of operation, performance characterstics of D/A converters.

Display devices: Decimal, BCD and straight binary number, indicating system, numeric & alpha number display using LCD & LED, specification of digital meters: display digit & counts resolution, sensitivity, accuracy, speed & settling time etc.

UNIT IV

Oscilloscopes & RF Measurements: Types of oscilloscopes, controls, Measurements voltage, frequency time & Phase. High frequency measurements – RF impedancy. Probes: Types of probes probe loading & measurement effect, probe specifications.

Signal Generators & Analyzers: frequency synthesis techniques & digital signal generators. Signal Analyzers: Distortion, wave and Network spectrum analyzers.

UNIT V

SCADA: need of SCADA system, distributed control system (DCS), General definition and SCADA components. Hardware architecture, software architecture, protocol detail, discrete control and analog control, application & benefits, PLCs Vs RTUs, RTU block diagram, MTU communication interface, future trends, Internet based SCADA display system, functional block, structural text, instruction, ladder diagram, trouble shooting, features.

Text Books:

1. Electronic Instruments & Instrumentation Technology by MMS Anand, PHI Pvt. Ltd., New Delhi Ed. 2005.
2. Electronics Instrumentation by H.S. Kalsi TMH Ed. 2004.

Reference Books:

1. Electronics Instrumentation & Measurement Techniques by W.D. cooper & A.D. Helfrick, PHI 3rd Ed.
2. Electronic Measurement & Instrumentation by Oliver & Cage Mc-Graw Hill.
3. SCADA: by Stuart A. Boyer, IAS 1999.

Effective from the session 2017-18

BET-C604

SWITCHING THEORY AND LOGIC DESIGN

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Combinational Circuits: Parallel Binary adder, IC 7483, 4-bit Binary parallel adder/subtractor, Serial binary adders, sequential detectors, iterative networks, analogy between iterative networks and sequential machines, Design of sequence detector using iterative networks.

UNIT II

Asynchronous Sequential Circuits: Analysis procedure, Reduction of state & flow table, Race free state assignment, Design of fundamental mode asynchronous sequential circuits.

UNIT III

Static & Dynamic Hazard: Gate delay, Generation of Spikes, Determination of hazard in combinational circuits, Algorithmic state machines (ASM), ASM chart, Timing consideration, Control implementation, Design with multiplexer.

UNIT IV

Logic Families: Diode switching, Transistors as a switching element, MOS as a digital circuit element, concept of transfer characteristics, input characteristics and output characteristics of logic gates, fan in, fan out, noise margin, Logic families: TTL, IIL, ECL, NMOS, & CMOS, Open collector outputs.

UNIT V

Memories: Sequential & Random Access, NMOS and CMOS Static and Dynamic Memory elements, one and multidimensional selection arrangements, Read only memories. Digital Techniques related to PALs, PLAs.

Text Book

1. M.Morris Mano, Digital Design,PHI
2. R.P.Jain , Modern Digital electronics, TMH
3. A.Anand Kumar, Fundamentals of Digital Circuits, PHI

Reference Book:

1. Taub & schilling / Digital Integrated Electronics/Mc Graw Hill International Edition.
2. Malvino & Leach/ Digital Electronics & circuit design/ TMH.
3. G.Gopalan / Introduction to Digital Microelectronics circuits/TMH
4. S. Salivahann & S.Arivazhagan/ Digital Circuits & Design/ Vikas Publishing House Pvt. Ltd.

Effective from the session 2017-18

BET-C606
MICROWAVE ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Microwave Tubes: UHF limitation in conventional vacuum tubes, Klystron Amplifier and Reflex Klystron, Admittance diagrams of Klystrom Amplifiers.

UNIT II

Analysis of travelling tube (TWT), m type TWT and O type TWT, study of the effect of electron beam on the helix, estimation of gain of TWT amplifier, Backward wave oscialltor (BWO), and applications.

UNIT III

Magnetron, operation of magnetron oscialltor, cavity magnetron, mode jumping in magnetron, application of magnetron.

UNIT IV

Solid-state microwave, devices, varactor doade parameteric Amplifiers, PUC, PDC, PIN diode Tunnel diode, V-I characteristics of T.D., T.D. amplifiers, and oscillator, Transferred electron devices, Gunn effect devices, Avalanche Transit time devices.

UNIT V

Microwave Communication Systems, Analog microwave communication, LOS microwave system, Derivation of field strength of a Tropospheric wave, Fading in Troposphere and its effects, Digital microwave Communication and its system, Bandwidth efficiency, Microwave for Biomedical applications, Microwave Imaging . Introduction to very high frequency such as millimetre wave and teraHz to be discussed.

Text Book

Leo, Sanuer---Microwave & Solid state devices-Prentice Hall

Reference Books

1. Watson, H.A. ---Microwave Semiconductor Devices-McGraw Hill.
2. Collin, R.E. ---Fundamental of Microwave Engineering.
3. V. Sharma & S.S. Pattnaik, “Microwaves, metamaterial & skin cancer detection” / Lambert academic publishing, Germeny.

Effective from the session 2017-18

BCE-C607
JAVA PROGRAMMING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction : Creation of Java, importance of Java to internet, byte code, OOP Principles, Encapsulation, Inheritance and Polymorphism, data types, variables, declaring variables, dynamic initialization, scope and life time of variables, arrays, operators, control statements, type conversion and casting, compiling and running of simple Java program.

Classes and Objects : Concepts of classes and objects, class fundamentals Declaring objects, assigning object reference variables, introducing methods,constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing – call by value, recursion, nested classes and inner classes, exploring the String class.

UNIT II

Inheritance : Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class.

Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding classpath, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT III

Exception Handling and Multithreading : Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes, Concepts of Multithreading, differences between process and thread, thread life cycle,creating multiple threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread communication, daemon threads,deadlocks, thread groups.

UNIT IV

Applets : Concepts of Applets, differences between applets and applications,life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

UNIT V

AWT : Concepts of components, container, panel, window, frame, canvas, AWT Controls - Buttons, Labels, Text fields, Text area, Check boxes, Check box groups, Lists, Choice, Scrollbars, Menus, Layout Managers – Flow, Border,Grid.

Swing : JApplet, JFrame and JComponent, Icons and Labels, Handling threading issues, text fields, Buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

References

1. Herbert Schildt, The Complete Reference Java J2SE 5th Edition, TMH Publishing Company Ltd.
2. Cay Horstmann, ig Java 2nd Edition, John Wiley and Sons.
3. H.M.Dietel and P.J.Dietel, Java How to Program, Pearson Education/PHI
4. Cay.S.Horstmann and Gary Cornell, Core Java 2, Vol 1, Fundamentals, Pearson Education.
5. Cay.S.Horstmann and Gary Cornell, Core Java 2- Advanced Features, Pearson Education.
6. Iver Horton, Beginning in Java 2, Wrox Publications.

Effective from the session 2017-18

BET-C651

ANALOG INTERGRATED CIRCUITS LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS:

1. To measure different parameter of the Op-Amps.
2. To find the CMRR in differential amplifier.
3. To study the gain and frequency response of Inverting Amplifier.
4. To study the gain and frequency response of Non Inverting Amplifier.
5. To study the operational amplifier as Differentiator.
6. To study the Op-Amp as summer.
7. To study the Op-Amp as subtractor.
8. To study the operational amplifier as Integrator.
9. To find the response of clipper circuit.
10. To study the OP-AMP as square wave generator.
11. To study 2^{nd} order Low Pass active Filter.
12. To study 2^{nd} order High Pass active Filter.
13. To study the hysteresis characteristics of the Op- Amp based Schmitt trigger.
14. To study the monostable multivibrator using Timer IC 555.
15. To find the frequency of oscillation for astable multivibrator using Timer IC 555.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BET-C652
MICROWAVE LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. Study of characteristics of Klystron tube and to determine its electronic tuning range.
2. To determine the frequency & wavelength in a rectangular wave-guide working on
3. TE10 mode.
4. To determine the Standing Wave Ratio, Reflection Coefficient.
5. To measure an unknown Impedance with Smith chart.
6. To study V-I characteristics of Gunn Diode.
7. To measure the polar pattern and the gain of wave-guide horn antenna.
8. Study the function of multi hole directional coupler by measuring the following parameters:
   (a) Main-line and Auxiliary-line VSWR.
   (b) Coupling factor and Directivity.
9. Study of Magic Tee.
10. Setting up a Fiber Optic Analog Link.
11. Setting up a Fibre Optic Digital Link.
12. Measurement of Numerical Aperture.
13. Study of Electromagnetic/Radio Frequency Interference.
14. Simulation using HFSS / CST.
15. Introduction to biological interaction with RF or microwave signals using FEKO.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BET-C653
INSTRUMENTATION AND PROCESS LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. To draw characteristics of Strain Gauge.(Strain vs Resistance)
2. To study the measurement of Angular Displacement trainer.
3. To study of speed measurement using Electromagnetic pick up
4. To study of speed measurement using Photo Electric pick up.
5. To draw a curve of displacement vs. voltage by L.V.D.T.
6. To study performance characteristics of Load Cell.
7. To measure pressure using Strain Gauge.
8. To measure temperature by using R.T.D demonstration set up.
9. To study the Thermistor Demonstration Trainer.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BCE-C655
JAVA PROGRAMMING LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

Write Following Programs In Java Using RAD (Rational Application Developer)

1. Write a program in Java for illustrating overloading, over riding and various forms of inheritance.
2. Write programs to create packages and multiple threads in Java.
3. Write programs in Java for event handling Mouse and Keyboard events.
4. Using Layout Manger create different applications.
5. Write programs in Java to create and manipulate Text Area, Canvas, Scroll
6. Bars, Frames, and Menus using swing/AWT.
7. Using Java create Applets.
8. Using Java language for Client Server Interaction with stream socket connections.
9. Write a program in Java to read data from disk file.
10. Write a program to show use of swing controls.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2018-19

BHU-S701

INDUSTRIAL ECONOMICS AND BUSINESS ADMINISTRATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper

UNIT I

Industrial Economics: Elasticity of demand and supply, Demand forecasting methods, Consumption laws, Types of competition, Break even analysis, National income accounting, Trends in Industrialization in India, Economies of scale, Production Planning and control.

UNIT II

Money, Banking and Financial Management: Nature and functions of money, Functions of commercial and central banks, Credit creation in the banks, Balance of payment and trade, Foreign Exchange, Exchange control, Devaluation and Revaluation, Sources of Industrial Finance, Principles of accounting, Balance sheet & P & L A/C, Cash flow statement.

UNIT III

Principles of Management: Managerial functions - Planning, Organizing Leading & Controlling.

UNIT IV

Marketing Management: Concept of marketing management, P's of marketing, Product life cycle, Market segmentation.

UNIT V

Personnel Management and Industrial Psychology: Concept and importance of Personnel Management recruitment and selection, Training and development, Job evaluation, Fatigue, Accidents - causes and prevention, Nature of Industrial relations, Industrial disputes, Quality of work life.

References

1. Dewtt. K.K., Modern Economic Theory" S. Chand, & Co (r) Ltd (r) 1999.
2. Robbins (r) P. Stephen, Coutter Mary, 'Management' PHI 1998.
3. Kotler Philip, 'Marketing Management', PHI latest edition.
4. Nair N.G.,Latha Nair,Personnel Management and Industrial Relations', S.Chand &Co 1999.
5. Singh S.P. "Industrial Economics & Management" AITBS, New Delhi, 2006
6. Kooutsnnis, 'Modern Economic Theory', PHI, 1996.
7. Maheswari S.N., 'An Introduction to Accountancy' Vikas Publishing House 1999.
8. Koontz Harold, O Donnel Cyril, Weihirch Heniz, 'Management', TMH-1983.
9. Monoppan Arun, Sayadain S (r) Mirza, 'Personnel Management', TMH 1997 Edn.

Effective from the session 2018-19
BET-C701
DIGITAL SIGNAL PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Discrete Fourier Transform: Frequency Domain Sampling: The Discrete Fourier Transform Frequency-Domain Sampling and Reconstruction of Discrete-Time Signals. The Discrete Fourier Transform (DFT). The DFT as a linear Transformation.Relationship of the DFT to Other Transforms. Properties of the DFT. Periodicity, Linearity, and Symmetry Properties. Multiplication of two DFTs and Circular Convolution. Additional DFT Properties. Frequency analysis of signals using the DFT.

UNIT II

Efficient Computation of DFT: Efficient Computation of the DFT: FFT Algorithms, Direct Computation of the DFT. Radix-2 FFT algorithms. Efficient computation of the DFT of two real sequences, computations, efficient computation of the DFT of a 2NPointreal sequences, Gortezel Algorithm, Chirp Z-transform algorithm.

UNIT III

Basic IIR Filter Structures: Direct forms (I & II), cascade and parallel realizations. Signal flow graph, Transposed structure, Basic FIR filter structures-. Direct form structure, frequency sampling structure, Lattice structure, Linear phase FIR structure. FIR structures.

UNIT IV

Symmetric and Anti-symmetric FIR Filters, Design of Linear-Phase FIR Filters Using Windows, Design of Linear-Phase FIR Filters by the Frequency Sampling Method, Design of FIR, Equi-ripple filter design Differentiators. Design of Hilbert Transformers.

UNIT V

Design of IIR Filters from Analog Filters: IIR Filter Design by Approximation of Derivatives, IIR Filter Design by Impulse Invariance. IIR Filter Design by the Bilinear Transformation. The Matched-z Transformation, Characteristics of Commonly Used Analog Filters. Application of above technique to the design of Butterworth & Chebyshev filters. Introduction to wavelets.

Text Book

Proakis, J.G & Manolakis, D.G., "Digital Signal Processing: Principles Algorithms and Applications", Prentice Hall (India).

Reference Books

1. Sanjit K. Mitra, "Digital Signal Processing", Third Edition, TMH, 2005.
2. Oppenheim A.V. & Schafer, Ronald W., "Digital Signal Processing", Pearson Education.

Effective from the session 2018-19
BET-C702
VLSI DESIGN

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to integrated circuit technology. CMOS fabrication, the p-well process, n-well process, twin tub process. Bi-CMOS technology. Basic electrical properties of Enhancement MOS devices, Ids-Vds relationship in linear & saturation for GCA & channel length modulation, MOS transistor threshold voltage Vth, body effect. Scaling of MOS; Constant voltage & electric field scaling, limitations of scaling, capacitive model of MOS(parasitic capacitances) ,Trans conductance and output conductance, MOS transistor figure of merit.

UNIT II

Electrical performance parameters for n-MOS resitive & active inverters, pull-up to pull-down ratio, CMOS inverter and its characteristics, latch –up in CMOS circuits. n-MOS, CMOS gates(NAND, NOR, AND, OR). Combinational & sequential logic circuit design, Dynamic logic families and performances. MOS SPICE model, device characterization, Circuit characterization. MOS device layout: Transistor layout, Inverter layout, CMOS digital circuits layout & simulation.

UNIT III

Design considerations, problems associated with VLSI Design, Automated Layout Generation tools, stick diagrams for n-MOS design style, CMOS design style. Lambda & micron based design rules for MOS layout Physical design; Partitioning, Placement, Floor planning, Routing, Parasitic Extraction.

UNIT IV

Design Methodology & styles, Design Flows, Y- chart Standard Cell Based Design, Full Custom Design, Semi Custom Design, Programmable Logic structures, Field Programmable Gate arrays (FPGA), Configurable Logic Block (CLB), Application- Specific Integrated Circuits (ASICs).

UNIT V

Design for Testability; Faults types and Models, Controllability and Observability, Adhoc Design techniques, Scan-Based Techniques, Built-In self Test (BIST) Techniques, Current Monitoring IDDQ Test. Packaging, Heat dissipation.

Text Books

1. CMOS VLSI Design, A Circuits and Systems Perspective by Neil H.E. Weste, David Harris, Ayan Banerjee, Pearson Education.
2. CMOS Digital Integrated Circuits Analysis and Design by Sung-Mo Kang, Yusuf Leblebici. Tata Mc-Graw- Hill.
3. Basic VLSI Design by Douglas A. Pucknell & Kamran Eshraghian, Prentice-Hall of India.

Reference Books

1. Digital Integrated Circuits A Design Perspective by Jab M. Rabaey, Anantha Chandra kasan, Borivoje Nikolic, Prentice-Hall of India Pvt. Limited.
2. Principles of C-MOS VLSI Design A systems Perspective by Neil H.E. Weste, Kamrau Eshraghian, Pearson Education Application-Specific Integrated Circuits by Michal John Sebastian smith, Pearson Education.

Effective from the session 2018-19
BET-C703
OPTICAL FIBER COMMUNICATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Block diagram of optical fiber communication system, Advantages of optical fiber Communication.Optical fiber waveguides: structure of optical wave guide, light propagation in optical fiber using ray theory, acceptance angle, numerical aperture, skew rays, wave theory for optical propagation, modes in a planar and cylindrical guide, mode volume, single mode fibers, cutoff wavelength, mode field diameter, effective refractive index and group and mode delay factor for single mode fiber.

UNIT II

Transmission Characteristics of Optical fiber, Attenuation in optical fibers, intrinsic and extrinsic absorption, linear and non linear scattering losses, fiber bend losses. Dispersion and pulse broadening, intramodal and intermodal dispersion for step and graded index fibers, modal noise, over all fiber dispersion for multimode and monomode fiber, dispersion shifted fibers, modal birefringence and polarization maintaining fibers

UNIT III

Optical Sources: Basic concepts Einstein relations and population inversion optical feedback and threshold conditions, direct and indirect band gap semiconductors spontaneous and stimulated emission in p-n junction, threshold current density, Hetero junction & DH structure, semiconductor injection lasers structure & Characteristics of injection laser. Drawback and advantages of LED, DH, LED, LED structures and Characteristics

UNIT IV

Optical Detectors: Requirement for photo detections p-n photodiode, characteristics of photo detections, p-i-n and avalanche photodiodes, phototransistors & photoconductors. Direct detection receiver performance considerations: Noise sources in optical fiber communication, noise in p-n, p-i-n and APD receivers, Receiver structures.

UNIT V

Optical Fiber Communication Systems: Principal components of an optical fiber communication system, source laminations, optical transmitter circuits, LED and laser drive circuits, optical receiver block diagram, simple circuits for pre-amplifier, automatic gain control and equalization, Regenerative repeater, BER of optical receiver, channel losses, ISI penalty and optical power budgeting for digital optical fiber system, line coding, analog systems, Direct intercity and sub carrier intensity modulation using AM, FM and PM. Block diagram and detection principle of coherent optical fiber system. Broad applications of fiber optics.

Text Book

Optical fiber Communication: John M.S Senior PHI, 2nd Ed. Reference Books.

Reference Books

1. Optical Communication: J. Gowar PHI, 2nd Ed.
2. Optical fiber Communication: G.E. Keiser Mc Graw-Hill, 3rd Ed.
3. Optoelectronics: Wilson & Hawkes PHI, 2nd Ed.

Effective from the session 2018-19
BET-C704
SATELLITE COMMUNICATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Elements of Satellite Communication, Orbital mechanics, look angle and orbit determination, launches & launch vehicle, orbital effects, Geostationary Orbit.

UNIT II

Satellite subsystems, attitude and orbit control systems, TTC&M, communication subsystem, satellite antenna ,satellite link design: basic transmission theory, system noise temperature and G/T ratio, downlink design, uplink design, satellite systems using small earth station, design for specified C/N.

UNIT III

Modulation and multiplexing techniques for satellite links: FM, pre-emphasis and de-emphasis, S/N ratios for FM video transmission, digital transmission, digital modulation and demodulation, TDM. Multiple access: FDMA, TDMA, DAMA and CDMA.

UNIT IV

Error control for digital satellite links: error detection and correction, channel capacity, error control coding, convolutional codes, linear and cyclic block codes. Propagation effects and their impact on satellite-earth links: attenuation and depolarization, atmospheric absorption, rain, cloud and ice effects etc.

UNIT V

Introduction of various satellite systems: VSAT, low earth orbit and non-geostationary, direct broadcast satellite television and radio, satellite navigation and the global positioning systems. Pseudo-satellite, brief about satellite pay loads.

Text / Reference Books

1. Satellite Communications / Pratt, Bostian, Allnutt / John Wiley & Sons.
2. Satellite Communications / Dennis Roddy / McGraw-Hill
3. Digital Satellite Communications/ Tri T. Ha./ McGraw-Hill.

Effective from the session 2018-19
BCE-C710
COMPUTER NETWORK

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT-I

Introduction : Computer Network & its uses, OSI reference model, TCP/IP Reference Model, ARPANET, Protocols, Routers, Switches, Hubs, Bridges and Repeaters, Introduction to LAN/MAN/WAN.

The Physical Layer: Transmission media: Twisted pair, Baseband and Broadband coaxial cable, Fiber optics; Wireless Transmission: Radio transmission, Microwave transmission, Infrared and light wave transmission; ISDN: services and architecture, ALOHA

UNIT-II

The Data Link Layer: Design Issues: Services provided to other Layer, framing, Error control, Flow control; Error detection and Correction; Simplex, Sliding window protocol, Using Go-Back n, Stop & Wait Protocol ARQ.

The Medium Access Sub layer: Static and Dynamic Channel Allocation in LANs and MANs; IEEE standard 802.3, 802.4, 802.5; CSMA, Finite state machine model.

UNIT-III

The Network Layer: Network layer design issues, Shortest path routing, Flooding, flow- based routing, Broadcast routing, Congestion control and prevention policies; Traffic Shaping, Internetworking : connectionless Interworking, IP addressing, IPv4, Fragmentation, introduction to IPV-6.

UNIT-IV

The Transport Layer: QOS, The transport service; Transport protocols: Addressing, Establishing and releasing a connection; TCP/UDP header**,** Examples of transport layer**.**

Session Layer-RPC, Synchronization, dialog management.

UNIT-V

The Application Layer: Network Security, FTP, SNMP, Telnet, E- mail, Multimedia, WWW, DNS, SMTP.

Presentation layer: ASN, data compression, encryption.

References

1. Andrew S. Tanenbaum (3/e), Computer Networks, PHI
2. Frouzan , Data Communications & Networking(3/e, 4/e)
3. W.Stallings (5/e), Data and Computer Communications, PHI
4. Douglas E.Comer (3/e), Interworking with TCP/IP,Principles, Protocols & Architecture
5. D. Minoli, Internet & Intranet Engineering, TMH

Effective from the session 2018-19
BET-C751
DIGITAL SIGNAL PROCESSING LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

To study the sampling & waveform Generation.
2. To study the Quantization.
3. To study the PCM Encoding.
4. To study the delta modulation.
5. To study the digital modulation schemes (ASK, PSK, FSK).
6. To study the DFT Computation.
7. To study the Fast Fourier Transform.
8. To study the FIR filter implementation.
9. To study the IIR filter implementation.

NOTE
1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.
6. The programming to be done in mixed programming platform i.e. using Sci-Lab and Matlab.

Effective from the session 2018-19
BCE-C752
COMPUTER NETWORK LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

Perform Following Programs in C/C++

1. Implementation of the Data Link Layer framing method such as character stuffing and bit stuffing in C.
2. Implementation of CRC algorithm in C.
3. Implementation of a Hamming (7,4) code to limit the noise. We have to code the 4 bit data in to 7 bit data by adding 3 parity bits. Implementation will be in C.
4. Implementation of LZW compression algorithm in C.
5. Write a socket program in C to implement a listener and a talker.
6. Simulation of a network of 3 nodes and measure the performance on the same network.
7. Write a program in C to encrypt 64-bit text using DES algorithm.
8. Simulation of various layers using simulation kit.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2018-19
BET-C771
MINOR PROJECT

MM : 100 **ESE: 70**
Credit : 4 **Sessional : 30**

Each student shall be assigned a Minor Project by departmental committee. The student shall be required to perform his project work under the supervision of the supervisor(s). There shall be a seminar on the project work of the student to be evaluated by a departmental committee chaired by H.O.D. The student shall be required to submit his project report in the form of dissertation 15 days before the end of VII semester. The student shall be required to submit three copies of the project work with certificate from the supervisor(s) that the work is authentic record of the work performed by him. The report shall be forwarded by H.O.D. The report of the project work shall be evaluated by the external examiner(s). The same external examiner(s) shall hold the viva-voce examination.

THE DISTRIBUTION OF MARKS FOR THE MINOR PROJECT SHALL BE AS FOLLOWS:

MINOR PROJECT	
Project**	50
Viva-voce/Presentation**	20
Seminar (Internal)***	30
Total	100

** - Marks for the project work shall be awarded jointly by the external and internal examiners after viva-voce examination.

*** - There shall be a seminar on the project work of the student to be evaluated by the departmental committee chaired by H.O.D.

Effective from the session 2018-19
BET-C861
MAJOR PROJECT

MM : 400 **ESE : 300**
Credit : 8 **Sessional : 100**

Each student shall be assigned a Major Project by departmental committee. The student shall be required to perform his project work under the supervision of the supervisor(s). There shall be a seminar on the project work of the student to be evaluated by a departmental committee chaired by H.O.D. The student shall be required to submit his project report in the form of dissertation 15 days before the end of VIII semester. The student shall be required to submit three copies of the project work with certificate from the supervisor(s) that the work is authentic record of the work performed by him. The report shall be forwarded by H.O.D. The report of the project work shall be evaluated by the external examiner(s). The same external examiner(s) shall hold the viva-voce examination.

THE DISTRIBUTION OF MARKS FOR THE MAJOR PROJECT SHALL BE AS FOLLOWS:

MAJOR PROJECT	
Project**	200
Viva-voce/Presentation**	100
Seminar (Internal)***	100
Total	400

** - Marks for the project work shall be awarded jointly by the external and internal examiners after viva-voce examination.

*** - There shall be a seminar on the project work of the student to be evaluated by the departmental committee chaired by H.O.D.

Effective from the session 2018-19

Gurukula Kangri Vishwavidyalaya, Haridwar

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. Fourth Year

SEMESTER-VIII

List of Electives

S. No	CODE	SUBJECT
1	BET-E 801	Wireless and Mobile Communication
2	BET-E 802	Fundamental of Radar and Navigation
3	BET-E803	Principles of Secure Communication
4	BET-E804	Adaptive Signal Processing
5	BET-E805	Filter Design
6	BET-E806	Digital Image Processing
7	BET-E807	Digital System Design
8	BET-E808	Random Signal Theory
9	BET-E809	Biomedical Signal Processing
10	BET-E810	Speech Processing
11	BET-E811	Soft Computing and Expert Systems
12	BET-E812	Telecommunication Switching Network and Protocols

NOTE: Electives will be offered depending upon the availability of teaching staff and minimum thirty students should opt for a particular elective.

Effective from the session 2018-19

BET-E801

WIRELESS AND MOBILE COMMUNICATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Wireless Communication Systems: Evolution of Mobile Radio Communication, examples of wireless communication: Paging System, Cordless telephone system, Cellular telephone system, Second generation cellular networks: 2G and 2.5G, Third generation cellular networks: 3G Cellular concept : Frequency reuse, Channel assignment strategies and Handoff strategies.

UNIT II

Interference and System Capacity: Co-channel interference and system capacity, Channel planning for wireless systems, adjacent channel interference, Power control for reducing interference. Improving Coverage and capacity in cellular systems using cell splitting and sectoring.

Path loss in mobile radio propagation: Reflection, Ground reflection (Two ray model), Diffraction, Scattering, Practical Link Budget analysis. Outdoor Propagation models: Okumura model and Hatta model.

UNIT III

Multi Path Fading in Mobile Radio Propagation: Factors influencing Small scale fading, Doppler Shift. Impulse response model of Multi path Channel, Fading effect due to multi path time delay spread, Fading effect due to Doppler spread.

Diversity techniques: Time diversity, frequency diversity and polarization diversity.

RAKE Receiver.

UNIT IV

Multiple Access Techniques: FDMA, TDMA, CDMA, Spread spectrum Techniques: DS SS and FHSS, Processing gain, PN sequence generation and its properties.

Packet radio protocols : Pure ALOHA, Slotted ALOHA and CSMA, OFDM system

Switching Techniques: Circuit switching, Message Switching and Packet Switching.

UNIT V

Global System for Mobile (GSM): GSM Services and Features, GSM System Architecture, GSM Radio Subsystems, GSM Channel types: Traffic channels, Control Channels, Frame structure in GSM, Signal Processing in GSM. Atleast 10% time to be devoted to discuss latest trends by referring to IEEE and IET (UK) transcations.

Text Book

T.S. Rappaport, Wireless Communication, PHI, 2002

References

1. W.C.Y. Lee, Mobile Communication engineering, McGraw Hill, 1997.
2. K.O. Feher, Wireless Digital Communication, Prentice Hall, 1995.
3. Raj Pandya, Mobile and Personal Communication Services and Systems, PHI, 2001
4. A. K. Sharma & V. Sharma, "OFDM communication system", Lambert academic publishing, Germeny.

Effective from the session 2018-19
BET-E802
FUNDAMENTAL OF RADAR AND NAVIGATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Radar Signal Models: Amplitude models, distributed target forms of range equation, radar cross section, statistical description of radar cross section, Clutter, signal to clutter ratio, temporal and spatial correlation of clutter, noise model and signal to noise ratio, frequency models, Doppler shift, simplifies approach to Doppler shift, stop and hop assumption, variation with angle, variation with range, projections, multipath.

UNIT II

Radar Wave Forms: Waveform matched filter of moving targets, ambiguity function, ambiguity function of the simple matched pulse filter for the pulse burst, pulse by pulse processing, range ambiguity, Doppler response and ambiguity function of the pulse burst.

UNIT III

Detection Fundamentals: Radar detection as hypothesis testing, Neyman-Pearson detection rule, likelihood ratio test, threshold detection of radar signals, non-coherent integration of nonfluctuating targets, Albersheim and Shnidaman equations, Binary integration.

UNIT IV

Radio Direction Finding: loop direction finder, goniometer, errors in direction finding, adcock and automatic direction finders, commutated aerial direction finder.

Radio Ranges: LF/MF four course radio range, VOR, ground equipment & receiver, VOR errors.

Hyberbolic System of Navigation: LORAN Decca & Omega system. DME & TECAN

UNIT V

Aids to Approach and Landing: ILS, GCA & MLS

Doppler Navigation: Beam configuration, doppler frequency equation, track stabilisation and doppler spectrum, components of doppler navigation system, doppler radar equipment, CW & FMCW Doppler radar, frequency trackers, doppler range equation.

Text Book:

Fundamentals of radar signal processing Mark A Richards, TMH.

Reference Books:

1. Elements of Electronics Navigation, N. S. Nagraja, TMH.
2. Radar principles, Peebles Jr. P. Z., Wiley, NY.
3. S Kolnik, M.L-Introdution to Radar Systems-McGraw Hill.1980.

Effective from the session 2018-19
BET-E803
PRINCIPLES OF SECURE COMMUNICATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Direct Sequence Spread Spectrum Systems: Model of SS digital communication system, direct sequence spread spectrum signal, error rate performance of the decoder, processing gain and jamming margin, uncoded.

DSSS signals, applications of DSSS signals in anti-jamming, low detectability signal transmission, code division multiple access and multipath channels, effect of pulsed interference on DSSS systems, Generation of PN sequences using m sequence and Gold sequences, excision of narrowband interference in DSSS systems, acquisition and tracking of DSSS system.

UNIT II

Frequency Hopped Spread Spectrum Systems: Basic concepts, slow and fast frequency hopping, performance of FHSS in AW GN and partial band interference, FHSS in CDMA system, Time hopping and hybrid SS system, acquisition and tracking of FH SS systems.

UNIT III

Cryptographic Techniques: Classical encryption technique, Symmetric cipher model, cryptography and cryptanalysts, Substitution techniques, transposition techniques

UNIT IV

Block Cipher and Data Encryption Standard: Block cipher principle, data encryption standard (DES) strength of DES, differential and linear cryptanalysts, block cipher design principles, simplified advanced encryption standard (S-AES), multiple encryption and triple DES, Block cipher modes of operation, stream ciphers and RC4 algorithm.

UNIT V

Public Key Cryptography: Prime numbers, Fermat and Euler's theorem, Chinese remainder theorem, discrete algorithms, principles of public key cryptosystems, RSA algorithm, key management Diffie-Hellman keyexchange, message authentication requirements and functions.

Text / Reference Books

1. Digital Communication by J.G. Proakis McGraw Hill 2nd Ed.
2. Cryptography and Network Security by W. Stallivgs 4th Ed., PHI
3. Digital Communication by Simon Haykin, Wiley.
4. Principle of Communication systems by Taub & Schilling TMH.
5. Cryptography and secure Communications by M.Y. Rhee, Mc Graw Hill

Effective from the session 2018-19
BET-E804
ADAPTIVE SIGNAL PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Definition and characteristics, general properties open and closed loop adaptation. Adaptive Linear Combiner: General description, input signal and Weight vectors, desired response and error performance function, gradient and minimum mean square, alternative definition of gradient, decorelection of error and input components.

UNIT II

Theory of Adaptation with Stationary Signals: Input correlation matrix, Eigenvalues and eigenvectors of the correlation matrix, and their geometrical significance. Basic ideas of gradient search methods, gradient search by newton's method and method of steepest descent, gradient component estimation by derivative measurement, effects of gradient noise, on weight vector solution, excess MSE, time constant and misadjustment, performance comparison of Newton and S.D. methods.

UNIT III

Adaptive Algorithms: Least mean square algorithm, convergence, learning curve noise in Weight vector misadjustment and performances of LMS algorithms, sequential regression algorithm, adaptive recursive LMS algorithm, random search algorithm.

UNIT IV

Recursive Least Square Algorithm: Preliminaries, matrix inversion lemma, exponentially weighted RLS algorithm, update recursion for the sum of weighted error squares, convergence analysis of RLS algorithm.

UNIT V

Adaptive Filter Structures: Lattice structures, all poles and all zeroes versions, adaptive lattice predictor. Lattice LMS algorithms, and lattice SER algorithms, adaptive filters with orthogonal signals, DFT and lattice preprocessors.
Adaptive Filter Applications: (i) Adaptive modeling and systems identification. (ii) Inverse adaptive modeling, equalization and deconvolution

Text Books

1. Adaptive Signal Processing, Widrow and Stearns, Pearson Education
2. Adaptive Filter Theory, Simon Haykin, Pearson Education

Reference Books

1. Adaptive Filters, Cowan & Grant, Prentice Hall
2. Theory and design of adaptive filters, John R. Treichler, PHI.

Effective from the session 2018-19
BET-E805
FILTER DESIGN

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Review of op-amps circuits, Categorization of filters-Low-pass filter, High-pass filter, band-pass filter, band-reject filter, Gain equalizers, and Delay equalizers.

UNIT II

Approximation Theory: Butterworth approximation, Chebyshev approximation, Inverse Chebyshev approximation, Basic of sensitivity, Frequency Transformations.

UNIT III

Three Amplifier Biquad: Basic low pass and band pass circuit, realization of the general Biquadratic Functions, summing of four Amplifier biquad, feed forward three amplifier biquad, Passive Ladder structures, Inductor Substitution using Gyrator, Transformation of elements using the FDNR.

UNIT IV

Elementary transconductor building blocks, resistors, integrators, amplifiers, summers, gyrator, First and second order filters, higher order filters.

UNIT V

Switched capacitor filters: The MOS switch, The switched capacitor, first order building blocks, second order sections, sampled data operation, Switched capacitor first and second order filters, Bilinear transformation.

Text Book

1. R.Schaumann, M.E.Van Valkenburg, “Design of analog filters”, Oxford University Press.

Reference Book

1. Gobind Daryanani, “Principles of active network synthesis and design”,John Wiley and Sons

Effective from the session 2018-19
BET-E806
DIGITAL IMAGE PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Fundamental steps in DIP, elements of DIP, Simple image model, Sampling & uantization, basic relationships between Pixels, Color image model.

UNIT II

Image Transforms: One-dimensional & Two-dimensional DFT, Cosine, Sine, Hadamard, Haar, and Slant & KL transforms. Image Enhancement: Introduction, Point operations, Histogram modeling, spatial operations, Transform operations.

UNIT III

Image Restoration: Introduction, Image observation models, Inverse & Wiener filtering, difference between enhancement & restoration Restoration-spatial filtering, Noise reduction in frequency domain.

UNIT IV

Image Compression: Introduction, Pixel coding, Predictive coding, Transform coding, Interframe coding.

UNIT V

Image Segmentation: Introduction, Spatial feature extraction, Transforms features, Edge detection, Boundary extraction, Segmentation techniques.

Text Books

1. Digital Image Processing, Rafael C. Conzalez Richard E Woods, 2nd Ed.
2. Fundamentals of Digital Image Processing, Anil K Jain.

Effective from the session 2018-19
BET-E807
DIGITAL SYSTEM DESIGN

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to VHDL: VHDL description, combinational networks, modeling flip flop using VHDL, VHDL model for multiplexer, comliance and simulation of VHDL, codes, modeling a sequential machine, variables, signals and constants, arrays VHDL operators, VHDL functions, VHDL procedures, packages and libraries, VHDL model for a counter.

UNIT II

Advanced VHDL: Attributes, transport and inertial delays, operator over loading, multi valued logic and signal resolution, IEEE-1164, standard logic, generic, generates statements, synthesis of VHDL codes, synthesis examples, file handling and TEXTIO.

UNIT III

Design of Networks for Arithmatic Operations: Design of serial adder with accumulator, state graph for control networks design of binary multiplier, multiplication of signed binary numbers, design of binary divider. DIGITAL DESIGN WITH SM CHART: state machine charts, derivation of SM charts, realisation of SM charts, implementation of dice game, alternative realisation of SM charts using microprogramming, linked state machine.

UNIT IV

Floating Point Arithmetic: Representation of floating point numbers, floating point multiplication, other floating point operations. DESIGNING WITH PROGRAMMABLE GATE ARRAYS AND COMPLEX PROGRAMMABLE LOGIC DEVICES: Xinx 3000 series FPGAs, Xinx 4000 series FPGAs, using one hot state assignment.

UNIT V

Memory Models for Memories and Buses: Static RAM, a simplified 486 bus model, interfacing memory to microprocessor bus. DESIGN EXAMPLES: UART design, description of MC68HC05 microcontroller, design of microcontroller CPU, complete microcontroller design.

Text Book

1. Charles H Roth Jr, “Digital System Design using VHDL”, Thomson Learning, 2002.

Reference Books

1.Stephen Brown & Zvonko Vranesic,“Fundamentals of digital logic design with VHDL”, TMH, 2nd Ed.,2007.
2. Jhon F Wakerly, “Digital design”, PHI, 4th Ed.

Effective from the session 2018-19
BET-E808
RANDOM SIGNAL THEORY

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Theory of Probability Axioms of Probability: set theory, probability space, conditional probability Repeated Trials: Combined experiments, Bernoulli trials, Bernoulli's Theorem.

UNIT II

Concept of Random Variable: Introduction, distribution and density functions, specific random variables, conditional distributions. Functions of one random variable: function and distribution of random variable, mean and variance, moments, characteristic functions.

UNIT III

Two Random Variables: Bivariate distributions, one function of two random variables, two functions of two random variables, joint moments, joint characteristic functions, conditional distributions Multiple random variables, sequences of random variables

UNIT IV

Concept of Stochastic Processes: Definition, systems with stochastic inputs, power spectrum, discrete-time processes. Random walks and other applications: random walks, Poisson poins and shot noise, cyclostationary processes, bandlimited processes and sampling theory, deterministic signals in noise. Spectral representation and estmation: factorization and innovations, finite-order systems and state variables, spectral representation of random processes, ergodicity, spectrum estimation

UNIT V

Mean Square Estimation: prediction, filtering and prediction, Kalman filters. Entropy: Basic concepts, random variables and stochastic processes, MEM. Markov chain: introduction, higher transition probabilities and the Chapman-Kolmogorov equation, classification of states, stationary distributions and limiting probabilities, transient states and absorption probabilities, branching processes. Markov processes and Queueing theory: introduction, Markov processes, queueing theory.

Text Book

1. Probability, Random Variables & Random Signal Principles/Peyton Z. Peebles, Jr./TMH

Reference Book

1. Probability, Random Variables and Stochastic Processes/A. Papoulis & S. U. Pillai/4th ed./TMH

Effective from the session 2018-19
BET-E809
BIOMEDICAL SIGNAL PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Bio-Medical Signals: Classification, Acquisition and Difficulties during Acquisition. Basics of Electrocardiography, Electroencephalography, Electromyography & electro-retinography Role of Computers in the Analysis, Processing, Monitoring & Control and image reconstruction in bio-medical field.

UNIT II

ECG: Measurement of Amplitude and Time Intervals, QRS Detection(Different Methods), ST Segment Analysis, Removal of Baseline Wander And Power line Interferences, Arrhythmia Analysis, Portable Arrhythmia Monitors.

UNIT III

Data Reduction: Turning Point algorithm, AZTEC Algorithm, Fan Algorithm, Huffman and Modified Huffman Coding, Run Length Coding.

UNIT IV

EEG: Neurological Signal Processing, EEG characteristic, linear prediction theory, Sleep EEG, Dynamics of Sleep/Wake transition. Study of pattern of brain waves, Epilepsy-Transition, detection and Estimation. EEG Analysis By Spectral Estimation: The Bt Method, Periodogram, -Maximum Entropy Method & AR Method, Moving Average Method. The ARMA Methods, Maximum Likelihood Method.

UNIT V

EP Estimation: by Signal Averaging, Adaptive Filtering:- General Structures of Adaptive filters, LMS Adaptive Filter, Adaptive Noise Canceling, Wavelet Detection:- Introduction, Detection By Structural features, Matched Filtering, Adaptive Wavelet Detection, Detection of Overlapping Wavelets.

Text Books

1. Biomedical Digital Signal Processing, Willis J Tomkin, Phi.
2. Biomedical Signal Processing, D.C Reddy McGrawhill
3. Biomedical Instrumentation and Measurement.,Crommwell,Weibel and Pfeifer, PHI

Reference Books:

1. Biomedical Signal Processing, Arnon Cohen, volume I & Licrc Press
2. Biomedical Signal Analysis A Case Study Approach, Rangaraj M. Rangayyan, John Wiley and Sons Inc.
3. Medical instrumentation Application and Design, john G. Webster, john Wiley & Sons Inc.

Effective from the session 2018-19
BET-E810
SPEECH PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Digital Models for Speech Signals: Mechanism of speech production & acoustic phoenetics, the acoustic theory of speech production, lossless tube models, and digital models for speech signals.

UNIT II

Time Domain Methods of Speech Sampling: Time dependent processing of speech, short time energy and average magnitude, short time average zero crossing rate, discrimination between speech& silence, pitch period estimation using parallel processing, short time autocorrelation function & AMDF, pitch period estimation using autocorrelation function.

UNIT III

Short Time Fourier Analysis: Definition and properties, design of filter banks, implementation of filter bank summation method using FFT, spectrographic displays, pitch detection, analysis by synthesis phase, vocoder and channel vocoder .

UNIT IV

Homomorphic Speech Processing: Homomorphic system for convolution, complex cepstrum of speech, pitch detection using Homomorphic processing, formant estimation, Homomorphic vocoder.

UNIT V

Linear Predictive Coding of Speech: Basic principles of linear predictive analysis, the autocorrelation method, computation of the gain for the model, solution of LPC equations for auto correlation method, prediction error and normalized mean square error, frequency domain interpretation of mean squared prediction error relation of linear predictive analysis to lossless tube models, relation between various speech parameters, synthesis of speech from linear predictive parameters, application of LPC parameters.

Text Book

1. Digital Processing of speech signals by R.L. Rabiner & R.W. Schafer, Pearson Education.

Reference Books

1. Voice processing by G.E. Pelton, McGraw –Hill.
2. Speech Analysis, synthesis and perception by J.L. Flanagan, Springer- Verlog. N. Y.
3. Diserete time speech signal Processing: Principles and Practices by Jhomas Quatieri, Pearson Education.

Effective from the session 2018-19
BET-E811
SOFT COMPUTING AND EXPERT SYSTEMS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Introduction and history, human brain, biological neuron, models of neuron, signal flow graph of neuron, feedback, network architecture, knowledge representation, Artificial intelligence and neural networks.

Learning Process: Error correction learning, memory based learning, Hebbian learning, competitive learning, Boltzmann learning, learning with and without teacher, learning tasks, memory, adaptation.

UNIT II

Artificial Neurons, Neural Networks and Architectures: Introduction, neuron signal function, mathematical preliminaries, Feedforward & feedback architecture.

Geometry of Binary Threshold Neurons and Their Networks: Pattern recognition, convex sets and convex hulls, space of Boolean functions, binary neurons for pattern classification, non linear separable problems, capacity of TLN, XOR solution.

UNIT III

Perceptrons and LMS: Learning objective of TLN, pattern space & weight space, perceptron learning algorithm, perceptron convergence theorem, pocket algorithm, *á* – LMS learning, MSE error surface, steepest descent search, *ì* – LMS and application.

Backpropogation and Other Learning Algorithms: Multilayered architecture, backpropagation learning algorithm, practical considerations, structure growing algorithms, applications of FFNN, reinforcement learning.

UNIT IV

Statistical Pattern Recognition: Bayes' theorem, classical decisions with bayes' theorem, probabilistic interpretation of neuron function, interpreting neuron signals as probabilities, multilayered networks & posterior probabilities, error functions for classification problems.

RBF Networks: Regularization networks, generalized RBF networks, RBF network for solving XOR problem, comparison of RBF networks & multilayer perceptrons.

Stochastic Machines: Statistical mechanics, simulated annealing, Boltzmann machine.

UNIT V

Adaptive Resonance Theory: Building blocks of adaptive resonance, ART 1.

Self Organizing Feature MAP: Introduction, Maximal eigenvector filtering, principal component analysis, generalized learning laws, competitive learning, vector quantization, maxican hat networks, SOFM, applications of SOFM. Fuzzy sets, Fuzzy systems and applications, neural networks and fuzzy logic.

Text Books

1. Simon Haykin, "Neural Networks,", Pearson Education 2nd edition.
2. Satish Kumar, "Neural Networks," Tata McGraw-Hill.

Reference Books

1. Jack M. Zurada, " Introduction to Artificial Neural System," Jaico Publishing House.
2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications," McGraw-Hill Inc.

Effective from the session 2018-19

BET-E812

TELECOMMUNICATION SWITCHING NETWORK AND PROTOCOLS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Message switching, circuits switching, functions of a switching system, register-translator-senders, distribution frames, crossbar switch, a general trunking, electronic switching, Reed electronic system, digital switching systems.

UNIT II

Digital Switching: Switching functions, space division switching, multiple stage switching, nonblocking switches, blocking probabilities, Lee graphs and Jacobaeus, foulded four wire switches, path dinding, switch matrix control; Time division switching, analog and digital time division switching, a digital memory switch, time stage in general, two dimensional switching, implementation complexity of TD switches, multiple stage time and space switching, STS switching , TST switching, TSSST switches, No.4 ESS Toll switch, System 75 digital PBX, Digital cross connect systems, Consolidation and segregation, DCS hierarchy, integrated cross connect equipment, digital switching in analog environment, zero loss switching.

UNIT III

Telecom Traffic Engineering: Network traffic load and parameters, grade of service and blocking probability, modeling switching systems, Markov processes, birth-death processes, incoming traffic and service time characteristics, Poisson arrival process, holding time of calls, blocking models and loss estimates, lost calls cleared systems with infinite and finite subscribers, lost calls returned systems and lost calls held system, Delay systems and Erlang C formula.

UNIT IV

Control of Switching Systems: Call processing functions, sequence of operations, signal exchanges, state transition diagrams; common control, Reliability availability and security; Stored program control, processor architecture, centralized SPC, distributed SPC, Level3, Level2 and Level-1 processing, SPC software, system software and Language processor, SDL, application software.

UNIT V

Signalling : Customer line signalling, AF junctions and trunk circuits, outband and inband signalling, PCM and inter register signalling, Common channel signaling, general principles and network, CCITT signaling system No. 6 and 7, HDLC protocol, Signal units, the signaling information field. Packet Switching: Packets formats, statistical multiplexing, routing control, dynamic, virtual path circuit and fixed path routing, flow control, X.25 protocol, frame relay, TCP/IP, ATM cell, ATM service categories, ATM switching, ATM memory switch, space memory switch, memory-space, memory-space-memory switch, Banyan network switch..

Text Book

Telecommunication switching System and networks, Thiagarajan Viswanathan, PHI.

Reference Books

1. Telecommunication switching, Traffic and Networks, J.E. Flood, Pearson education.
2. Digital Telephony, J.C. Bellamy, John Wiley, 3rd ed.

CHOICE BASED CREDIT SYSTEM

EVALUATION SCHEME

AND

COURSE OF STUDY

IN

B.TECH

ELECTRONICS AND COMMUNICATION ENGINEERING

(w.e.f. 2015-2016)

FACULTY OF ENGINEERING AND TECHNOLOGY

GURUKUL KANGRI VISHWAVIDYALAYA

HARIDWAR-249404

JUNE 2015

Effective from the session 2015-16

BAC-C101
ENGINEERING CHEMISTRY

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Periodicity & Chemical Bonding: Atomic radii, Ionization potential, Electro negativity, Electro positivity, Electron affinity and their periodicity. Hybridization involving s, p and d orbital, partial ionic character, dipole moment and its applications, hydrogen bond and Vander Waal's forces, elementary treatment of M.O. theory and its application to homo nuclear diatomic molecules of I and II period elements.

Phase Rule: Gibbs phase rule (without derivation). Applications of Phase rule to one component system (H_2O and S) and two component system (KI- H_2O system).

UNIT II

Chemical kinetics: Arrhenius equation, determination of activation energy, theories of reaction rates (collision and absolute reaction rate theory).

Photochemistry: Laws of Photochemistry, Quantum yield, Fluorescence, Phosphorescence, Chemiluminescence, Jabolinski diagram.

UNIT III

Water Analysis: Hard & soft water, Specification of water, Analysis of water-alkalinity, hardness (EDTA Method only) of water for domestic use, Water softening-soda-lime process, anion exchangers, Boiler-feed water, Boiler problems-scale and sludge, priming & forming, Caustic embittlement & corrosion, their cause and prevention (Removal of dissolved gases, carbonate treatment, Phosphate conditioning, Colloidal conditioning), numerical problems based on hardness. Solid impurities (filterable, non-filterable), pH, D.O, B.O.D., C.O.D.

Polymers: Polymers, thermoplastics, thermosetting plastic, linear, branched & cross linked polymers etc., industrial application of polymers, addition, condensation polymerizations.

(I)Plastics: Structure, properties and uses of thermoplastic (Polyvinyl chloride, Teflon, Nylons and Polymethyl methacrylate) and thermosetting (Bakelite) materials. (II)Rubber: natural Rubber and it's preparations, vulcanization, mechanism of vulcanization, synthetic rubber (General).

UNIT IV

Fuels: Definition and classification, Calorific value; Gross & Net calorific value and their determination by Bomb calorimeter.(I)Solid fuels: Coke-it's manufacture by Otto Hoffman oven and uses. (II) Liquid fuels: Conversion of coal into liquid fuels (Bergius process & Fischer Tropsch process and mechanism), Petroleum- its chemical composition and fractional distillation. Cracking of Heavy oil residues (Thermal cracking and catalytic cracking), Knocking & Anti knocking agents, octane and cetane numbers and their significance. (III)Gaseous fuels: Natural Gas, Producer gas, Water gas, Carburetted water gas, Coal gas and Oil gas. (IV)Nuclear fuels: Nuclear fission and nuclear fusion. Nuclear reactor.

Corrosion: Definition and types of corrosion, Electrochemical Theory of corrosion, laws of oxide film, different theories of corrosion, Atmospheric corrosion, stress corrosion water line, pitting and soil corrosion. Protective measures against corrosion

UNIT V

Lubricants: Principle of Lubrication, types of Lubrication, Lubricating oil, fraction from crude oil, de-waxing of oil fraction, acid and solvent, refining of lubricating oils, properties of refined oils (viscosity, viscosity index, acid value, saponification value & iodine value, pour point and cloud point, flash point and fire point, aniline point, and their determination, Lubricant greases (Semi solid) and their Penetration and drop point tests, solid lubricants.

Name Reactions: Reimer Tieman reaction, Aldol Condensation, Diel's Alder Reaction, Wurt'z Reaction and Claisen Reaction.

References

1. Principales of Physical chemistry : B.R. Puri, L.R. Sharma, M. Pathania
2. Advanced inorganic chemistry : Cotton
3. A text book of organic chemistry : S.K. Jain
4. Principals of Physical Chemistry : Samuel Glastone
5. A text book of Engineering chemistry : S.S. Dara
6. A text book of Engineering chemistry : Jain

Effective from the session 2015-16

BEM-C101
ENGINEERING MATHEMATICS I

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Differential Calculus I : Successive differentiation, Leibnitz theorem, Taylor's & Maclaurin's Expansion, Indeterminate forms, Radius of curvature, Asymptotes, Double points and their classification, Tracing of curves.

UNIT II

Differential Calculus II : Partial Differentiation of functions, Normal to surfaces and tangent plane, Change of variables, Jacobian, Taylor's series of two variables, Truncation errors, Extrema of function of two and more variables, Method of Lagrange's multipliers.

UNIT III

Multiple Integrals : Fundamental Theorem of integral calculus, Differentiation under the integral sign, Double and triple integrals, Change of order of integration, change of variables. Application to arc length, area , volume, centroid and moment of inertia. Gamma and Beta functions, Dirichlet's integral.

UNIT IV

Vector Calculus : Differentiation of a vector, Scalar and vector fields, Gradient, Divergence, Curl and their physical meanings, Differential operator and identities, Line, Surface and Volume integrals, Green's theorem in plane. Gauss and Stoke's theorems (without proof). Simple applications.

UNIT V

Matrices : Elementary row/ column operations, Rank of a matrix and its applications, Eigen-values and Eign vectors, Cayley-Hamilton theorem, Diagonalisation of Matrices, Linear dependence and independence, Normal matrices, Complex matrices and unitary matrices.

References

1. Prasad C., A first course in mathematics for Engineers, Prasad Mudranalaya
2. Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999
3. Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
4. Srivastava R.S.L., Engineering Mathematics Vol.I

Effective from the session 2015-16

BME-C101

FUNDAMENTAL OF MECHANICAL ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Thermodynamics I: Introduction to SI units, Definition of thermodynamic system, Surrounding and Universe, Quasi static process, Energy interaction Zeroth law, Concept of temperature First law of thermodynamics, Application to closed and open system, Concept of Enthalpy, steady flow energy equation, Throttling process.

UNIT II

Thermodynamics II: Second law, reversible and irreversible process, Thermal reservoir, heat engines and thermal efficiency, COP of heat pump and refrigerator, Carnot cycle, Clausius inequality, Concept of entropy, Entropy change for ideal gases.

UNIT III

Thermodynamics III: Generation of steam at constant pressure, Properties of steam, Use of property diagram, Process of vapor in closed and open system, Rankine cycle. Stroke clearance ratio, Compression ratio, Definition and calculation of mean effective pressure (no proof) for air standard cycles (Otto and diesel cycles)

UNIT IV

Mechanics: Trusses: Plane structure, (Method of Joints and Sections only) Beams: Bending moment and shear force diagram for statically determinate beams.

UNIT V

Strength of Materials: Simple stresses and strain, strain energy, stress- strain diagram, elastic constants. Compound stress and strain: state of stress at a point, Simple tension, pure shear,general two dimensional stress system, principal planes, principal stresses and strains, Mohr's stress circle, Poisson's ratio, maximum shear stress

References

1 Kumar DS (2/e), Thermal Science and Engineering, S.K.Kataria, New Delhi,2001
2 P.K.Nag (2/e), Engineering Thermodynamics, TMH, New Delhi,2001
3 R.Yadav(7/e), Thermal Engineering, Central Publishing House, Allahabad, 2000
4 Shames Irving H.(4/e), Engineering Mechanics, PHI, New Delhi, 1994
5 Hibler (1/e), Statics and Dynamics, Pearson Education, Singapore, 2000
6 Pytel & Singer (1/e), Strength of Materials, Addison Wesley, 1999

Effective from the session 2015-16

BCE-C101
PROBLEM SOLVING THROUGH 'C'

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Computers: Block diagram of computers, functions of its important components, Memory and I/O devices. Concept of assembler, interpreter, compiler & generation of languages.

Number System: Decimal, Binary, Octal, and Hexadecimal numbers and their arithmetic (addition, subtraction, multiplication, and division): 1's and 2's complements

UNIT II

Programming in C: History, Introduction to C Programming Languages, Structure of C Programs, Compilation and Execution of C Programs, Debugging techniques, Data Type and sizes, Declarations of variables, Modifiers, Identifiers and keywords, Symbolic Constants, Storage classes(automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor.

Operators: Unary operators, Arithmetic & Logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, Precedence and order of evaluation.

Control Statements: If-else, switch, break, continue, the coma operator, goto statement. **Loops:** while, do-while, for loop.

UNIT III

Arrays: One-dimensional arrays: declaration, initialization and application. Two-dimensional array: declaration, initialization and application, Multidimensional arrays.

Handling of Character Strings: Declaring and initializing string variables, Reading strings, Writing strings, Arithmetic operation on strings, comparison of two strings and string handling functions.

Pointers: Accessing the address of the variable, Declaring and initializing pointers, accessing a variable through its pointer expression, pointer increment and scale factor, pointers and array, pointers and character strings.

UNIT IV

Functions: Need for user defined function, Return value and its type, function calls, No argument and No return values function, Argument and No return values functions, argument and return value functions. Handling of non integer function, Scope and life time of variable in functions.

Recursion: Recursive Definition and processes, recursion in C, example of recursion, Tower oh Hanoi Problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

UNIT V

Structures: Structures definition, giving value to members, structure initialization, array of structures, array within structures, structures within structures, structures and functions, Structure Pointrers.

File Handling: Creating and Deleting a File, Updating File, Copying File, Searching & Sorting in a File.

References:

1. Rajaraman V.(3/e), Fundamental of Computers, PHI, New Delhi, 1999
2. Sanders,D.H., Computers Today, Mcgraw Hill, 1998
3. Kris Jamsa, DOS the complete reference, Tata McGraw Hill
4. J.Peek Tim O'reilly & M.Locekides, UNIX POWER TOOLS, BPB Publication
5. Yashwant Kanetkar, Let Us C, BPB
6. Yashwant Kanetkar, C In Depth, BPB

Effective from the session 2015-16

BHU-S101
VEDIC SCIENCE & ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 2**
2 0 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Science in Vedic literature and Indian Philosophy-I : Kanad's atomic theory, concept of parmanu, Formation of molecules, Parimandal, Comparison with Dalton's atomic theory and models of Thompson, Rutherford and Bhor. Concept of SAMATA and VISHAMTA vs Maxwell-Boltzmann's distribution of velocities and energies.

UNIT II

Science in Vedic literature and Indian Philosophy-II : First and Second Law of thermodynamics in daily life. Law of helplessness of mankind in thermodynamics and Indian philosophy. Entopy in life and concept of pralaya. Dhananjay Vs concept of Radioactivity-life after death. Atomic spectrum Vs concept of Kundalini.

UNIT III

Vedic Mathematics : Measurements in Vedic Times, ancient scale of length, mass, time and temperature, Number system, Geometry according to sulba Sutra. Overview of Vedic Mathematical Rules (ekadhiken pooren, Nikhil navtascharaman dashatah, oordhavatriyagyabhyam)

UNIT IV

Electrical, Electronics & Aeronautical Engineering in Vedas : Concept of electrical Engineering, type of electricity – Tadit, Saudamini, Vidyut, Shatakoti, Haradini, Ashani. Electronics Engineering in Vedic literature. Aeronautical Engineering in Vedic literature, Types of Vimanas and their construction and working, Shakun viman, Rukma viman, Tripura viman, concept of calculator and ancient ways of computation.

UNIT V

Mechanical, Chemical, Civil & Architectural engineering in Vedic Literature : Mechanical & Chemical Engineeering in ancient India,Art of Alchemy,Types of Iron and steel.Civil and Architectural engineering in Vedic literature.Concept of cryptography & Art of secret writing.

Suggested Readings :

1. Science in Vedas by Acharya Vaidyanath Sashtri.
2. Science in the Vedas by Hansraj, Shakti Publications, Ludhiana.
3. Vedic Mathematics by Swamisri Bharati Krishana Teerathaji, Motilal Banarasi Das, Delhi.
4. Brahad Viman shastra by Maharishi Bhardwaj.
5. Vymanika shastra, English translation by G. R. Josyer.
6. Alchemy and Metallic Medicines in Ayurveda by : Vaidya Bhagwan Das.
7. History of Hindu Chemistry by : P. C. Raya
8. Indian Alchemy by : Dr. S. Mahdihassan.
9. Ancient Scientist of Indian by Satya Prakash.
10. Vaishaishik Darshan by Maharishi Kanad.
11. Vedas : The sources of ultimate science by S. R. Verma, Nag Publisher, New Delhi.

Effective from the session 2015-16

BEN-A101
ENVIRONMENTAL STUDIES

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 2**
2 0 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Multidisciplinary Nature of Environmental Studies & Ecosystems: (a) definition, scope and importance of ecology and environment (b) ecological components: (i) abiotic components: soil, water, light and temperature (ii) biotic components & their relationships- symbiosis, commensalisms, parasitism, predation and antibiosis (c) concept of an ecosystem (d) structure and function of an ecosystem (e) producers, consumers and decomposers (f) energy flow in the ecosystem (g) ecological succession (h) food chains, food webs and ecological pyramids (i) introduction, types, characteristic features, structure and function of the following ecosystems: (i) forest ecosystem (ii) grassland ecosystem (iii) desert ecosystem (iv) aquatic ecosystems (pond, river, ocean) (j) Need for public awareness

UNIT II

Natural Resources: (a) forest resources: use and over-exploitation, deforestation, timber extraction, mining; dams and their effects on forest and tribal people (b) water resources: use and over-utilization of surface and ground water, benefits and problems of dams (c) mineral resources: use and exploitation, environmental effects of extracting and using mineral resources (d) energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources (e) land resources: land as a resource, land degradation, man induced landslides, soil erosion and desertification (f) biodiversity & its conservation: definition- genetic, species and ecosystem diversity, values of biodiversity- consumptive use, productive use, social, ethical, aesthetic and option values (g) India as a mega-diversity nation, hot-spots of biodiversity, threats to biodiversity- habitat loss, poaching of wildlife, man-wildlife conflicts; endangered and endemic species of India, conservation of biodiversity: *in-situ* & *ex-situ* methods (h) bio-geographical classification of India (i) role of an individual in conservation of natural resources (j) equitable use of resources for sustainable lifestyles

UNIT III

Environmental Pollution: (a) Definition, causes, effects and control measures of: air pollution, water pollution, soil pollution, noise pollution, thermal pollution and nuclear hazards (b) solid

waste management- causes, effects and control measures of urban and industrial wastes (c) role of an individual in prevention of pollution (d) disaster management: floods, earthquake, drought & landslides

UNIT IV

Social Issues and the Environment: (a) from unsustainable to sustainable development (b) urban problems related to energy (c) rain water harvesting (d) resettlement & rehabilitation of people- problems and concerns (e) environmental ethics- issues and possible solutions (f) wasteland reclamation (g) population growth and family welfare programme (h) environment and human health, human rights, value education (i) HIV/AIDS (j) role of information technology (IT) in environment and human health (k) global environmental issues: global warming, acid rain, ozone layer depletion

UNIT V

Environmental policies and laws: (a) salient features of following acts i. Environment Protection Act 1986 ii. Air (Prevention and Control of Pollution) Act 1981 iii. Water (Prevention and Control of Pollution) Act 1974 iv. Wildlife Protection Act 1972 v. Forest Conservation Act 1980 (b) issues involved in enforcement of environmental legislation (c) public awareness

References

1. Agarwal, K.C. *Environmental Biology*, Nidhi Publ. Ltd., Bikaner.
2. Bharucha E. *The Biodiversity of India*, Mapin Publishing Pvt. Ltd., Ahmedabad.
3. Clark R.S. *Marine Pollution*, Clanderson Press Oxford.
4. Cunningham, W.P., Cooper, T.H., Gorhani, E. & Hepworth, M.T. *Environmental Encyclopedia*, Jaico Publ. House, Mumabai.
5. De A.K. *Environmental Chemistry*, Wiley Eastern Ltd.
6. Gleick, H.P. *Water in Crisis*, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press.
7. Hawkins R.E. *Encyclopedia of Indian Natural History*, Bombay Natural History Society, Bombay.
8. Heywood, V.H & Waston, R.T. *Global Biodiversity Assessment*, Cambridge Univ. Press.
9. Odum, E.P. *Fundamentals of Ecology*, W.B. Saunders Co. USA.
10. Rao M N. & Datta, A.K. *Waste water treatment*, Oxford & IBH Publ. Co. Pvt. Ltd.
11. Sharma B.K. *Environmental Chemistry*, Geol Publ. House, Meerut.
12. Trivedi R.K. *Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards*, Vol. I and II, Enviro Media.
13. Trivedi R. K. and Goel, P. K. *Introduction to air pollution*, Techno-Science Publication.
14. Wanger K.D. *Environmental Management*, W.B. Saunders Co. Philadelphia, USA.

Effective from the session 2015-16

BAC-C151
ENGINEERING CHEMISTRY LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. Find out the surface tension of given liquid by stalagnometer.
2. Find out the viscosity of given liquid by Ostwald's viscometer.
3. Find out pH of given acid/base solution by using pH meter.
5. Determine Na^+ and K^+ concentration using flame photometer.
6. Determine the turbidity of given solution/water sample by turibidimeter.
7. Determination of D.O. of water sample.
8. Find out distribution constant for the distribution of I_2 between CCl_4 and water.
9. Separate the given mixture indicator by using TLC.
10. Separate the given mixture by using paper chromatography
11. Determine the angle of rotation of given solution by using polarimeter.
12. Determination of strength of oxalic acid/Mohr salt by $KMnO_4$.
13. Determination of strength of oxalic acid/Mohr salt by $K_2Cr_2O_7$.
14. Determine the refractive index of given liquid by using Abbe's refractrometer.
15. Determine conductivity of given compound.
16. Determine absorption maxima and concentration of given $KMnO_4$ solution.
17 To observe fluorescence of fluorescent materials.
18. Determine acid value of given oil sample.
19. Determine iodine value of given oil sample.
20. Determine saponification value of given oil sample.

REFERENCES

1. Advanced practical physical chemistry : J.B. Yadav
2. Analytical chemistry Vol. I, II, III : Subhash, Satish
3. Applied chemistry : Virmani and Narula

NOTE

1. In practical examination the student shall be required to perform two experiments.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BME-C151
BASIC MECHANICAL ENGINEERING LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. To conduct the tensile test on a UTM and determine ultimate tensile strength, percentage elongation for a steel specimen.
2. To conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To determine the hardness of the given specimen using Brinell / Rockwell / Vicker testing machine.
4. To study the 2-stroke I.C. Engine models.
5. To study the 4-stroke I.C. Engine model.
6. To study close loop system example (Turbine)
7. To study model of Locomotive boiler.
8. To study model of Bibcock boiler.
9. Study of Fire Tube boiler
10. Study of water Tube boiler

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BCE-C151
COMPUTER PROGRAMMING LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. Practice of all internal and external DOS commands.
2. Write simple batch program.
3. Giving exposure to windows environment.
4. File and program management in windows.
5. Practice of all UNIX commands.
6. Introduction to text editing and word processing.
7. Net surfing.
8. Creation and usage of E-mail account.
9. Write a program in C to perform different arithmetic operations.
10. Write a program in C to greater of two numbers.
11. Write a program in C to check whether no. is odd or even.
12. Write a program in C to check whether no. is prime or not.
13. Write a program in C to print Fibonacci series.
14. Write a program in C to print factorial of a no.
15. Write a program in C to add two matrices.
16. Write a program in C to search a no. in array.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BME-C153
ENGINEERING GRAPHICS

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 3

LIST OF EXPERIMENTS

1. To understand graphics as a tool to communicate ideas, lettering and dimensioning, construction of geometrical figures.
2. To understand orthographic projection: principles of orthographic projections.
3. To understand principle and auxiliary planes.
4. To understand first and third angle projections.
5. To draw a sheet on projections of points.
6. To make two sheets based on projection of lines parallel to both the planes, parallel to one and inclined to other, inclined to both the planes, true length and traces of a line.
7. To make a sheet based on projection of planes, traces of planes, angles of inclinations of planes, parallel planes.
8. To make a sheet projection of solid in simple position, axis or slant edge inclined to one and parallel to other plane, solids lying on a face.
9. To make a sheet using section of solids lying in various positions, true shape of the section.
10. To make a sheet on development of lateral surfaces.
11. To understand isometric projection: principle of isometric projection, isometric projection using box and offset methods.
12. To practice two exercises using computer aided drawing: basic concepts and application.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BSP-S151

Physical training and Yoga

MM : 100 **Sessional :100**

L T P **Credit : 0**

0 0 2

1. Sports Activites and Development of motor abilities
   Track and field events
   Game events

2. Yogic Exercises and Pranayam

   Surya namaskar
   Bhujangasana
   Shalabhasana
   Shrishasana
   Anuloma-viloma
   Kapal Bhati
   Shitali
   Bhramari

Effective from the session 2015-16

BAP-C201
ENGINEERING PHYSICS

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Optics: Interference of light, Coherence, Fresnel's Biprism, Interference in thin films & wedge shaped film, Newton's rings. Diffraction of light, Diffraction at a single slit, Double slits, Plane transmission grating. Polarization of light, Brewester's Law, Mauls law, Double refraction, Nicol Prism, Production and analysis of polarized light.

UNIT II

Electromagnetics: Gauss' law and its applications.Maxwell's equations, Poynting theorem, Electromagnetic wave equation (elementary idea of each, no derivation). Magnetic induction, Magnetic field intensity, Magnetic permeability and susceptibility (definitions only), Dia, Para,& ferromagnetic materials (Qualitative idea only). Motion of charged particle in uniform electric and magnetic field, Magnetic and electrostatic focusing, Function and block diagram of CRO.

UNIT III

Special Theory of Relativity & Quantum Theory: Inertial & non-inertial frames of reference, Galilean transformation, Lorentz transformation equation of space and time, Michelson-Morlay experiment, Postulates of special theory of relativity, Length contraction, Time dilation, Addition of velocities, Mass energy equivalence& variation of mass with velocities.

Quantum theory of radiations, Planck's law, Photoelectric effect, de-Broglie concept of matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle and its applications, Schrodinger wave equation and its solution for a particle in a box.

UNIT IV

Atomic & Nuclear Physics: Bohr's atomic model and energy level diagram, Sommerfeld relativistic atomic model, Vector atom model, Franck-Hertz experiment, Quantum numbers, general properties of nucleus, Mass defect and packing fraction, Nuclear binding energy, Semi-empirical mass formula.

UNIT V

Solid State Physics: Crystal structure, Miller indices, Separation between lattice planes, Different kinds of crystal bonding, Formation of energy bands in solids (energy level approach), classification of solids, Basic idea of conduction mechanism in semiconductors, Hall effect, X-ray diffraction & Bragg's Law.

References

1. Vasudeva AS, Modern Engineering Physics, S Chand, New Delhi, 1998.
2. Ghatak Ajoy, Optics, TMH, New Delhi, 1999.
3. K.K. Tiwari, Text book of Electricity and Magnetism, S.Chand, New Delhi, 2001
4. Rajam JB.,Atomic Physics, SChand, New Delhi;2000.
5. Beiser Arthur,Concepts of Modern Physics, TMH, New Delhi,1999
6. Mani HS, Modern Physics, New Delhi,1999
7. Kittel Charles(7/e), Introduction to Solid State Physics, John Wiley, Singapore, 1996
8. Murugeshan R (8/e), Modern Physics, S.Chand,New Delhi,2001
9. Kaplan lrving , Nuclear Physics, Narosa ,New Delhi,1998
10. Schiff (3/e), Quantum Mechanics, McGraw, Auckland
11. S.R.Verma, Engg. Physics Vol-I & Vol-II, 2009.

Effective from the session 2015-16

BEM-C201
ENGINEERING MATHEMATICS II

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Differential Equation : Ordinary differential equations of first order, orthogonal trajectories, linear differential equations with constant coefficients, Euler- Cauchy equations, Equations of the form $y'' = f(y)$. Solution of second order differential equations by change of dependent and independent variables, Method of variation of parameters for second order differential equations. Simple applications.

UNIT II

Partial Differential Equations and its Applications : Introduction of partial differential equations, Linear partial differential equations of II order with constant coefficients and their classifications - parabolic, elliptic and hyperbolic with illustrative examples, Method of separation of variables. Wave and Heat equation up to two-dimensions.

UNIT III

Solution in Series : solution in series of second order linear differential equations, Bessel's and Legendre's equations and their solutions, Properties of Bessel function and Legendre's polynomials, Recurrence relations, Generating functions, Jacobi series, Integral representation of Bessel's functions.

UNIT IV

Fourier Series : Fourier series, Dirichlet's condition and convergence. Half range series, Harmonic analysis.

UNIT V

Statistics : Moments, Moment generating functions. Binomial, Poisson and Normal distributions. Correlation and Regression. Method of least squares and curve fitting - straight line and parabola.

References

1. Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
2. Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999
3. Prasad C.,Advanced Mathematics for Engineers, Prasad Mudranalaya
4. Kapur J. N. & Saxena H.C., Mathematical Statistic.

Effective from the session 2015-16

BEE-C201
BASIC ELECTRICAL ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

D.C. Network Theory: Concept of elements**,** Circuit theory concepts- Mesh and node analysis, Star-Delta transformation. Network Theorems- Super-position theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, DC Transients- RL, RC circuits.

UNIT II

Steady State Analysis of A.C. Circuits: Sinusoidal and Phasor representation of voltage and current, average and rms value, form and peak factor of sinusoidal and different waveforms, single -phase A.C. circuit- behavior of resistance, inductance and capacitance and their combination in series & parallel and power factor, series parallel resonance-band width and quality factor.
Three Phase A.C. Circuits: Star-Delta connections, line and phase voltage/current relations, three -phase power and its measurement.

UNIT III

Magnetic Circuits: Ampere turns, magnetomotive force, permeability, reluctance, composite magnetic circuits, comparison between magnetic and electric circuits.
Transformer: Principle of operation, types of construction, phasor diagram, equivalent circuit, efficiency and voltage regulation of single-phase transformer, O.C. and S.C. tests.

UNIT IV

D. C. Machines : Principle of electromechanical energy conversion, types of D.C. machines, E.M.F. equation, Magnetization and load characteristics, losses and efficiency, speed control of D.C. motors and applications.
Measuring Instruments: Principle of working and constructional features of Permanent Magnet Moving Coil and Moving Iron ammeters and voltmeters, Electrodynamic Wattmeter, Induction type single-phase Energy meter.

UNIT V

Three-phase Induction Motor: Principle of operation, types and methods of starting, slip-torque characteristics and applications.
Single-phase Induction Motor: Principle of operation, methods of starting.
Three-phase Synchronous Machines: Principle of operation and application of synchronous motor.

Text Books

1. V. Del Toro, Principles of Electrical Engineering, Prentice Hall International.
2. H. Cotton, Advanced Electrical Technology, Wheeler Publishing.
3. E. Huges, Electrical Technology.

References

1. B. L., Theraja, Electrical Technology, Vol-1, S. Chand Publisher, New Delhi.
2. W.H. Hayt & J.E. Kennedy, Engineering circuit Analysis, Mc Graw Hill.
3. I.J. Nagrath, Basic Electrical Engineering, Tata Mc Graw Hill.
4. A.E. Fitgerald, D.E., Higginbotham and A Grabel, Basic Electrical Engineering, Mc Graw Hill.
5. Ashfaq Hussain, Fundamentals of Electrical Engineering, Dhanpat Rai Publish.

Effective from the session 2015-16

BET-C201
BASIC ELECTRONICS ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Semiconductors, energy band description of semiconductors, effect of temperature on semiconductors, intrinsic and extrinsic semiconductors, donor and acceptor impurities, electron and hole concentration, conductivity of a semiconductor, mobility, Hall effect, Fermi level, mass action law, charge densities in a semiconductor, diffusion and continuity equation

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UNIT II

P-N junction and its properties, V-I characteristics of P-N junction, semiconductor-diode, depletion layer, equivalent circuits of junction diode, diode equation, diode resistance and capacitance, application of junction diode as clippers, clampers and rectifiers (Half-wave, Full-wave and bridge), efficiency of rectifiers, ripple factor, filter circuits, Zener and avalanche breakdown mechanism, Zener diode and its characteristics, equivalent circuit of Zener diode, Zener diode as a voltage regulator.

UNIT III

Bipolar junction transistor(BJT) and its action, Transistor configurations (CB, CE and CC) and their characteristics, cut-off, active and saturation regions. Transistor as a switch, operating point, dc load line, Transistor biasing and its necessity, thermal runaway, types of biasing and their analysis, stability factors, Transistor as a regulator.

UNIT IV

Concept of Transistor amplifier, graphical analysis of CE amplifier, dc and ac equivalent circuits, Emitter follower and its ac model. Basic idea of operational amplifier and OP-AMP parameters, inverting, non-inverting and unity gain configurations. Application of OP-AMP as adder, subtractor, differentiator and integrator.

UNIT V

Number system, conversion of bases (decimal ,binary, octal and hexadecimal), addition and subtraction, BCD numbers, Boolean algebra, logic gates, concept of universal gate, canonical forms, Minimization using K-map, don't care conditions.

Text Book

1. Integrated Electronics: Jacob Millman & C.C. Halkias

References

1. Malvino and leach "Digital principle and applications.
2. Streetman Ben.G, "Solid state electronic devices" (3/e), PHI
3. Millman and grabel, "Microelectronics" PHI
4. Robert Bolyestad "Electronic devices and circuit", PHI

Effective from the session 2015-16

BME-C202
BASIC MANUFACTURING PROCESS

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction : Classification of Manufacturing Process, Composition , Properties and uses of wrought iron, cast iron, Malleable iron ,Carbon and alloy steels, Copper, Aluminum, lead, brass, bronze, duralumin, bearing metals, high temperature metals , Properties of metals: Strength , Elasticity, Stiffness , Plasticity, Malleability , Ductility, Brittleness, Toughness, Hardness, Impact Strength, Fatigue.

UNIT II

Metal Casting: Scope of moulding, moulding sands, Principles of metal casting, pattern materials, types and allowances: classification of moulds, roles of gate, runner and riser, core, core box, and core print. Introduction of dicasting, permanent mould casting, investment casting, casting defects.

UNIT III

Metal Joining: Welding Principles, Classification of welding techniques, oxy-acetylene gas welding, Electric Arc welding, Electric resistance welding, Spot, Seam, Butt welding, Flux: composition, properties and function, Brazing and soldering, types of joints

UNIT IV

Machine Shop and Metal Cutting : Brief description of Lathe, drilling, shaping, planning, milling machines, Cutting tools used and their materials and geometry. Introduction & Profile Programming to CNC machines.

UNIT V

Carpentry: Characteristics of Soft Wood & Hard Wood, object & Methods Seasoning. Cutting, Drilling, Boring, Striking, Miscellaneous & Shaving tools. Types of Saw, Chisels & Planes.

Fitting: Operation of the Fitting Shop. Type of Vices & Clamps. Marking , Cutting, Drilling & Boring tools. Classification of Files, Hacksaw, Scrapers, Hammer, Taps, Dies, Drill, Surface Plate.

References

1 Hazra and Chowdhary (11/e), Workshop Technology (Vol 1 and 2), Media, Mumbai, 2000
2 B.S.Raghuvanshi (9/e),Workshop Technology (Vol 1 and 2), Dhanapat Rai, Delhi, 2001
3 Lindeberg Ray A, (4/e), Process & Materials of Manufacturing, PHI, New Delhi, 1995
4 Degarmo, Materials and Processes in Manufacturing, PHI, New Delhi, 2000
5 Begmen , Manufacturing Processes

Effective from the session 2015-16

BAP-C251
ENGINEERING PHYSICS LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. To determine the value of Stefan's constant by electrical method.
2. To determine the focal points, principal points and focal length of a combination of by lenses Newton's method and its verification.
3. To determine the focal length of a combination of two lenses by Nodal Slide method and to locate the position of cardinal points.
4. To determine the dispersive power of the material of the given prism.
5. To determine the wavelength of spectral lines by plane transmission grating.
6. To determine the wavelength of monochromatic light with the help of Newton's ring method.
7. To determine the wavelength of monochromatic light with the help of Fresnel's Biprism.
8. To study the variation of magnetic field along the axis of the current carrying coil and then to estimate the radius of the coil.
9. To determine the e/m of electron by magnetron method.
10. To study the characteristics of a photocell.
11. To determine the value of Plank's constant by photoelectric effect.
12. To study the Energy band gap of a semi conducting sample by Four Probe method.
13. To study the Hall effect using Hall effect set up.
14. To determine the susceptibility by Quink's method.
15. To determine the specific resistance of the material of the given wire using C.F. bridge.
16. To study the nature of polarization of Laser light& to verify malus Law.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BEG-A251
TECHNICAL COMMUNICATION LAB.

MM : 100 **Sessional : 30**
Time : 3 hrs **ESE : 70**
L T P **Credit : 2**
2 0 0

Experiments related to the following:

Objectives:

1. To expose the learners to English sound system and acquire phonetic skill and speech rhythm.
2. To help the learners use grammar correctly.
3. To train the learners to speak English, clearly, intelligibility and effectively.
4. To equip the learners to compete for a career, and enable them to function effectively in careers which demand good communication skills.

Contents:

i) Non - verbal communication

- Use of hands
- Posture of shoulders
- Eye contact
- Weight of the body
- Movement of the body

ii) Applied Phonetics

- Sound of English-consonants and Vowels
- Phonemic Transcription
- Stress, Rhythm and Intonation

Remedial Grammar

- Some useful expression (introduction, greetings etc.) that are used frequently.
- Common mistakes in the use of nouns, pronouns, adjectives, adverb, prepositions and conjunctions.
- Use of who and whome, much and many, still and yet, so as and so that, make and do.
- Tense and their use.
- Confusion of participles.
- Tag Questions

Reading and Speaking skills, Listening and Writing skills

- Presentation and addresses
- Group discussion
- Interviews
- Role playing

Reading and Writing skills, Listening and Writing skills

- Letter writing-formal and informal
- Real life social situations
- Curriculum vitae
- Agenda, notice and minutes

List of recommended Books (Latest editions unless specified)

1). T. Balsubramaniam. "Phonetics for Indian students", Macmillan India Ltd.
2). Jones, Daniel. "English Pronouncing Dictionary", Cambridge Univ. Press.
3). Oxford Advanced Learners Dictionary.
4). Taylor, Grant. "Conversation Practice", TMH, New Delhi.
5). F.T.A. Wood. "Remedial English Grammar", Macmillan India Ltd.
6). Berry, Thomas Elliot. "The most common errors in English usage", TMH, New Delhi.
7). N. Krishnaswamy. "Modern English", Macmillan India Ltd.
8). Desmond. "People Watching".

Effective from the session 2015-16

BEE-C251

BASIC ELECTRICAL ENGINEERING LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. Verification of Kirchoff's laws.
2. Verification of Thevenin's theorems.
3. Verification of Norton's theorem
4. Verification of Superposition theorem.
5. Verification of maximum power transfer theorem.
6. Measurement of power in three-phase circuit by two wattmeter method.
7. Determination of efficiency of a single-phase transformer by load test.
8. To perform open circuit test on single-phase transformer & find equivalent circuit parameters.
9. To perform short circuit test on single-phase transformer & find equivalent circuit parameters.
10. D.C. generator characteristics
    (a) Shunt generator
    (b) Series generator
    (c) Compound generator
11. Speed control of D.C. shunt generator.
12. To study running and reversing of a three-phase Induction Motor.
13. To study & calibration of a single-phase Energy Meter.
14. Calibration of voltmeter and ammeter.
15. To study of resonance in RLC circuit.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BET-C251
BASIC ELECTRONICS ENGINEERING LAB

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

1. To draw the V-I characteristics of PN junction diode.
2. To draw the V-I characteristics of Zener diode.
3. To study junction diode as half wave and full wave rectifier.
4. To study junction diode as clipper and clamper.
5. To study the Zener diode as voltage regulator.
6. To draw the input and output characteristics of a transistor in CE configuration.
7. To draw the input and output characteristics of a transistor in CB configuration.
8. To find the small signal h-parameters of a transistor.
9. To study various logic gates.
10. To study Op-Amp as inverting and non- inverting amplifier.
11. To study Op-Amp as adder and subtractor.
12. To study Op-Amp as differentiator and integrator.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2015-16

BME-C252
WORKSHOP PRACTICE

MM :100 **Sessional: 30**
Time : 2 hrs **ESE: 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS

Carpentry Shop

1. To prepare a half T joint of given dimensions.
2. To prepare a wooden pattern of given dimensions.

Moulding Shop

3. To prepare a mould of half bearing.
4. To prepare a mould using core.

Metal Joining.

5. To prepare a butt joint of MS strips using Arc welding.
6. To prepare a T joint of MS strips using Oxy Acetylene gas welding.

Fitting Shop

7. To prepare a rectangular piece with slant edge of given size from M.S. flat.

Machine Shop

8. To prepare a job on Lathe machine of given shape and size.
9. To prepare a job on Shaper machine of given shape and size.
10. To prepare a job on Milling machine of given shape and size.
11. To prepare a job on CNC train master of given shape and size.
12. To prepare a job on drilling machine of given shape and size.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BEM-C301
ENGINEERING MATHEMATICS- III

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Laplace Transform: Laplace transform of elementary functions. Shifting theorems. Transform of derivatives. Differentiation and Integration of transforms. Heaviside unit step and Dirac Delta functions. Convolution theorem. Solution of ordinary linear differential equations used in Mechanics, Electric circuits and Bending of beams.

UNIT II

Fourier Transforms : Definition of Fourier transform, Fourier sine and cosine transforms. Fourier integral formula. Applications to solutions of boundry value problems.

UNIT III

Z - transform : Definition, Linearity property, Z - transform of elementary functions, Shifting theorems, Initial and final value theorem, Convolution theorem, Inversion of Z - transforms, Solution of difference equations by Z - transforms.

UNIT IV

Functions of a Complex Variable - I : Analytic functions, C-R equations and harmonic functions, Line integral in the complex plane, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic functions, Liouville's theorem.

UNIT V

Functions of a Complex Variable - II : Representation of a function by power series, Taylor's and Laurent's series, Singularities, zeroes and poles, Residue theorem, evaluation of real integrals of type $\int_{o}^{2\pi} f(\cos\theta, \sin\theta)d\theta$ and $\int_{-\infty}^{\infty} f(x)/F(x)dx$, Conformal mapping and bilinear transformations.

References

1. Prasad C., Advanced mathematics for Engineers, Prasad Mudranalaya
2. Schaum outline Series, Integral Transform,TMH
3. Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
4. Brancewel, Fourier Transforms and their applications, McGraw
5. Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999

Effective from the session 2016-17
BET-C301
ELECTRONIC DEVICES AND CIRCUITS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Varactor, tunnel, Schottkey barrier, LED, Photodiode and their characteristics, p-n-p-n diode and their characteristics, SCR, UJT. Ebers-Moll model of BJT, T model of BJT, Hybrid model of BJT at low frequency, computation of voltage gain, current gain and power gain, Z_i and Z_o and approximate formulas, high frequency transistor hybrid $\boldsymbol{\pi}$ model.

UNIT II

Field Effect Transistor: JFET and its characteristics, biasing of JFET, small signal low frequency and high frequency model of JFET amplifier, configurations of JFET, MOSFET, MESFET (Enhancement & depletion types) their construction and characteristics, configuration of MOSFET, AND, OR, NAND, and NOR Gates using PMOS, NMOS and CMOS.

UNIT III

Multistage Amplifier: Effect of coupling and by-pass capacitors, types of coupling (DC, RC and TC), Darlington connection, cascode amplifier, coupling schemes for multistage amplifier and frequency response of transistor amplifier.

Power amplifiers: ClassA, Class B, Class C and Class AB amplifiers and their efficiencies, harmonic distortion, push-pull amplifier. Basic idea of tuned amplifier.

UNIT IV

Feedback Amplifiers: Principles of feedback in amplifiers, advantages of negative feedback, classification of feedback(voltage-series, voltage-shunt, current-series, current-shunt)amplifiers, effect of negative feedback on gain, stability of gain, input and output impedances, bandwidth and gain-bandwidth product.

UNIT V

Oscillators: Positive feedback, Berkhausen criterion for sinusoidal oscillation, Phase-shift oscillator, Weinbridge oscillator, Tuned oscillator, Hartley, Colpitts and Crystal oscillator.

Text Book

J.Millman & A. Grabel, 'Microelectronics', TMH

References

1. R.L. Boylestad L. Nashelsky, 'Electronics Devices & Circuit Theory. Prentice hall
2. J.Millman & Halkias, 'Integrated Electronics', MGH
3. Sedra & smith, "Microelectronics circuit."

Effective from the session 2016-17
BET-C302
DIGITAL ELECTRONICS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Number System: Representation of negative numbers, 9's and 1's complement, 10's and 2's complement, arithmetic using 2's complement. BCD Code, Gray Code, Excess-3 Code, Introduction to Boolean algebra, Truth table verification of various gates, Realization of Switching functions with gates.

UNIT II

K- Map: Representation up to 4 variables, simplification and realization of various functions using gates, Tabular Method, Combinational logic and design procedure.

UNIT III

Combinational logic Circuits: Arithmetic circuits, Half and Full adder, Subtractors, BCD adders, Code Conversion, 4 bit Magnitude Comparator (IC -7485), Cascading of IC 7485, Decoder, Multiplexer, Demultiplexers, Encoders.

UNIT IV

Sequential Logic Circuits: Flip Flops, S-R latch, gated latches, Edge triggered Flip Flops, Master-slave Flip Flops, Conversion of flip flops, Analysis of clocked sequential circuits, Design of synchronous circuits, State transition diagram, state reduction and assignment.

UNIT V

Counters: Design of Asynchronous and Synchronous Counters, Two bits & four bits up & down counters and their design, Shift registers, Serial & Parallel data transfer, Shift left/Right register, Shift Register applications.

Text Book

M.Morris Mano, Digital Design, PHI

Reference Books

1. R.P.Jain, Modern Digital electronics, TMH
2. A.Anand Kumar, Fundamentals of Digital Circuits, PHI
3. Lee S.C, Modern Switching Theory and Digital design, PHI
4. Greenfield J.D., Practical Digital design using ICs, John Wiley.

Effective from the session 2016-17
BCE-C301
DATA STRUCTURE – I

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

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UNIT I

Structures: Structures definition, giving value to members, structure initialization, array of structures, array within structures, structures within structures, structures and functions,Structure Pointrers.
File Handling: Creating and Deleting a File, Updating File, Copying File, Searching & Sorting in a File.
Complexity: Algorithm Complexity and Time-Space trade-off.

UNIT II

Stack: Array representation and Implementation of stack, Operations on stack: Push & Pop, Array representation of Stack, Linked representation of Stack, Operation associated with stacks, Application on stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of Postfix expression using stack.
Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, Deque and Priority Queue.

UNIT III

Linked List: Representation and Implementation of Singly Linked List, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and Deletion to/from Linked List, Insertion and Deletion Algorithms, Doubly linked List, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

UNIT IV

Trees: Basic terminology, Binary Trees, Binary Tree Representation, Algebraic Expressions, Complete Binary Tree. Extended Binary Trees, Array and Linked representation of Binary trees, Traversing Binary trees.
Binary Search Tree: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of search algorithm, Path Length, AVL Tree, B-trees.

UNIT V

Searching and Hashing: Sequential Search, Comparison and Analysis, Hash table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.
Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting.
File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree

index Files, Indexing and Hashing Comparisons.

References

1. Horowitz and Sahani, Fundamentals of Data Structure, Galgotia.
2. R.Kruse etal, Data Structures and Program Design in C, Pearson Education.
3. A M Tenenbaum etal, Data Structure using C & C++, PHI.
4. Lipschutz, Data Structure, TMH.
5. K. Loudon, Mastering Algorithms with C, Sheoff Publisher & Distributors.
6. Bruno R Preiss, Data Structures and Algorithms with Object Oriented Design Pattern in C++, John Wiley & Sons, Inc.
7. Yashwant Kanetkar, Pointers in C, BPB

Effective from the session 2016-17

BCE-C304

COMPUTER ORGANIZATION AND OPERATING SYSTEM

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Micro-operation, Arithmetic Logic Shift Unit, Arithmetic Algorithms (addition, subtraction, Booth's Multiplication), IEEE standard for Floating point numbers.

UNIT II

Control Design: Hardwired & Micro Programmed Control Unit, Fundamental Concepts (Register Transfers, Performing of arithmetic or logical operations, Fetching a word from memory, storing a word in memory), Execution of a complete instruction, Multiple-Bus organization, Microinstruction, Microprogram sequencing, Wide-Branch addressing, Microinstruction with Next-address field, Prefetching Microinstruction.

UNIT III

Processor Design: Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, Reduced Instruction Set Computer (RISC), Complex Instruction Set Computer (CISC).

UNIT IV

Process Management : Process Concept, Process Scheduling, Operation on Process, Cooperating Processes, Interprocess Communication, Threads, Overview – Multithreading Models, Process Synchronization, The Critical Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Deadlocks, System Model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

UNIT V

CPU Scheduling And Memory Management : CPU Scheduling, Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real Time Scheduling, Algorithm Evaluation, Memory Management Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging.

References

1. M. Mano, Computer System Architecture, PHI
2. Vravice, Zaky & Hamacher, Computer Organization, TMH Publication
3. Tannenbaum, Structured Computer Organization, PHI
4. Silberschatz,Galvin,Gagane, Operating System Concepts , Sixth edition, John wile & Sons, INC, 2002.
5. D.M.Dhamdhere, Operating Systems, Tata McGraw Hill, 2002.
6. Charles Crowley, Operating Systems: A Design Oriented Approach, Tata McGraw Hill, 1999.

Effective from the session 2016-17
BET-C304
ANALOG COMMUNICATION AND SYSTEM

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Signals and its Representation: Review of Fourier transform, Signal transmission through linear system, Signal distortion in transmission, Time domain versus Frequency Domain, Application of Delta function in Fourier Transform calculations Fourier transform of periodic signals.

UNIT II

Linear Modulation, Amplitude modulation, generation and demodulation of AM, Wave, suppressed carrier modulation, DSB-SC modulation, and its generation and demodulation, SSB-SC modulation, Exponential modulation, modulation F.M. waves, generation of F.M. waves, De-emphasis and Pre-emphasis filtering.

UNIT III

A.M. and F.M. transmitters, SSB transmission, F.M. transmitter, IC AM and FM standard transmitter.

UNIT IV

A.M. and F.M. Receivers, Superhetrodyne receivers, the complete A.M. receiver system, SSB receiver, F.M. receiver, Introduction To Television, Different Modulations Used In Television Transmission.

UNIT V

Pulse Analog Modulation, Practical Sampling, Analog pulse modulation, Time Division multiplexing (TDM) Synchronization in pulse modulated system, Noise in Continuous-wave modulation, baseband system, noise calculation in communication system noise in A.M and angle modulated system.

Books Recommended :

1. Chakrabarti------ Analog and digital Communication-Dhanpatrai & Com.
2. Wayne Tomasi---Electronic Communications Systems-Pearson Education Asia Publisher.
3. Taub, H., Shillmg D.L. ---Principles of Communication Systems-Tata-McGraw Hill, N.D.
4. B.P. Lathi, “Modern Digital & Analog Communication Systems”, Oxford University Press.
5. A.B. Carlson / “Communication Systems” / Tata McGraw-Hill.
6. Simon Haykin / “Communication Systems” / John Wiley / 4th Ed.

Effective from the session 2016-17

BET-C351

ELECTRONICS DEVICES AND CIRCUITS LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS:

1. To draw the input and output characteristics of FET and to measure the pinch off voltage.
2. To draw the drain and transfer characteristic curve of MOSFET.
3. To draw the frequency response of FET amplifier.
4. To design and study various logic gates using MOS.
5. To draw the frequency response curve of RC Coupled Amplifier.
6. To draw the frequency response curve of Transformer Coupled Amplifier.
7. To draw the frequency response curve of Emitter Follower.
8. To find the efficiency of A, B & AB Push pull Amplifier.
9. To find the frequency of oscillation of Hartley Oscillator.
10. To find the frequency of oscillation of Colpitt Oscillator.
11. To find the frequency of oscillation of R-C phase shift oscillator.
12. To find the frequency of oscillation of Wein Bridge Oscillator
13. To find the frequency of oscillation of Crystal Oscillator.
14. To draw the characteristic of SCR.
15. To draw the characteristic of UJT.

NOTE

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1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BET-C352
DIGITAL ELECTRONICS LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS :

1. To verify the truth tables of various types of gates using IC 7400.
2. To verify the truth tables of Multiplexer & also implement a function using Multiplexer.
3. To design & verify the truth table of half & full adder.
4. To design & verify the truth table SR flip-flop using NOR/NAND gates.
5. To design & verify the truth table JK flip-flop using NOR/NAND gates.
6. To design & study Counters.
7. To design & study Shift registers.
8. To verify the truth tables of de Multiplexer.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BET-C353
ANALOG COMMUNICATION LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. To study Amplitude modulation using a transistor and determine depth of modulation.
2. To study envelope detector for demodulation of AM signal and observe diagonal peak clipping effect.
3. To study frequency modulation using reactance modulator.
4. Study of frequency modulation using varactor modulator.
5. Narrow band FM generator using Armstrong method.
6. Study of Foster- Seely discriminator.
7. Generation of DSB-SC signal using balanced modulator.
8. Generation of single side band signal.
9. Study of phase lock loop and detection of FM signal using PLL.
10. Measurement of noise figure using a noise generator.
11. Study of super heterodyne AM receiver and measurement of sensitivity, selectivity & fidelity.
12. Study and demonstration of active filter (low pass, high pass, and band pass type).

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BCE-C351
DATA STRUCTURE – I LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

Write Program in C

1. Array implementation of Stack.
2. Array implementation of Queue.
3. Array implementation of Circular Queue.
4. Implementation of Linked List.
5. Implementation of Stack using list.
6. Implementation of Queue using list.
7. Implementation of Binary Search Tree, Tree Traversal.
8. Insertion and Deletion in BST.
9. Implementation of Searching and Sorting Algorithms.
10. Sort a double linked list.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
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Effective from the session 2016-17
BEM-C401
DISCRETE MATHEMATICS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Sets and Propositions: Introduction. Combination of sets, Finite and Infinite sets, Uncountably Infinite sets, Mathematical Induction, Principle of Inclusion and Exclusion. Propositions.

UNIT II

Relations and Functions: Introduction. Relation, Properties of primary relations, Equivalence relations and partitions, Partial ordering relations and lattices. Functions and the Pigeonhole principle.

UNIT III

Graphs and Planar Graphs: Basic terminology, Multigraphs and weighted graphs, Paths and circuits, Shortest paths in weighted graphs. Eulerian Paths and circuits, Hamiltonian paths and circuits, Planar Graphs.

UNIT IV

Trees and Cut sets : Trees, Rooted trees, Path lengths in rooted trees, Prefix codes, Spanning trees and cut sets. Minimum spanning trees.

UNIT V

Generating Functions and Recurrence Relations : Introduction. Manipulation of numeric Functions, Generating functions, Recurrence relations, Linear Recurrence relations with constant coefficients. Homogeneous solutions, Particular solutions, Total solutions. Solution by the method of generating functions.

References

1. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
2. Liu,C.L(2/e)., Elements of Discrete Mathematics, TMH, New Delhi, 2000
3. Tremblay J.P. and Manohar R., Discrete Mathematical structures with application to Computer Science, McGraw, Singapore, 1988
4. Kolman & Busby(3/e), Discrete Mathematical structures for Computer Science, PHI, New Delhi, 2001

Effective from the session 2016-17
BET-C401
VLSI TECHNOLOGY

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Crystal growth: Crystal growth for pure (bulk), N& P type semi-conductors, float zone process, CZ-process, Bridgeman process. Processing considerations for wafer preparation; Chemical & mechanical cleaning, wafer shaping operations . Fabrication & material defects in wafer.

UNIT II

Epitaxy: Vapour phase epitaxy, LPE, MBE. safety considerations, epitaxial defects, film characteristics. Burried layer. SOI structure. **Oxidation**; properties of oxide layer, growth mechanism & kinetics, silicon oxidation model, interface considerations, oxidation rates in thin oxide, oxidation techniques & systems, dry & wet oxidation.

UNIT III

Diffusion & Ion Implantation: selection of N & P type dopants ,diffusion mechanism & techniques. Diffusion profile like; complementary error function, limited source diffusion solution of diffusion equation. Ion implantation process system, implantation mechanism, implantation defects.

UNIT IV

Lithography: resist coating, pre-baking of photo-resist, mask transfer, resist development, post-baking resist, selective removal of material, resolution, registration, throughput. Optical lithography; shadow & projection printing, properties of photo resist materials. Electron beam lithography. X-ray lithography. Ion beam lithography. Etching; techniques of etching.

UNIT V

Metallization: properties of metallization, application of Metallization. Metal film fabrication; physical vapour deposition, chemical vapour deposition. Aluminium Metallization. Metallization with silicides. Fabrication of active & passive components in IC. The teacher should at least utilize 10 % time to discuss latest trends and industrial development by following IEEE and IET (UK) transcations.

Text book

1. S. M. Sze "VLSI technology"
2. Chen , VLSI technology

Reference Books

1. Simon Sze, "Semiconductor devices & Technology" McGraw HillScience/Engineering/Math; 2 Edition
2. C. Y. Chang, "ULSI Technology" McGraw-Hill Higher Education; International Ed edition
3. Wai-Kai Chen, "VLSI Technology (Principles and Applications in Engineering, 8)" CRC; 1 edition.

Effective from the session 2016-17
BEM-C402
NUMERICAL ANALYSIS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Errors and Roots of Equations: Absolute, relative, round-off and truncation errors. Significant digits. Algebraic and Transcendental Equations, Numerical solution, Method of bisection, Newton-Raphson method, Direct iterative method, convergence.

UNIT II

Linear Simultaneous Algebric Equations: Method of Gauss elemination, LU - decomposition Jacobi's and Gauss- Seidal methods, Largest eigen value and corresponding eigen vector (Powers method).

UNIT III

Interpolation: Finite difference operators, Greogory- Newton, Stirling, Bessel and Lagrange's formula. Errors in interpolation. Divided differences.

UNIT IV

Numerical Differentiation and Integration: Differentiation, Newton- Cotes formula of Inegration, Gaussian Quadrature formula. Extension of Trapezodial and Simpson's rules to multiple integration.

UNIT V

Ordinary Differential Equations : Picard, Taylor, Eulers, Runge-Kutta, Adams-Bash forth and Milne's method. System of ordinary differential equations, Partial Differential Equations: Numerical solutions of Laplace and Poisson equations by finite difference method.

References

1. Jain M.K, Iyengar S.R.K., Jain R.K., Numerical Methods for scientific & Engineering Computation, Wiley ,1987
2. Grewal, B.S., Numerical Methods in Engineering & Sciences, Khanna, New Delhi,
3. Sastry B., Introductory Method of Numerical Analysis, PHI
4. Flowers, Numerical Methods in C++, Oxford
5. Gerald C.F. (5/e), Applied Numerical Analysis, Addison Wesley, 1994

Effective from the session 2016-17
BEE-C403
NETWORK ANALYSIS AND SYNTHESIS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Graph Theory : Graph of a Network, definitions, tree, co tree , link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Node methods of analysis.

UNIT II

Network Theorems: Applications to ac networks- Super-position theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, Reciprocity theorem. Millman's theorem, compensation theorem, Tellegen's theorem.

UNIT III

Network Functions: Concept of Complex frequency , Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot, frequency response and Bode plots.

UNIT IV

Two Port Networks: Characterization of LTI two port networks Z, Y, ABCD and h parameters, reciprocity and symmetry. Inter-relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks. T and Π Representation.

UNIT V

Network Synthesis: Positive real function; definition and properties; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms.

Filters: Image parameters and characteristics impedance, passive and active filter fundamentals, low pass, high-pass, band pass, band elimination filters.

Text Books

1. M.E. Van Valkenburg, Network Analysis, Prentice Hall of India.
2. D. Roy Chaudhary, Networks and Systems, Wiley Eastern Ltd.
3. Donald E. Scott, An Introduction to Circuit analysis: A System Approach, McGraw Hill Book Company.

Reference Books

1. M.E. Van Valkenburg, An Introduction to Modern Network Synthesis, Wiley Eastern Ltd.
2. W.H. Hayt & Jack E-Kemmerly, Engineering Circuit analysis, Tata McGraw Hill.
3. Soni, Gupta , Circuit Analysis, Dhanpat Rai & Sons.
4. A. Chakrabarti, Circuit Theory, Dhanpat Rai & Co.

Effective from the session 2016-17
BET-C402
MICROPROCESSOR & MICROCONTROLLER

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Microprocessors and assembly language, 8085 μp architecture, addressing modes of 8085, basics of memory interfacing, 8085 instruction set and programming techniques, timing diagrams.

UNIT II

Counters, time delays, stacks and subroutines, programming of basic arithmetic operations: addition, subtraction, multiplication, division, code conversion etc interrupts, interfacing I/o devices: Data converters, Switches, LED'S, Seven segment LED display, printer.

UNIT III

Programmable interface devices: 8155A I/O & timer, 8279 programmable keyboard / display interface, general-purpose programmable peripheral devices: PPI-8255, Programmable interrupt controller (8259), DMA & DMA controller (8237), Serial I/O and data communication.

UNIT IV

Introduction to 16 bit microprocessors, architecture of 8086, Physical address, segmentation, memory organization, addressing modes.

UNIT V

Introduction to 8051 microcontroller, architecture, Addressing modes, timer/counter, interrupts. The class should have some component of design/interface problem discussion.

Text Book

Microprocessor, architecture, programming and applications with 8085 R.S Gaonkar.

Reference Books

1. 8086 microprocessor: programming and interfacing the pc- K.J Ayala
2. 8051 microcontroller architecture programming and applications-K. J Ayala
3. Microprocessors and interfacing: Douglas hall.

Effective from the session 2016-17
BET-C403
ELECTRO MAGNETIC FIELD THEROY

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

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UNIT I

Electrostatics – Fundamentals: Electric charges – Coulomb's Law – Electric Field Intensity – Linear, Surface and Volume charge density – Gauss Law and its application – electric Scalar Potentials and potential difference – Potential due to uniformly charged disc and uniformly charged line, potentials between two coaxial cylinders and between two conducting spherical shell – Electric field lines and equipotential contours – Potential gradient and electric field due to electric dipoles – Conservative nature of electric field.

UNIT II

Dielectrics & Capacitance: Dielectric boundaries – Capacitance – Capacitance of system of conductors Overhead lines and underground cables – Methods of images and its application Electrostatic energy and energy density – Force between charged conductors dielectric strength and breakdown. Divergence and curl of vector fields . Divergence theorem – Stokes theorem – solutions of electrostatic problems – Examples on Laplace's equation.

UNIT III

Magnetostatics Fundamentals: Magnetic field intensity and magnetic flux density, Biot Savarat law, Force between current carrying wires. Torque on closed circuits, Ampere's law Magnetic scalar and vector potentials – Boundary conditions at magnetic surfaces.

UNIT IV

Magnetic Circuits and Inductance: Faraday's law of electromagnetic induction , Inductor and inductance Inductance of solenoids, toroids, transmission lines and cables, Mutual inductance, Inductors in series and parallel, energy stored in magnetic field, Pull of an electromagnet magnetic circuits.

UNIT V

Electro Magnetic Waves: Maxwell's equations, Equation of continuity, displacement current , Maxwell's equation in point and integral forms ,The wave equations, Uniform plane wave , relation between electric and magnetic field intensities in a uniform plane wave, Poynting vector , Poynting theorem, boundary conditions.

Text Books

1. Gangodhar, K.A., ' Field Theory', Khanna Pub. Delhi 11th edition, 1994.
2. William H. Hayt, ' Engineering electromagnetics', Tata- McGraw Hill, 5th edition, 1992.

References

1. Sarwate, V.V., ' Electromagnetic Fields and Waves', Wiley Eastern Limited, New Delhi, 1993.
2. Mahajan, A.S. and Rangawala, A.A. 'Electricity and Magnetism, Tata-McGraw Hill Publishing Company, Ld, New Delhi, 1989.
3. Seely, S., Introduction to electromagnetic Fields', McGraw Hill.

4. Joseph, a. Edminister, ‘ Electromagnetic – Schaum’s outline Series’, International Edition, McGraw Hill Inc., New York, 1993.
5. Narayana Rao, N., ‘Elements of Engineering Electromagnetics’, Prentics Hall of India, 1991.

Effective from the session 2016-17
BET-C451
MICROPROCESSOR LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. Addition of 8 bit hexadecimal numbers without carry.

Addition of 8 bit hexadecimal numbers with carry.

3. To calculate 2's compliments of a 8 bit number.
4. Subtraction of two 8 bit hexadecimal number.
5. Interfacing with 8255 in I/O mode & BSR mode.
6. Verification of all interrupts.
7. Multiplication of 8 bit hexadecimal number by 2.
8. Division of 8 bit hexadecimal numbers.
9. Addition of two 8 bit decimal numbers.
10. Transfer the block from one memory location to another.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BEM-C452
NUMERICAL ANALYSIS LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

Roots of Algebraic and transcendental equations

1. Bisection method
2. Newton Raphson method
3. Direct iterative method

Solutions of simultaneous equations-

4. Gauss Elimination method
5. LU – Decomposition method
6. Jacobi method
7. Gauss Seidel method

Interpolation

8. Lagrange's Interpolation method
9. Newton Forward's interpolation method and Newton Backward's interpolation method

Numerical differentiation and integration

10. first and second order differential coefficient
11. Trapezoidal formula composite
12. Simpson's 1/3 formula composite
13. Simpson's 3/8 formula
14. Lagendre Gaussian Quadrature

Solution of differential equations

15. Picards method
16. Euler's method
17. Runge-Kutta method
18. Milne's method

Statistics

19. Method of least square curve fitting
20. Regression analysis
21. Linear square fit and polynomial fit.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17
BET-C452
CIRCUIT SIMULATION LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

Electronic Workshop & PCB

1. Winding Shop: Step down transformer winding of less than 5VA.
2. Soldering Shop: Fabrication of DC unregulated power supply.
3. PCB Lab: (a) Artwork & printing of a simple PCB.
(b) Etching & drilling of PCB.

Wiring & Fitting Shop: Fitting of Power Supply along with a meter in cabinet.

4. Testing of Power Supply fabricated.

Electronics CAD Lab

5. Design, simulation and Analysis of following circuits using circuit simulator:
(i) Push pull Amplifier.
(ii) NMOS & CMOS inverter.
(iii) Two input NAND Gate.
(iv) Two input NOR Gate.

6. Layout design of NMOS & CMOS inverter using Layout Generator.
7. Layout design of two input NAND Gate.

MATLAB Excersices

8.(i) Write a MATLAB program to find the roots of a quadratic equation.
(ii) Write a MATLAB program to find the factorial.
(iii) Simulate an RC circuit in MATLAB.
(iv) Write a MATLAB program to draw I-V characteristic of a MOSFET.
(v) Write a MATLAB program to find the average with a dynamic array.
(vi) Plot one and two-dimensional graphs using various MATLAB 2-D Plot types.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2016-17

BET-C481

SEMINAR

MM : 100 **Sessional :100**

L T P **Credit : 2**

0 0 2

Objective: To increase the communication ability on students and to prepare then for presenting seminar on advanced topics of their branch.

The students will be required to deliver a seminar on a topic of general interest in or any advanced technical topics related to the theory papers studied. The topic will be decided by mutual consent of the Faculty- in- charge and students.

* Total 100 marks include 25 marks for report and 75 marks for presentation.

Effective from the session 2017-18

BET-C501
DIGITAL COMMUNICATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Elements of Digital Communication and Information Theory: Model of a Digital Communication, System, Probability Theory and Random Variables, Logarithmic Measure of Information, Entropy and Information Rate, Conditional Entropy and Redundancy, Source Coding, Fixed and Variable Length Code Words, Source Coding Theorem, Prefix Doing and Kraft Inequality, Shannon-Fanno and Huffman Coding.

UNIT II

Digital Base band Transmission: PCM Coding, DM, DPCM, ADCM, Data Transfer Rate, Line Coding and Its Properties, NRZ & RZ Types, Signaling Format For Unipolar, Polar, Bipolar (AMI) & Manchester Coding and Their Power Spectra (No Derivation) Matched Filter Receiver, Derivation of Its Impulse Response and Peak Pulse Signal to Noise Ratio. Correlation Detector Decision Threshold and Error Probability For Binary, Unipolar (ON-OFF) Signalling, ISI, Nyquist Criterion For Zero ISI & Raised Cosine Spectrum.

UNIT III

Digital Modulation Techniques: Gram-Schmidt Orthogonalization Procedure, Types of Digital Modulation, Wave forms for Amplitude, Frequency and Phase Shift Keying, Method of Generation and Detection of Coherent & Non-Coherent Binary ASK, FSK & PSK Differential Phase Shift Keying, Quadrature Modulation Techniques QPSK, Probability of Error and Comparison of Various Digital Modulation Techniques.

UNIT IV

Digital Multiplexing: Fundamentals of Time Division Multiplexing, Electronic Commutator, Bit, Byte Interleaving T1 Carrier System, Synchronization and Signaling of T1, TDM, PCM Hierarchy, T1 to T4 PCM TDM System (DS1 to DS4 Signals).

UNIT V

Error Control Coding: Error Free Communication Over a Noise Channel, Hamming code, Relation Between Minimum Distance and Minimum Distance Error Correcting Capability, Linear Block Codes, Encoding and Syndrome Decoding, Cyclic Codes, Encoder and Decoder For Cyclic Codes, Convolution Codes, Tree diagram state diagram and Trellis Diagram, Viterbi and Sequential Decoding, Comparison of Performance.

Text Book

Haykin, Simon / "Communication Systems" / John Wiley / 4th Ed.

References Books

1. Singh, R.P. & Sapre, S.D. / "Communication Systems: Analog & Digital" / Tata McGraw- Hill.
2. Lathi, B.P / "Modern Digital & Analog Communication Systems" / Oxford University Press .
3. Taub & Schilling / "Principles of Communication Systems" / Tata McGraw-Hill /
4. A.B. Carlson / "Communication Systems" / Tata McGraw-Hill.
5. Charkrabarti, P. / "Analog Communication Systems" / Dhanpat Rai & Co.

Effective from the session 2017-18

BET-C502
EMBEDDED SYSTEM DESIGN

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Embedded systems and its applications, Embedded Operating system, Design parameters of an embedded system and its significance, design life cycle, tools introduction, hardware and software partitioning and co-design. Hardware Fundamentals for the embedded developers Digital circuit parameters. Open collector outputs Tristate outputs I/O sinking and Sourcing, PLD's, Watchdog Timers, Hardware design and development.

UNIT II

Custom Single Purpose Processors: Optimizing program, FSMD, Data path & FSM. General purpose processors and ASIP's (Application Specific Instruction set Programming): Software and operation of general purpose processors-Programmers View Development Environment-ASIPs Microcontrollers- DSP Chips.

UNIT III

Introduction to Microcontrollers and Micoprocessors, Embedded versus external memory devices, CISC and RISC processors, Harvard and Von Neumann Architectures. 8051 Microcontrollers-Assembly language, architecture, registers, Addressing modes, Instruction set, I/O ports and memory organization Interrupts Timer/counter and serial communication.

UNIT IV

RTOS-Tasks, states, Data, Semaphores and shared data, Operating system services, Message queues, Mailboxes. Advanced Processor-(only architectures) 80386, 80486 and ARM (References)

UNIT V

Communication basics, Microprocessor Interfacing I/O Addressing, Direct memory access, Arbitration, multilevel bus architecture, Serial protocols, Parallel protocols and wireless protocols. Real world Interfacing: LCD, Stepping Motor, ADC, DAC, LED, Push Buttons, Key board, Latch Interconnection, PPI.

Text Book

Embedded System Design-Frank Vahid/Tony Givargis, John Willey, 2005.

References Books

1. The 8051 Microcontroller and embedded systems-Muhammad Ali Mazidi and Janice Gillispie.
2. Microcontrollers (Architecture, Implementation & Programming) Kenneth Hintz, Daniel Tabak, Tata McGraw-Hill, 2005.
3. 8051 Microcontrollers & Embedded Systems 2nd Edition-Sampath Kr, Katson Books, 2006.
4. Microcontroller (Theory and Applications) Ajay V Deshmukh, Tata McGraw-Hill, 2005.
5. An Embedded Software Primer-David E.Simon, Pearson Education, 1999.

Effective from the session 2017-18

BEE-C503
AUTOMATIC CONTROL SYSTEM

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Control System: Open loop & closed control; servomechanism, Physical examples. Transfer functions, Block diagram algebra, Signal flow graph, Mason's gain formula Reduction of parameter variation and effects of disturbance by using negative feedback.

UNIT II

Time Response Analysis: Standard test signals, time response of first and second order systems, time response specifications, steady state errors and error constants Design specifications of second order systems: Derivative error, derivative output, integral error and PID compensations, design considerations for higher order systems, performance indices.

UNIT III

Control System Components: Constructional and working concept of ac servomotor, synchros and stepper motor.

Stability and Algebraic Criteria: Concept of stability and necessary conditions, Routh- Hurwitz criteria and limitations.

Root Locus Technique: The root locus concepts, construction of root loci.

UNIT IV

Frequency Response Analysis: Frequency response, correlation between time and frequency responses, polar and inverse polar plots, Bode plots.

Stability in Frequency Domain: Nyquist stability criterion, assessment of relative stability: gain margin and phase margin, constant M&N circles.

UNIT V

Introduction to Design: The design problem and preliminary considerations lead, lag and lead-lag networks, design of closed loop systems using compensation techniques in time domain and frequency domain.

Review of State Variable Technique: Review of state variable technique, conversion of state variable model to transfer function model and vice-versa, diagonalization, Controllability and observability and their testing.

Text Books

1. Nagrath & Gopal, Control System Engineering, 4th Edition, New age International.
2. K. Ogata, Modern Control Engineering, Prentice Hall of India.

Reference Books

1. Norman S. Mise, Control System Engineering 4th edition, Wiley Publishing Co.
2. M.Gopal, Control System; Principle and design, Tata McGraw Hill.
3. M.Gopal, Modern Control system, Tata McGraw Hill.
4. D.Roy Choudhary, Modern Control Engineering, Prentice Hall of India.

Effective from the session 2017-18

BET-C503

APPLIED ELECTROMAGNETICS FIELD THEORY

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT-I

Maxwell's equations, Wave equation, Poynting vector, Standing waves, VSWR, impedance, Planner transmission lines, Transmission line problem solving using smith chart.

UNIT-II

Waveguides, Parallel plate waveguides, TEM, TE and TM modes, wave impedance, rectangle, Cylindrical wave guides, excitation of waveguides, Quasi TEM mode and propagation in metamaterial structure.

UNIT-III

Resonators rectangular and cylindrical and their application, wave propagation in an isotropic media, ferrites, Faraday rotation ferrite devices, isolators, Circulators, and phase shifters.

UNIT- IV

Microwave components, S-parameters and their applications to Tee network, Magic Tee, Directional Couplers, Isolators, Attenuators, Wave meters.

UNIT- V

Microwave filters, matching networks, Quarter and half wave filters, Measurement of low and high microwave powers, Equivalent circuit and analysis of wave guide and resonator.

Books Recommended :

1. Krauss E.---Electromagnetic Theory-Mc-Graw Hill.
2. Leo S.---Solid State Microwave Devices-Prentice Hall.

Effective from the session 2017-18

BET-C405/BET-C504
SIGNALS AND SYSTEMS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Signals and Systems: Continuous-time and discrete-time Signals, Transformations of the Independent Variable, Exponential and Sinusoidal Signals, Continuous-Time and Discrete-Time LTI Systems and their properties, convolution sum and convolution integrals, LTI System described by differential and difference equations.

Z-Transform: Z-Transform, Region of convergence, Inverse Z-transform, analysis and characterization of LTI system, Block diagram representation, Unilateral Z-transform.

UNIT II

Fourier Series and Fourier Transform: The response of LTI Systems to Complex Exponentials, Fourier Series Representation of Continuous-time Periodic Signals and their Properties, Continuous time and discrete time Fourier Transforms and their properties, System Characterized by Linear Constant Coefficient Differential equations and Difference equations.

UNIT III

Time and Frequency Characterization of Signals and Systems: Magnitude Phase Representation of the Fourier Transform, Magnitude Phase Representation of the Frequency response of LTI systems, Time domain Properties of Ideal Frequency Selective filter, Time Domain and Frequency Domain aspects of Non ideal filters, First Order and Second Order Continuous Time and Discrete time Systems.

UNIT IV

Sampling and Laplace Transform: Signal representation by samples, sampling theorem, Impulse train sampling, sampling of discrete time signals, discrete time processing of continuous time signals. Laplace Transform, Region of convergence, inverse Laplace Transform, Analysis and characterization of LTI System, Block diagram representation, Unilateral Laplace transform.

UNIT V

Random variable, random process correlation functions, cumulative distribution function, probability density function, joint-cumulative distribution, probability density function. Expectation, mean, variance, covariance, auto-correlation, power spectral density, Gaussian Pdf and Rayleigh Pdf.

Text Book

V. Oppenheim, A.S. Willsky and S. Hamid Nawab, 'signals & System', Pearson Education, Second Edition, 2003.

Reference Books:

1. Roberts, "Signals and Systems" Tata McGraw Hills.
2. P. Ramesh Babu, R. Ananda Natarajan,"Signals and Systems", SCITECH Publications.
3. Charles L. Phillips, John M.PARR and EVEA. RISKIN, "Signals, Systems and Transforms", PEARSON Education, Third Edition.
4. Chen 'Signals & Systems, Oxford University, Press.

Effective from the session 2017-18

BCE-C506

OBJECT ORIENTED PROGRAMMING USING C++

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Review of C, Difference between C and C++, Cin, Cout, new ,delete operators, abstraction, encapsulation, inheritance, polymorphism, Structured versus object-oriented development, elements of object-oriented programming.

Class Overview: Class specification, class objects, accessing class members, defining member functions, outside member functions as inline, accessing member functions within a class, data hiding, access boundary of objects revisited, empty classes, pointers within a class, passing objects as arguments, returning objects from functions, friend functions and friend classes, constant parameters and member functions, structures and classes, static data and member functions, class, objects and memory resource, class design steps.

UNIT II

Object Initialization and Cleanup: Class revisited, constructors, parameterized constructors, destructor, constructor overloading, order of construction and destruction, constructors with default arguments, dynamic initialization through constructors, constructors with dynamic operations, copy constructor, static data members with constructors and destructors.

Operator overloading: Introduction, over loadable operators, unary operator overloading, operator keyword, operator return values, limitations of increment/decrement operators, binary operator overloading, arithmetic operators, overloading of new and delete operators, data conversion, conversion between basic data types, conversion between objects and basic types, conversion between objects of different classes, overloading with friend functions.

UNIT III

Inheritance : Introduction, class revised, derived class declaration, forms of inheritance, inheritance and member accessibility, constructors in derived classes, destructors in derived classes, constructors invocation and data members initialization, overloaded member functions, multilevel inheritance, multiple inheritance, hierarchical inheritance, multi-path inheritance and virtual base classes, hybrid inheritance.

UNIT IV

Virtual Functions and Classes: Introduction, need for virtual functions, static and dynamic binding, pointer to derived class objects, definition of virtual functions, pure virtual functions, abstract classes, virtual destructors.

Generic programming with templates: Introduction, function templates, overloaded function templates, multiple arguments function templates, user defined template arguments, class templates, class template with overloaded operators.

UNIT V

Streams Computation with Streams: Predefined console streams, hierarchy of console stream classes, unformatted I/O operations, formatted console I/O operations, manipulators, custom/user-defined manipulators, stream operator with user-defined classes.

Stream computation with files: Introduction, hierarchy of file stream classes, opening and closing of files, testing for errors, file modes, file pointers and their manipulators, sequential access to a file, ASCII and binary files, saving and retrieving of objects, file input/output with stream class, random access to a file, in-memory buffers and data formatting, error handling during file manipulations, filter utilities.

Exception handling: Introduction, error handling, exception handling model, exception handling constructs.

References

1. E.Balagurusamy, Object Oriented Programming with C++, TMH
2. R.Lafore, Object Oriented Programming using C++, Galgotia
3. S.B.Lippman & J.Lajoie, C++ Primer, Addison Wesley
4. G.Booch, Object Oriented Design & Applications, PHI

Effective from the session 2017-18

BET-C551
DIGITAL COMMUNICATION LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. Study of Sample and hold circuit using Op-amp.
2. Study of PAM generation and detector and observe characteristics of both single and dual polarity pulse amplitude modulation.
3. Study of pulse width modulation and demodulation.
4. Study of pulse position modulation demodulation.
5. Study of delta modulation and demodulation and observe effect of slope overload.
6. Study of pulse data coding techniques for NRZ formats.
7. Data decoding techniques for NRZ formats.
8. Study of amplitude shift keying modulator and demodulator.
9. Study of frequency shift keying modulator and demodulator.
10. Study of phase shift keying modulator and demodulator .
11. Study of single bit error detection and correction using Hamming code.
12. Study of Pulse code modulation and demodulation.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BET-C552
SYSTEM ENGINEERING LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. To measure frequency and level of a given unknown signal.
2. To measure harmonics of SINE WAVE.
3. To check Frequency response of a 'LOW PASS' filter.
4. To check Frequency response of a 'HIGH PASS' filter.
5. To check Frequency response of a 'BAND PASS' filter.
6. To construct a triangular wave with the help of fundamental frequency and its harmonic components.
7. To construct a rectangular sawtooth wave with the help of fundamental frequency and its harmonic components.
8. To construct square wave with the help of fundamental frequency and its harmonic components.
9. To construct Half sine wave with the help of fundamental frequency and its harmonic components.
10. Study of signal sampling and reconstruction techniques.
11. To calculate and verify time response of low pass filter.
12. To calculate and verify time response of high pass filter.

NOTE

1. A teacher shall be assigned 20 students for daily practical work in laboratory.
2. No batch for practical class shall consist of more than 20 students.
3. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
4. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BCE-C554

OBJECT ORIENTED PROGRAMMING LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

Programming exercise on the following topics.

Functions in C++, parameter passing, call and return by reference, friend functions, inline functions, function overloading.

Classes and objects: arrays within a class, memory allocation for objects, static members, returning objects, constructor and destructors, operator overloading.

Inheritance: derived classes, single and multiple inheritance, hierarchical inheritance, constructors in derived classes, classes containing objects of other classes.

Polymorphism: pointers to objects, this pointer, pointer to derived classes, virtual functions.

Templates: class and function templates, template arguments, exception handling; use of files, learning to use Visual C++ environment.

NOTE

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1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BET-C554
EMBEDDED SYSTEM DESIGN LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1.Program to interface LCD data pins to port P1 and display a message on it.

2 .Program to interface keypad. Whenever a key is pressed, it should be displayed on LCD.

3.Program to interface seven segment display unit.

4.Program to interface LED display unit

5.Program to toggle all the bits of Port P1 continuously with 250 mS delay.

6.Program to toggle only the bit P1.5 continuously with some delay. Use Timer 0, mode 1 to create delay.

7.Program to interface ADC0808

8.program to clear 16 RAM locations starting at RAM address 60H

9. prgram to find the sum of the values 79H, F5H and E2H . put the sum in registers R0 (low bytes) and R5(high bytes)

10. write a program to copy a block of 10 bytes of data from RAM locations , starting at 35H to RAM locations starting at 60H

NOTE

1.Minimum of 8 experiments have to be conducted.
2.The programs have to be tested on 8051/89C51 Development board/equivalent using Embedded C Language/Assembly Language on Keil IDE or Equivalent
3. In practical examination the student shall be required to perform one experiment.
4. A teacher shall be assigned 20 students for daily practical work in laboratory.
5. No batch for practical class shall consist of more than 20 students.
6. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
7. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BET-C601
ANALOG INTEGRATED CIRCUITS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

IC OP-AMP Applications: OP-AMP Fundamentals (brief review of differential amplifier, current mirror, active load, level shifter, output stage; ac and dc characteristics) Basic building blocks using OP-AMPS. Inverting/ Non-inverting VCVS, Integrators, Differentiators, CCVS and VCCS, Instrumentation Amplifiers.

UNIT II

Waveform Generator: Square wave generators: 555Timer, Crystal controlled Oscillator Ramp Generator: Triangle generator, Sawtooth generator, Sine wave generator: Requirement for sinusoidal oscillations, Wien-bridge and twin-T oscillators. Function Generators: Multi op-amp function generators, IC function generators PLL Fundamentals.

UNIT III

Active Filters: Introduction to filtering: Frequency response, Characteristics and terminology, Active versus passive filters, Low pass filter: First order low pass active filter, second order active filter model, second order low pass filter characteristics, Sallen-Key unity gain filter, Sallen-Key equal component filter, Higher order filters.High pass active filter. Band pass filter: single op-amp band pass filter, multistage band pass filter,State variable filter

UNIT IV

Non-linear Circuits: Logarithmic Amplifiers, Log/Antilog Modules, Precision Rectifier, Peak Detector, Sample and Hold Circuits. OP-AMP as Comparator, Schmitt Trigger, Square and Triangular Wave Generator, Monostable Multivibrator. IC Analog Multiplier applications OTA

UNIT V

Voltage Regulators: OP-AMP Regulators, IC Regulators, Fixed Voltage Regulators (78/79, XX), SMPS.

Text Book

Gayakwad, R.A, Op-Amp and LINEAR INTEGRATED CIRCUITS, PHI

Reference Books

1. Sedra and Smith, Microelectronic Circuits", Oxford University press, 5th Edition, 2005.
2. J. Michael Jacob, Applications and design with Analog Integrated Circuits", PHI, 2nd Edition, 2004
3. B.P. singh and Rekha Singh, Electronic Devices an Integrated Circuits; Pearson Education, 1st Edition 2006.

Effective from the session 2017-18

BET-C602

ANTENNA AND WAVE PROPAGATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Antenna Principles: Potential Functions & Electromagnetic Field, Current Elements, Radiation from Monopole & Half Wave Dipole, power radiated by current element, radiation resistance. Network Theorems Directional Properties of Dipole Antenna. Antenna Gain, Effective Area, Antenna Terminal Impedance, Practical Antennas and Methods of Excitation, Antenna Temperature and Signal to Noise Ratio.

UNIT II

Antennas Arrays: Two Element Array, Horizontal Patterns in Broadcast Arrays, Linear Arrays, Multiplication of patterns, effect of the earth on vertical patterns, Binomial array, Chebyshev Array.

UNIT III

Practical Antennas: VLF and LF transmitting antennas, effect of antenna height, Field of short dipole, electric field of small loop antenna, Directivity of circular loop antenna with uniform current, Yagi-Uda array: Square corner yagi-uda hybrid, circular polarization Rhombic Antenna: Weight and Leg length Parabolic Reflectors: Properties, Comparison with corner reflectors Horn Antenna: Length and Aperture, Introduction to metamaterial, Use of metamaterial in antenna application.

UNIT IV

Antenna Measurements: Radiation Pattern measurement, Distance requirement for uniform phase, uniform field amplitude requirement, Introduction to phase measurement; Gain Measurement: Comparison method, Near field method, Introduction to current distribution measurement, Measurement of antenna efficiency, measurement of Noise figure and noise temperature of an antenna polarization measurement.

UNIT V

Wave Propagation: Modes of Propagation, Plane Earth Reflection, Space wave and Surface Wave, Reflection and refraction waves by the Ionosphere Tropospheric Wave. Ionosphere Wave Propagation in the Ionosphere, Virtual Height, MUF Critical frequency, Skip Distance, Duct Propagation, Space wave. Antenna theory to supported with antenna Lab. So antenna equipments are to be procured.

Text Books

1. Jordan Edwards C. and Balmain Keith G./ "Electromagnetic Waves and Radiating Systems"/ Prentice Hall (India)
2. Kraus, John D. & Mashefka, Ronald J. / "Antennas: For All Applications" / Tata McGraw Hill, 3rd Ed.

Reference Books:

1. Prasad, K.D./ "Antennas and Wave Propagation"/ Khanna Publications
2. Collin, R. / "Antennas and Radiowave Propagation" / Tata McGraw-Hill

3. Hayt Jr. William H./ “Engineering Electromagnetics “/ Tata McGraw-Hill
4. Das, Annaparna & Das, Sisir K. / “Microwave Engineering”/ Tata McGraw Hill.
5. V. Sharma & S.S. Pattnaik, “Microwaves, metamaterial & skin cancer detection” / Lambert academic publishing, Germeny.

Effective from the session 2017-18

BET-C603
PROCESS INSTRUMENTATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Theory of Measurement: Introduction, Performance Characteristics: static & dynamic standards, Error analysis: Sources, types and statistical analysis,Transducers: Passive transducers: Resistive, Inductive and capacitive, Active transducers: Thermoelectric, piezoelectric & photoelectric. Bridges: Direct current and alternating current bridges, LCR bridges.

UNIT II

Analog Meters: AC analog meters: Average, Peak and RMS responding voltmeters, sampling voltmeters. Electronics Analog meters, Electronics analog DC and AC voltmeters and ammeters, Electronic analog ohmmeter and multimeter.

UNIT III

Digital Meters: Analog to digital converter: Transfer characteristics, A/D Conversion technique, Simple potentiometric & servo method, successive approximation, ram type, Integrating & dual-slope integrating method. D/A Converter: Transfer characteristics, D/A conversion techniques digital mode of operation, performance characterstics of D/A converters.

Display devices: Decimal, BCD and straight binary number, indicating system, numeric & alpha number display using LCD & LED, specification of digital meters: display digit & counts resolution, sensitivity, accuracy, speed & settling time etc.

UNIT IV

Oscilloscopes & RF Measurements: Types of oscilloscopes, controls, Measurements voltage, frequency time & Phase. High frequency measurements – RF impedancy. Probes: Types of probes probe loading & measurement effect, probe specifications.

Signal Generators & Analyzers: frequency synthesis techniques & digital signal generators. Signal Analyzers: Distortion, wave and Network spectrum analyzers.

UNIT V

SCADA: need of SCADA system, distributed control system (DCS), General definition and SCADA components. Hardware architecture, software architecture, protocol detail, discrete control and analog control, application & benefits, PLCs Vs RTUs, RTU block diagram, MTU communication interface, future trends, Internet based SCADA display system, functional block, structural text, instruction, ladder diagram, trouble shooting, features.

Text Books:

1. Electronic Instruments & Instrumentation Technology by MMS Anand, PHI Pvt. Ltd., New Delhi Ed. 2005.
2. Electronics Instrumentation by H.S. Kalsi TMH Ed. 2004.

Reference Books:

1. Electronics Instrumentation & Measurement Techniques by W.D. cooper & A.D. Helfrick, PHI 3rd Ed.
2. Electronic Measurement & Instrumentation by Oliver & Cage Mc-Graw Hill.
3. SCADA: by Stuart A. Boyer, IAS 1999.

Effective from the session 2017-18

BET-C604

SWITCHING THEORY AND LOGIC DESIGN

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Combinational Circuits: Parallel Binary adder, IC 7483, 4-bit Binary parallel adder/subtractor, Serial binary adders, sequential detectors, iterative networks, analogy between iterative networks and sequential machines, Design of sequence detector using iterative networks.

UNIT II

Asynchronous Sequential Circuits: Analysis procedure, Reduction of state & flow table, Race free state assignment, Design of fundamental mode asynchronous sequential circuits.

UNIT III

Static & Dynamic Hazard: Gate delay, Generation of Spikes, Determination of hazard in combinational circuits, Algorithmic state machines (ASM), ASM chart, Timing consideration, Control implementation, Design with multiplexer.

UNIT IV

Logic Families: Diode switching, Transistors as a switching element, MOS as a digital circuit element, concept of transfer characteristics, input characteristics and output characteristics of logic gates, fan in, fan out, noise margin, Logic families: TTL, IIL, ECL, NMOS, & CMOS, Open collector outputs.

UNIT V

Memories: Sequential & Random Access, NMOS and CMOS Static and Dynamic Memory elements, one and multidimensional selection arrangements, Read only memories. Digital Techniques related to PALs, PLAs.

Text Book

1. M.Morris Mano, Digital Design,PHI
2. R.P.Jain , Modern Digital electronics, TMH
3. A.Anand Kumar, Fundamentals of Digital Circuits, PHI

Reference Book:

1. Taub & schilling / Digital Integrated Electronics/Mc Graw Hill International Edition.
2. Malvino & Leach/ Digital Electronics & circuit design/ TMH.
3. G.Gopalan / Introduction to Digital Microelectronics circuits/TMH
4. S. Salivahann & S.Arivazhagan/ Digital Circuits & Design/ Vikas Publishing House Pvt. Ltd.

Effective from the session 2017-18

BET-C606
MICROWAVE ENGINEERING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Microwave Tubes: UHF limitation in conventional vacuum tubes, Klystron Amplifier and Reflex Klystron, Admittance diagrams of Klystrom Amplifiers.

UNIT II

Analysis of travelling tube (TWT), m type TWT and O type TWT, study of the effect of electron beam on the helix, estimation of gain of TWT amplifier, Backward wave oscialltor (BWO), and applications.

UNIT III

Magnetron, operation of magnetron oscialltor, cavity magnetron, mode jumping in magnetron, application of magnetron.

UNIT IV

Solid-state microwave, devices, varactor doade parameteric Amplifiers, PUC, PDC, PIN diode Tunnel diode, V-I characteristics of T.D., T.D. amplifiers, and oscillator, Transferred electron devices, Gunn effect devices, Avalanche Transit time devices.

UNIT V

Microwave Communication Systems, Analog microwave communication, LOS microwave system, Derivation of field strength of a Tropospheric wave, Fading in Troposphere and its effects, Digital microwave Communication and its system, Bandwidth efficiency, Microwave for Biomedical applications, Microwave Imaging . Introduction to very high frequency such as millimetre wave and teraHz to be discussed.

Text Book

Leo, Sanuer---Microwave & Solid state devices-Prentice Hall

Reference Books

1. Watson, H.A. ---Microwave Semiconductor Devices-McGraw Hill.
2. Collin, R.E. ---Fundamental of Microwave Engineering.
3. V. Sharma & S.S. Pattnaik, “Microwaves, metamaterial & skin cancer detection” / Lambert academic publishing, Germeny.

Effective from the session 2017-18

BCE-C607
JAVA PROGRAMMING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction : Creation of Java, importance of Java to internet, byte code, OOP Principles, Encapsulation, Inheritance and Polymorphism, data types, variables, declaring variables, dynamic initialization, scope and life time of variables, arrays, operators, control statements, type conversion and casting, compiling and running of simple Java program.

Classes and Objects : Concepts of classes and objects, class fundamentals Declaring objects, assigning object reference variables, introducing methods,constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing – call by value, recursion, nested classes and inner classes, exploring the String class.

UNIT II

Inheritance : Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class.

Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding classpath, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT III

Exception Handling and Multithreading : Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes, Concepts of Multithreading, differences between process and thread, thread life cycle,creating multiple threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread communication, daemon threads,deadlocks, thread groups.

UNIT IV

Applets : Concepts of Applets, differences between applets and applications,life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

UNIT V

AWT : Concepts of components, container, panel, window, frame, canvas, AWT Controls - Buttons, Labels, Text fields, Text area, Check boxes, Check box groups, Lists, Choice, Scrollbars, Menus, Layout Managers – Flow, Border,Grid.

Swing : JApplet, JFrame and JComponent, Icons and Labels, Handling threading issues, text fields, Buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

References

1. Herbert Schildt, The Complete Reference Java J2SE 5th Edition, TMH Publishing Company Ltd.
2. Cay Horstmann, ig Java 2nd Edition, John Wiley and Sons.
3. H.M.Dietel and P.J.Dietel, Java How to Program, Pearson Education/PHI
4. Cay.S.Horstmann and Gary Cornell, Core Java 2, Vol 1, Fundamentals, Pearson Education.
5. Cay.S.Horstmann and Gary Cornell, Core Java 2- Advanced Features, Pearson Education.
6. Iver Horton, Beginning in Java 2, Wrox Publications.

Effective from the session 2017-18

BET-C651

ANALOG INTERGRATED CIRCUITS LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENTS:

1. To measure different parameter of the Op-Amps.
2. To find the CMRR in differential amplifier.
3. To study the gain and frequency response of Inverting Amplifier.
4. To study the gain and frequency response of Non Inverting Amplifier.
5. To study the operational amplifier as Differentiator.
6. To study the Op-Amp as summer.
7. To study the Op-Amp as subtractor.
8. To study the operational amplifier as Integrator.
9. To find the response of clipper circuit.
10. To study the OP-AMP as square wave generator.
11. To study 2^{nd} order Low Pass active Filter.
12. To study 2^{nd} order High Pass active Filter.
13. To study the hysteresis characteristics of the Op- Amp based Schmitt trigger.
14. To study the monostable multivibrator using Timer IC 555.
15. To find the frequency of oscillation for astable multivibrator using Timer IC 555.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BET-C652
MICROWAVE LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. Study of characteristics of Klystron tube and to determine its electronic tuning range.
2. To determine the frequency & wavelength in a rectangular wave-guide working on
3. TE10 mode.
4. To determine the Standing Wave Ratio, Reflection Coefficient.
5. To measure an unknown Impedance with Smith chart.
6. To study V-I characteristics of Gunn Diode.
7. To measure the polar pattern and the gain of wave-guide horn antenna.
8. Study the function of multi hole directional coupler by measuring the following parameters:
   (a) Main-line and Auxiliary-line VSWR.
   (b) Coupling factor and Directivity.
9. Study of Magic Tee.
10. Setting up a Fiber Optic Analog Link.
11. Setting up a Fibre Optic Digital Link.
12. Measurement of Numerical Aperture.
13. Study of Electromagnetic/Radio Frequency Interference.
14. Simulation using HFSS / CST.
15. Introduction to biological interaction with RF or microwave signals using FEKO.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BET-C653
INSTRUMENTATION AND PROCESS LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

1. To draw characteristics of Strain Gauge.(Strain vs Resistance)
2. To study the measurement of Angular Displacement trainer.
3. To study of speed measurement using Electromagnetic pick up
4. To study of speed measurement using Photo Electric pick up.
5. To draw a curve of displacement vs. voltage by L.V.D.T.
6. To study performance characteristics of Load Cell.
7. To measure pressure using Strain Gauge.
8. To measure temperature by using R.T.D demonstration set up.
9. To study the Thermistor Demonstration Trainer.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2017-18

BCE-C655
JAVA PROGRAMMING LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

Write Following Programs In Java Using RAD (Rational Application Developer)

1. Write a program in Java for illustrating overloading, over riding and various forms of inheritance.
2. Write programs to create packages and multiple threads in Java.
3. Write programs in Java for event handling Mouse and Keyboard events.
4. Using Layout Manger create different applications.
5. Write programs in Java to create and manipulate Text Area, Canvas, Scroll
6. Bars, Frames, and Menus using swing/AWT.
7. Using Java create Applets.
8. Using Java language for Client Server Interaction with stream socket connections.
9. Write a program in Java to read data from disk file.
10. Write a program to show use of swing controls.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2018-19

BHU-S701

INDUSTRIAL ECONOMICS AND BUSINESS ADMINISTRATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper

UNIT I

Industrial Economics: Elasticity of demand and supply, Demand forecasting methods, Consumption laws, Types of competition, Break even analysis, National income accounting, Trends in Industrialization in India, Economies of scale, Production Planning and control.

UNIT II

Money, Banking and Financial Management: Nature and functions of money, Functions of commercial and central banks, Credit creation in the banks, Balance of payment and trade, Foreign Exchange, Exchange control, Devaluation and Revaluation, Sources of Industrial Finance, Principles of accounting, Balance sheet & P & L A/C, Cash flow statement.

UNIT III

Principles of Management: Managerial functions - Planning, Organizing Leading & Controlling.

UNIT IV

Marketing Management: Concept of marketing management, P's of marketing, Product life cycle, Market segmentation.

UNIT V

Personnel Management and Industrial Psychology: Concept and importance of Personnel Management recruitment and selection, Training and development, Job evaluation, Fatigue, Accidents - causes and prevention, Nature of Industrial relations, Industrial disputes, Quality of work life.

References

1. Dewtt. K.K., Modern Economic Theory" S. Chand, & Co (r) Ltd (r) 1999.
2. Robbins (r) P. Stephen, Coutter Mary, 'Management' PHI 1998.
3. Kotler Philip, 'Marketing Management', PHI latest edition.
4. Nair N.G.,Latha Nair,Personnel Management and Industrial Relations', S.Chand &Co 1999.
5. Singh S.P. "Industrial Economics & Management" AITBS, New Delhi, 2006
6. Kooutsnnis, 'Modern Economic Theory', PHI, 1996.
7. Maheswari S.N., 'An Introduction to Accountancy' Vikas Publishing House 1999.
8. Koontz Harold, O Donnel Cyril, Weihirch Heniz, 'Management', TMH-1983.
9. Monoppan Arun, Sayadain S (r) Mirza, 'Personnel Management', TMH 1997 Edn.

Effective from the session 2018-19
BET-C701
DIGITAL SIGNAL PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Discrete Fourier Transform: Frequency Domain Sampling: The Discrete Fourier Transform Frequency-Domain Sampling and Reconstruction of Discrete-Time Signals. The Discrete Fourier Transform (DFT). The DFT as a linear Transformation.Relationship of the DFT to Other Transforms. Properties of the DFT. Periodicity, Linearity, and Symmetry Properties. Multiplication of two DFTs and Circular Convolution. Additional DFT Properties. Frequency analysis of signals using the DFT.

UNIT II

Efficient Computation of DFT: Efficient Computation of the DFT: FFT Algorithms, Direct Computation of the DFT. Radix-2 FFT algorithms. Efficient computation of the DFT of two real sequences, computations, efficient computation of the DFT of a 2NPointreal sequences, Gortezel Algorithm, Chirp Z-transform algorithm.

UNIT III

Basic IIR Filter Structures: Direct forms (I & II), cascade and parallel realizations. Signal flow graph, Transposed structure, Basic FIR filter structures-. Direct form structure, frequency sampling structure, Lattice structure, Linear phase FIR structure. FIR structures.

UNIT IV

Symmetric and Anti-symmetric FIR Filters, Design of Linear-Phase FIR Filters Using Windows, Design of Linear-Phase FIR Filters by the Frequency Sampling Method, Design of FIR, Equi-ripple filter design Differentiators. Design of Hilbert Transformers.

UNIT V

Design of IIR Filters from Analog Filters: IIR Filter Design by Approximation of Derivatives, IIR Filter Design by Impulse Invariance. IIR Filter Design by the Bilinear Transformation. The Matched-z Transformation, Characteristics of Commonly Used Analog Filters. Application of above technique to the design of Butterworth & Chebyshev filters. Introduction to wavelets.

Text Book

Proakis, J.G & Manolakis, D.G., "Digital Signal Processing: Principles Algorithms and Applications", Prentice Hall (India).

Reference Books

1. Sanjit K. Mitra, "Digital Signal Processing", Third Edition, TMH, 2005.
2. Oppenheim A.V. & Schafer, Ronald W., "Digital Signal Processing", Pearson Education.

Effective from the session 2018-19
BET-C702
VLSI DESIGN

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to integrated circuit technology. CMOS fabrication, the p-well process, n-well process, twin tub process. Bi-CMOS technology. Basic electrical properties of Enhancement MOS devices, Ids-Vds relationship in linear & saturation for GCA & channel length modulation, MOS transistor threshold voltage Vth, body effect. Scaling of MOS; Constant voltage & electric field scaling, limitations of scaling, capacitive model of MOS(parasitic capacitances) ,Trans conductance and output conductance, MOS transistor figure of merit.

UNIT II

Electrical performance parameters for n-MOS resitive & active inverters, pull-up to pull-down ratio, CMOS inverter and its characteristics, latch –up in CMOS circuits. n-MOS, CMOS gates(NAND, NOR, AND, OR). Combinational & sequential logic circuit design, Dynamic logic families and performances. MOS SPICE model, device characterization, Circuit characterization. MOS device layout: Transistor layout, Inverter layout, CMOS digital circuits layout & simulation.

UNIT III

Design considerations, problems associated with VLSI Design, Automated Layout Generation tools, stick diagrams for n-MOS design style, CMOS design style. Lambda & micron based design rules for MOS layout Physical design; Partitioning, Placement, Floor planning, Routing, Parasitic Extraction.

UNIT IV

Design Methodology & styles, Design Flows, Y- chart Standard Cell Based Design, Full Custom Design, Semi Custom Design, Programmable Logic structures, Field Programmable Gate arrays (FPGA), Configurable Logic Block (CLB), Application- Specific Integrated Circuits (ASICs).

UNIT V

Design for Testability; Faults types and Models, Controllability and Observability, Adhoc Design techniques, Scan-Based Techniques, Built-In self Test (BIST) Techniques, Current Monitoring IDDQ Test. Packaging, Heat dissipation.

Text Books

1. CMOS VLSI Design, A Circuits and Systems Perspective by Neil H.E. Weste, David Harris, Ayan Banerjee, Pearson Education.
2. CMOS Digital Integrated Circuits Analysis and Design by Sung-Mo Kang, Yusuf Leblebici. Tata Mc-Graw- Hill.
3. Basic VLSI Design by Douglas A. Pucknell & Kamran Eshraghian, Prentice-Hall of India.

Reference Books

1. Digital Integrated Circuits A Design Perspective by Jab M. Rabaey, Anantha Chandra kasan, Borivoje Nikolic, Prentice-Hall of India Pvt. Limited.
2. Principles of C-MOS VLSI Design A systems Perspective by Neil H.E. Weste, Kamrau Eshraghian, Pearson Education Application-Specific Integrated Circuits by Michal John Sebastian smith, Pearson Education.

Effective from the session 2018-19
BET-C703
OPTICAL FIBER COMMUNICATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Block diagram of optical fiber communication system, Advantages of optical fiber Communication.Optical fiber waveguides: structure of optical wave guide, light propagation in optical fiber using ray theory, acceptance angle, numerical aperture, skew rays, wave theory for optical propagation, modes in a planar and cylindrical guide, mode volume, single mode fibers, cutoff wavelength, mode field diameter, effective refractive index and group and mode delay factor for single mode fiber.

UNIT II

Transmission Characteristics of Optical fiber, Attenuation in optical fibers, intrinsic and extrinsic absorption, linear and non linear scattering losses, fiber bend losses. Dispersion and pulse broadening, intramodal and intermodal dispersion for step and graded index fibers, modal noise, over all fiber dispersion for multimode and monomode fiber, dispersion shifted fibers, modal birefringence and polarization maintaining fibers

UNIT III

Optical Sources: Basic concepts Einstein relations and population inversion optical feedback and threshold conditions, direct and indirect band gap semiconductors spontaneous and stimulated emission in p-n junction, threshold current density, Hetero junction & DH structure, semiconductor injection lasers structure & Characteristics of injection laser. Drawback and advantages of LED, DH, LED, LED structures and Characteristics

UNIT IV

Optical Detectors: Requirement for photo detections p-n photodiode, characteristics of photo detections, p-i-n and avalanche photodiodes, phototransistors & photoconductors. Direct detection receiver performance considerations: Noise sources in optical fiber communication, noise in p-n, p-i-n and APD receivers, Receiver structures.

UNIT V

Optical Fiber Communication Systems: Principal components of an optical fiber communication system, source laminations, optical transmitter circuits, LED and laser drive circuits, optical receiver block diagram, simple circuits for pre-amplifier, automatic gain control and equalization, Regenerative repeater, BER of optical receiver, channel losses, ISI penalty and optical power budgeting for digital optical fiber system, line coding, analog systems, Direct intercity and sub carrier intensity modulation using AM, FM and PM. Block diagram and detection principle of coherent optical fiber system. Broad applications of fiber optics.

Text Book

Optical fiber Communication: John M.S Senior PHI, 2nd Ed. Reference Books.

Reference Books

1. Optical Communication: J. Gowar PHI, 2nd Ed.
2. Optical fiber Communication: G.E. Keiser Mc Graw-Hill, 3rd Ed.
3. Optoelectronics: Wilson & Hawkes PHI, 2nd Ed.

Effective from the session 2018-19
BET-C704
SATELLITE COMMUNICATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Elements of Satellite Communication, Orbital mechanics, look angle and orbit determination, launches & launch vehicle, orbital effects, Geostationary Orbit.

UNIT II

Satellite subsystems, attitude and orbit control systems, TTC&M, communication subsystem, satellite antenna ,satellite link design: basic transmission theory, system noise temperature and G/T ratio, downlink design, uplink design, satellite systems using small earth station, design for specified C/N.

UNIT III

Modulation and multiplexing techniques for satellite links: FM, pre-emphasis and de-emphasis, S/N ratios for FM video transmission, digital transmission, digital modulation and demodulation, TDM. Multiple access: FDMA, TDMA, DAMA and CDMA.

UNIT IV

Error control for digital satellite links: error detection and correction, channel capacity, error control coding, convolutional codes, linear and cyclic block codes. Propagation effects and their impact on satellite-earth links: attenuation and depolarization, atmospheric absorption, rain, cloud and ice effects etc.

UNIT V

Introduction of various satellite systems: VSAT, low earth orbit and non-geostationary, direct broadcast satellite television and radio, satellite navigation and the global positioning systems. Pseudo-satellite, brief about satellite pay loads.

Text / Reference Books

1. Satellite Communications / Pratt, Bostian, Allnutt / John Wiley & Sons.
2. Satellite Communications / Dennis Roddy / McGraw-Hill
3. Digital Satellite Communications/ Tri T. Ha./ McGraw-Hill.

Effective from the session 2018-19
BCE-C710
COMPUTER NETWORK

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT-I

Introduction : Computer Network & its uses, OSI reference model, TCP/IP Reference Model, ARPANET, Protocols, Routers, Switches, Hubs, Bridges and Repeaters, Introduction to LAN/MAN/WAN.

The Physical Layer: Transmission media: Twisted pair, Baseband and Broadband coaxial cable, Fiber optics; Wireless Transmission: Radio transmission, Microwave transmission, Infrared and light wave transmission; ISDN: services and architecture, ALOHA

UNIT-II

The Data Link Layer: Design Issues: Services provided to other Layer, framing, Error control, Flow control; Error detection and Correction; Simplex, Sliding window protocol, Using Go-Back n, Stop & Wait Protocol ARQ.

The Medium Access Sub layer: Static and Dynamic Channel Allocation in LANs and MANs; IEEE standard 802.3, 802.4, 802.5; CSMA, Finite state machine model.

UNIT-III

The Network Layer: Network layer design issues, Shortest path routing, Flooding, flow- based routing, Broadcast routing, Congestion control and prevention policies; Traffic Shaping, Internetworking : connectionless Interworking, IP addressing, IPv4, Fragmentation, introduction to IPV-6.

UNIT-IV

The Transport Layer: QOS, The transport service; Transport protocols: Addressing, Establishing and releasing a connection; TCP/UDP header**,** Examples of transport layer**.**

Session Layer-RPC, Synchronization, dialog management.

UNIT-V

The Application Layer: Network Security, FTP, SNMP, Telnet, E- mail, Multimedia, WWW, DNS, SMTP.

Presentation layer: ASN, data compression, encryption.

References

1. Andrew S. Tanenbaum (3/e), Computer Networks, PHI
2. Frouzan , Data Communications & Networking(3/e, 4/e)
3. W.Stallings (5/e), Data and Computer Communications, PHI
4. Douglas E.Comer (3/e), Interworking with TCP/IP,Principles, Protocols & Architecture
5. D. Minoli, Internet & Intranet Engineering, TMH

Effective from the session 2018-19
BET-C751
DIGITAL SIGNAL PROCESSING LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

LIST OF EXPERIMENT:

To study the sampling & waveform Generation.
2. To study the Quantization.
3. To study the PCM Encoding.
4. To study the delta modulation.
5. To study the digital modulation schemes (ASK, PSK, FSK).
6. To study the DFT Computation.
7. To study the Fast Fourier Transform.
8. To study the FIR filter implementation.
9. To study the IIR filter implementation.

NOTE
1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.
6. The programming to be done in mixed programming platform i.e. using Sci-Lab and Matlab.

Effective from the session 2018-19
BCE-C752
COMPUTER NETWORK LAB

MM : 100 **Sessional : 30**
Time : 2Hr **ESE : 70**
L T P **Credit : 2**
0 0 2

Perform Following Programs in C/C++

1. Implementation of the Data Link Layer framing method such as character stuffing and bit stuffing in C.
2. Implementation of CRC algorithm in C.
3. Implementation of a Hamming (7,4) code to limit the noise. We have to code the 4 bit data in to 7 bit data by adding 3 parity bits. Implementation will be in C.
4. Implementation of LZW compression algorithm in C.
5. Write a socket program in C to implement a listener and a talker.
6. Simulation of a network of 3 nodes and measure the performance on the same network.
7. Write a program in C to encrypt 64-bit text using DES algorithm.
8. Simulation of various layers using simulation kit.

NOTE

1. In practical examination the student shall be required to perform one experiment.
2. A teacher shall be assigned 20 students for daily practical work in laboratory.
3. No batch for practical class shall consist of more than 20 students.
4. The number of students in a batch allotted to an examiner for practical examination shall not exceed 20 students.
5. Addition/deletion in above list may be made in accordance with the facilities available with the approval of H.O.D./Dean.

Effective from the session 2018-19
BET-C771
MINOR PROJECT

MM : 100 **ESE: 70**
Credit : 4 **Sessional : 30**

Each student shall be assigned a Minor Project by departmental committee. The student shall be required to perform his project work under the supervision of the supervisor(s). There shall be a seminar on the project work of the student to be evaluated by a departmental committee chaired by H.O.D. The student shall be required to submit his project report in the form of dissertation 15 days before the end of VII semester. The student shall be required to submit three copies of the project work with certificate from the supervisor(s) that the work is authentic record of the work performed by him. The report shall be forwarded by H.O.D. The report of the project work shall be evaluated by the external examiner(s). The same external examiner(s) shall hold the viva-voce examination.

THE DISTRIBUTION OF MARKS FOR THE MINOR PROJECT SHALL BE AS FOLLOWS:

MINOR PROJECT	
Project**	50
Viva-voce/Presentation**	20
Seminar (Internal)***	30
Total	100

** - Marks for the project work shall be awarded jointly by the external and internal examiners after viva-voce examination.

*** - There shall be a seminar on the project work of the student to be evaluated by the departmental committee chaired by H.O.D.

Effective from the session 2018-19
BET-C861
MAJOR PROJECT

MM : 400 **ESE : 300**
Credit : 8 **Sessional : 100**

Each student shall be assigned a Major Project by departmental committee. The student shall be required to perform his project work under the supervision of the supervisor(s). There shall be a seminar on the project work of the student to be evaluated by a departmental committee chaired by H.O.D. The student shall be required to submit his project report in the form of dissertation 15 days before the end of VIII semester. The student shall be required to submit three copies of the project work with certificate from the supervisor(s) that the work is authentic record of the work performed by him. The report shall be forwarded by H.O.D. The report of the project work shall be evaluated by the external examiner(s). The same external examiner(s) shall hold the viva-voce examination.

THE DISTRIBUTION OF MARKS FOR THE MAJOR PROJECT SHALL BE AS FOLLOWS:

MAJOR PROJECT	
Project**	200
Viva-voce/Presentation**	100
Seminar (Internal)***	100
Total	400

** - Marks for the project work shall be awarded jointly by the external and internal examiners after viva-voce examination.

*** - There shall be a seminar on the project work of the student to be evaluated by the departmental committee chaired by H.O.D.

Effective from the session 2018-19

Gurukula Kangri Vishwavidyalaya, Haridwar

Faculty of Engineering & Technology

Electronics & Communication Engineering

B. Tech. Fourth Year

SEMESTER-VIII

List of Electives

S. No	CODE	SUBJECT
1	BET-E 801	Wireless and Mobile Communication
2	BET-E 802	Fundamental of Radar and Navigation
3	BET-E803	Principles of Secure Communication
4	BET-E804	Adaptive Signal Processing
5	BET-E805	Filter Design
6	BET-E806	Digital Image Processing
7	BET-E807	Digital System Design
8	BET-E808	Random Signal Theory
9	BET-E809	Biomedical Signal Processing
10	BET-E810	Speech Processing
11	BET-E811	Soft Computing and Expert Systems
12	BET-E812	Telecommunication Switching Network and Protocols

NOTE: Electives will be offered depending upon the availability of teaching staff and minimum thirty students should opt for a particular elective.

Effective from the session 2018-19

BET-E801

WIRELESS AND MOBILE COMMUNICATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Wireless Communication Systems: Evolution of Mobile Radio Communication, examples of wireless communication: Paging System, Cordless telephone system, Cellular telephone system, Second generation cellular networks: 2G and 2.5G, Third generation cellular networks: 3G Cellular concept : Frequency reuse, Channel assignment strategies and Handoff strategies.

UNIT II

Interference and System Capacity: Co-channel interference and system capacity, Channel planning for wireless systems, adjacent channel interference, Power control for reducing interference. Improving Coverage and capacity in cellular systems using cell splitting and sectoring.

Path loss in mobile radio propagation: Reflection, Ground reflection (Two ray model), Diffraction, Scattering, Practical Link Budget analysis. Outdoor Propagation models: Okumura model and Hatta model.

UNIT III

Multi Path Fading in Mobile Radio Propagation: Factors influencing Small scale fading, Doppler Shift. Impulse response model of Multi path Channel, Fading effect due to multi path time delay spread, Fading effect due to Doppler spread.

Diversity techniques: Time diversity, frequency diversity and polarization diversity.

RAKE Receiver.

UNIT IV

Multiple Access Techniques: FDMA, TDMA, CDMA, Spread spectrum Techniques: DS SS and FHSS, Processing gain, PN sequence generation and its properties.

Packet radio protocols : Pure ALOHA, Slotted ALOHA and CSMA, OFDM system

Switching Techniques: Circuit switching, Message Switching and Packet Switching.

UNIT V

Global System for Mobile (GSM): GSM Services and Features, GSM System Architecture, GSM Radio Subsystems, GSM Channel types: Traffic channels, Control Channels, Frame structure in GSM, Signal Processing in GSM. Atleast 10% time to be devoted to discuss latest trends by referring to IEEE and IET (UK) transcations.

Text Book

T.S. Rappaport, Wireless Communication, PHI, 2002

References

1. W.C.Y. Lee, Mobile Communication engineering, McGraw Hill, 1997.
2. K.O. Feher, Wireless Digital Communication, Prentice Hall, 1995.
3. Raj Pandya, Mobile and Personal Communication Services and Systems, PHI, 2001
4. A. K. Sharma & V. Sharma, "OFDM communication system", Lambert academic publishing, Germeny.

Effective from the session 2018-19
BET-E802
FUNDAMENTAL OF RADAR AND NAVIGATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Radar Signal Models: Amplitude models, distributed target forms of range equation, radar cross section, statistical description of radar cross section, Clutter, signal to clutter ratio, temporal and spatial correlation of clutter, noise model and signal to noise ratio, frequency models, Doppler shift, simplifies approach to Doppler shift, stop and hop assumption, variation with angle, variation with range, projections, multipath.

UNIT II

Radar Wave Forms: Waveform matched filter of moving targets, ambiguity function, ambiguity function of the simple matched pulse filter for the pulse burst, pulse by pulse processing, range ambiguity, Doppler response and ambiguity function of the pulse burst.

UNIT III

Detection Fundamentals: Radar detection as hypothesis testing, Neyman-Pearson detection rule, likelihood ratio test, threshold detection of radar signals, non-coherent integration of nonfluctuating targets, Albersheim and Shnidaman equations, Binary integration.

UNIT IV

Radio Direction Finding: loop direction finder, goniometer, errors in direction finding, adcock and automatic direction finders, commutated aerial direction finder.

Radio Ranges: LF/MF four course radio range, VOR, ground equipment & receiver, VOR errors.

Hyberbolic System of Navigation: LORAN Decca & Omega system. DME & TECAN

UNIT V

Aids to Approach and Landing: ILS, GCA & MLS

Doppler Navigation: Beam configuration, doppler frequency equation, track stabilisation and doppler spectrum, components of doppler navigation system, doppler radar equipment, CW & FMCW Doppler radar, frequency trackers, doppler range equation.

Text Book:

Fundamentals of radar signal processing Mark A Richards, TMH.

Reference Books:

1. Elements of Electronics Navigation, N. S. Nagraja, TMH.
2. Radar principles, Peebles Jr. P. Z., Wiley, NY.
3. S Kolnik, M.L-Introdution to Radar Systems-McGraw Hill.1980.

Effective from the session 2018-19
BET-E803
PRINCIPLES OF SECURE COMMUNICATION

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Direct Sequence Spread Spectrum Systems: Model of SS digital communication system, direct sequence spread spectrum signal, error rate performance of the decoder, processing gain and jamming margin, uncoded.

DSSS signals, applications of DSSS signals in anti-jamming, low detectability signal transmission, code division multiple access and multipath channels, effect of pulsed interference on DSSS systems, Generation of PN sequences using m sequence and Gold sequences, excision of narrowband interference in DSSS systems, acquisition and tracking of DSSS system.

UNIT II

Frequency Hopped Spread Spectrum Systems: Basic concepts, slow and fast frequency hopping, performance of FHSS in AW GN and partial band interference, FHSS in CDMA system, Time hopping and hybrid SS system, acquisition and tracking of FH SS systems.

UNIT III

Cryptographic Techniques: Classical encryption technique, Symmetric cipher model, cryptography and cryptanalysts, Substitution techniques, transposition techniques

UNIT IV

Block Cipher and Data Encryption Standard: Block cipher principle, data encryption standard (DES) strength of DES, differential and linear cryptanalysts, block cipher design principles, simplified advanced encryption standard (S-AES), multiple encryption and triple DES, Block cipher modes of operation, stream ciphers and RC4 algorithm.

UNIT V

Public Key Cryptography: Prime numbers, Fermat and Euler's theorem, Chinese remainder theorem, discrete algorithms, principles of public key cryptosystems, RSA algorithm, key management Diffie-Hellman keyexchange, message authentication requirements and functions.

Text / Reference Books

1. Digital Communication by J.G. Proakis McGraw Hill 2nd Ed.
2. Cryptography and Network Security by W. Stallivgs 4th Ed., PHI
3. Digital Communication by Simon Haykin, Wiley.
4. Principle of Communication systems by Taub & Schilling TMH.
5. Cryptography and secure Communications by M.Y. Rhee, Mc Graw Hill

Effective from the session 2018-19
BET-E804
ADAPTIVE SIGNAL PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Definition and characteristics, general properties open and closed loop adaptation. Adaptive Linear Combiner: General description, input signal and Weight vectors, desired response and error performance function, gradient and minimum mean square, alternative definition of gradient, decorelection of error and input components.

UNIT II

Theory of Adaptation with Stationary Signals: Input correlation matrix, Eigenvalues and eigenvectors of the correlation matrix, and their geometrical significance. Basic ideas of gradient search methods, gradient search by newton's method and method of steepest descent, gradient component estimation by derivative measurement, effects of gradient noise, on weight vector solution, excess MSE, time constant and misadjustment, performance comparison of Newton and S.D. methods.

UNIT III

Adaptive Algorithms: Least mean square algorithm, convergence, learning curve noise in Weight vector misadjustment and performances of LMS algorithms, sequential regression algorithm, adaptive recursive LMS algorithm, random search algorithm.

UNIT IV

Recursive Least Square Algorithm: Preliminaries, matrix inversion lemma, exponentially weighted RLS algorithm, update recursion for the sum of weighted error squares, convergence analysis of RLS algorithm.

UNIT V

Adaptive Filter Structures: Lattice structures, all poles and all zeroes versions, adaptive lattice predictor. Lattice LMS algorithms, and lattice SER algorithms, adaptive filters with orthogonal signals, DFT and lattice preprocessors.
Adaptive Filter Applications: (i) Adaptive modeling and systems identification. (ii) Inverse adaptive modeling, equalization and deconvolution

Text Books

1. Adaptive Signal Processing, Widrow and Stearns, Pearson Education
2. Adaptive Filter Theory, Simon Haykin, Pearson Education

Reference Books

1. Adaptive Filters, Cowan & Grant, Prentice Hall
2. Theory and design of adaptive filters, John R. Treichler, PHI.

Effective from the session 2018-19
BET-E805
FILTER DESIGN

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Review of op-amps circuits, Categorization of filters-Low-pass filter, High-pass filter, band-pass filter, band-reject filter, Gain equalizers, and Delay equalizers.

UNIT II

Approximation Theory: Butterworth approximation, Chebyshev approximation, Inverse Chebyshev approximation, Basic of sensitivity, Frequency Transformations.

UNIT III

Three Amplifier Biquad: Basic low pass and band pass circuit, realization of the general Biquadratic Functions, summing of four Amplifier biquad, feed forward three amplifier biquad, Passive Ladder structures, Inductor Substitution using Gyrator, Transformation of elements using the FDNR.

UNIT IV

Elementary transconductor building blocks, resistors, integrators, amplifiers, summers, gyrator, First and second order filters, higher order filters.

UNIT V

Switched capacitor filters: The MOS switch, The switched capacitor, first order building blocks, second order sections, sampled data operation, Switched capacitor first and second order filters, Bilinear transformation.

Text Book

1. R.Schaumann, M.E.Van Valkenburg, “Design of analog filters”, Oxford University Press.

Reference Book

1. Gobind Daryanani, “Principles of active network synthesis and design”,John Wiley and Sons

Effective from the session 2018-19
BET-E806
DIGITAL IMAGE PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Fundamental steps in DIP, elements of DIP, Simple image model, Sampling & uantization, basic relationships between Pixels, Color image model.

UNIT II

Image Transforms: One-dimensional & Two-dimensional DFT, Cosine, Sine, Hadamard, Haar, and Slant & KL transforms. Image Enhancement: Introduction, Point operations, Histogram modeling, spatial operations, Transform operations.

UNIT III

Image Restoration: Introduction, Image observation models, Inverse & Wiener filtering, difference between enhancement & restoration Restoration-spatial filtering, Noise reduction in frequency domain.

UNIT IV

Image Compression: Introduction, Pixel coding, Predictive coding, Transform coding, Interframe coding.

UNIT V

Image Segmentation: Introduction, Spatial feature extraction, Transforms features, Edge detection, Boundary extraction, Segmentation techniques.

Text Books

1. Digital Image Processing, Rafael C. Conzalez Richard E Woods, 2nd Ed.
2. Fundamentals of Digital Image Processing, Anil K Jain.

Effective from the session 2018-19
BET-E807
DIGITAL SYSTEM DESIGN

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to VHDL: VHDL description, combinational networks, modeling flip flop using VHDL, VHDL model for multiplexer, comliance and simulation of VHDL, codes, modeling a sequential machine, variables, signals and constants, arrays VHDL operators, VHDL functions, VHDL procedures, packages and libraries, VHDL model for a counter.

UNIT II

Advanced VHDL: Attributes, transport and inertial delays, operator over loading, multi valued logic and signal resolution, IEEE-1164, standard logic, generic, generates statements, synthesis of VHDL codes, synthesis examples, file handling and TEXTIO.

UNIT III

Design of Networks for Arithmatic Operations: Design of serial adder with accumulator, state graph for control networks design of binary multiplier, multiplication of signed binary numbers, design of binary divider. DIGITAL DESIGN WITH SM CHART: state machine charts, derivation of SM charts, realisation of SM charts, implementation of dice game, alternative realisation of SM charts using microprogramming, linked state machine.

UNIT IV

Floating Point Arithmetic: Representation of floating point numbers, floating point multiplication, other floating point operations. DESIGNING WITH PROGRAMMABLE GATE ARRAYS AND COMPLEX PROGRAMMABLE LOGIC DEVICES: Xinx 3000 series FPGAs, Xinx 4000 series FPGAs, using one hot state assignment.

UNIT V

Memory Models for Memories and Buses: Static RAM, a simplified 486 bus model, interfacing memory to microprocessor bus. DESIGN EXAMPLES: UART design, description of MC68HC05 microcontroller, design of microcontroller CPU, complete microcontroller design.

Text Book

1. Charles H Roth Jr, “Digital System Design using VHDL”, Thomson Learning, 2002.

Reference Books

1.Stephen Brown & Zvonko Vranesic,“Fundamentals of digital logic design with VHDL”, TMH, 2nd Ed.,2007.
2. Jhon F Wakerly, “Digital design”, PHI, 4th Ed.

Effective from the session 2018-19
BET-E808
RANDOM SIGNAL THEORY

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Theory of Probability Axioms of Probability: set theory, probability space, conditional probability Repeated Trials: Combined experiments, Bernoulli trials, Bernoulli's Theorem.

UNIT II

Concept of Random Variable: Introduction, distribution and density functions, specific random variables, conditional distributions. Functions of one random variable: function and distribution of random variable, mean and variance, moments, characteristic functions.

UNIT III

Two Random Variables: Bivariate distributions, one function of two random variables, two functions of two random variables, joint moments, joint characteristic functions, conditional distributions Multiple random variables, sequences of random variables

UNIT IV

Concept of Stochastic Processes: Definition, systems with stochastic inputs, power spectrum, discrete-time processes. Random walks and other applications: random walks, Poisson poins and shot noise, cyclostationary processes, bandlimited processes and sampling theory, deterministic signals in noise. Spectral representation and estmation: factorization and innovations, finite-order systems and state variables, spectral representation of random processes, ergodicity, spectrum estimation

UNIT V

Mean Square Estimation: prediction, filtering and prediction, Kalman filters. Entropy: Basic concepts, random variables and stochastic processes, MEM. Markov chain: introduction, higher transition probabilities and the Chapman-Kolmogorov equation, classification of states, stationary distributions and limiting probabilities, transient states and absorption probabilities, branching processes. Markov processes and Queueing theory: introduction, Markov processes, queueing theory.

Text Book

1. Probability, Random Variables & Random Signal Principles/Peyton Z. Peebles, Jr./TMH

Reference Book

1. Probability, Random Variables and Stochastic Processes/A. Papoulis & S. U. Pillai/4th ed./TMH

Effective from the session 2018-19
BET-E809
BIOMEDICAL SIGNAL PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction to Bio-Medical Signals: Classification, Acquisition and Difficulties during Acquisition. Basics of Electrocardiography, Electroencephalography, Electromyography & electro-retinography Role of Computers in the Analysis, Processing, Monitoring & Control and image reconstruction in bio-medical field.

UNIT II

ECG: Measurement of Amplitude and Time Intervals, QRS Detection(Different Methods), ST Segment Analysis, Removal of Baseline Wander And Power line Interferences, Arrhythmia Analysis, Portable Arrhythmia Monitors.

UNIT III

Data Reduction: Turning Point algorithm, AZTEC Algorithm, Fan Algorithm, Huffman and Modified Huffman Coding, Run Length Coding.

UNIT IV

EEG: Neurological Signal Processing, EEG characteristic, linear prediction theory, Sleep EEG, Dynamics of Sleep/Wake transition. Study of pattern of brain waves, Epilepsy-Transition, detection and Estimation. EEG Analysis By Spectral Estimation: The Bt Method, Periodogram, -Maximum Entropy Method & AR Method, Moving Average Method. The ARMA Methods, Maximum Likelihood Method.

UNIT V

EP Estimation: by Signal Averaging, Adaptive Filtering:- General Structures of Adaptive filters, LMS Adaptive Filter, Adaptive Noise Canceling, Wavelet Detection:- Introduction, Detection By Structural features, Matched Filtering, Adaptive Wavelet Detection, Detection of Overlapping Wavelets.

Text Books

1. Biomedical Digital Signal Processing, Willis J Tomkin, Phi.
2. Biomedical Signal Processing, D.C Reddy McGrawhill
3. Biomedical Instrumentation and Measurement.,Crommwell,Weibel and Pfeifer, PHI

Reference Books:

1. Biomedical Signal Processing, Arnon Cohen, volume I & Licrc Press
2. Biomedical Signal Analysis A Case Study Approach, Rangaraj M. Rangayyan, John Wiley and Sons Inc.
3. Medical instrumentation Application and Design, john G. Webster, john Wiley & Sons Inc.

Effective from the session 2018-19
BET-E810
SPEECH PROCESSING

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Digital Models for Speech Signals: Mechanism of speech production & acoustic phoenetics, the acoustic theory of speech production, lossless tube models, and digital models for speech signals.

UNIT II

Time Domain Methods of Speech Sampling: Time dependent processing of speech, short time energy and average magnitude, short time average zero crossing rate, discrimination between speech& silence, pitch period estimation using parallel processing, short time autocorrelation function & AMDF, pitch period estimation using autocorrelation function.

UNIT III

Short Time Fourier Analysis: Definition and properties, design of filter banks, implementation of filter bank summation method using FFT, spectrographic displays, pitch detection, analysis by synthesis phase, vocoder and channel vocoder .

UNIT IV

Homomorphic Speech Processing: Homomorphic system for convolution, complex cepstrum of speech, pitch detection using Homomorphic processing, formant estimation, Homomorphic vocoder.

UNIT V

Linear Predictive Coding of Speech: Basic principles of linear predictive analysis, the autocorrelation method, computation of the gain for the model, solution of LPC equations for auto correlation method, prediction error and normalized mean square error, frequency domain interpretation of mean squared prediction error relation of linear predictive analysis to lossless tube models, relation between various speech parameters, synthesis of speech from linear predictive parameters, application of LPC parameters.

Text Book

1. Digital Processing of speech signals by R.L. Rabiner & R.W. Schafer, Pearson Education.

Reference Books

1. Voice processing by G.E. Pelton, McGraw –Hill.
2. Speech Analysis, synthesis and perception by J.L. Flanagan, Springer- Verlog. N. Y.
3. Diserete time speech signal Processing: Principles and Practices by Jhomas Quatieri, Pearson Education.

Effective from the session 2018-19
BET-E811
SOFT COMPUTING AND EXPERT SYSTEMS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Introduction and history, human brain, biological neuron, models of neuron, signal flow graph of neuron, feedback, network architecture, knowledge representation, Artificial intelligence and neural networks.

Learning Process: Error correction learning, memory based learning, Hebbian learning, competitive learning, Boltzmann learning, learning with and without teacher, learning tasks, memory, adaptation.

UNIT II

Artificial Neurons, Neural Networks and Architectures: Introduction, neuron signal function, mathematical preliminaries, Feedforward & feedback architecture.

Geometry of Binary Threshold Neurons and Their Networks: Pattern recognition, convex sets and convex hulls, space of Boolean functions, binary neurons for pattern classification, non linear separable problems, capacity of TLN, XOR solution.

UNIT III

Perceptrons and LMS: Learning objective of TLN, pattern space & weight space, perceptron learning algorithm, perceptron convergence theorem, pocket algorithm, *á* – LMS learning, MSE error surface, steepest descent search, *ì* – LMS and application.

Backpropogation and Other Learning Algorithms: Multilayered architecture, backpropagation learning algorithm, practical considerations, structure growing algorithms, applications of FFNN, reinforcement learning.

UNIT IV

Statistical Pattern Recognition: Bayes' theorem, classical decisions with bayes' theorem, probabilistic interpretation of neuron function, interpreting neuron signals as probabilities, multilayered networks & posterior probabilities, error functions for classification problems.

RBF Networks: Regularization networks, generalized RBF networks, RBF network for solving XOR problem, comparison of RBF networks & multilayer perceptrons.

Stochastic Machines: Statistical mechanics, simulated annealing, Boltzmann machine.

UNIT V

Adaptive Resonance Theory: Building blocks of adaptive resonance, ART 1.

Self Organizing Feature MAP: Introduction, Maximal eigenvector filtering, principal component analysis, generalized learning laws, competitive learning, vector quantization, maxican hat networks, SOFM, applications of SOFM. Fuzzy sets, Fuzzy systems and applications, neural networks and fuzzy logic.

Text Books

1. Simon Haykin, "Neural Networks,", Pearson Education 2nd edition.
2. Satish Kumar, "Neural Networks," Tata McGraw-Hill.

Reference Books

1. Jack M. Zurada, " Introduction to Artificial Neural System," Jaico Publishing House.
2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications," McGraw-Hill Inc.

Effective from the session 2018-19

BET-E812

TELECOMMUNICATION SWITCHING NETWORK AND PROTOCOLS

MM : 100 **Sessional : 30**
Time : 3 Hr **ESE : 70**
L T P **Credit : 4**
3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain ten objective type questions of one marks each and student shall be required to attempt all questions Sec.-B shall contain ten short answer type question of four marks each and student shall be required to attempt any five question. Sec.-C shall contain eight descriptive type questions of ten marks each and students shall be required to attempt any four questions. Question shall be uniformly distributed from the entire syllabus. The previous year paper /model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Introduction: Message switching, circuits switching, functions of a switching system, register-translator-senders, distribution frames, crossbar switch, a general trunking, electronic switching, Reed electronic system, digital switching systems.

UNIT II

Digital Switching: Switching functions, space division switching, multiple stage switching, nonblocking switches, blocking probabilities, Lee graphs and Jacobaeus, foulded four wire switches, path dinding, switch matrix control; Time division switching, analog and digital time division switching, a digital memory switch, time stage in general, two dimensional switching, implementation complexity of TD switches, multiple stage time and space switching, STS switching , TST switching, TSSST switches, No.4 ESS Toll switch, System 75 digital PBX, Digital cross connect systems, Consolidation and segregation, DCS hierarchy, integrated cross connect equipment, digital switching in analog environment, zero loss switching.

UNIT III

Telecom Traffic Engineering: Network traffic load and parameters, grade of service and blocking probability, modeling switching systems, Markov processes, birth-death processes, incoming traffic and service time characteristics, Poisson arrival process, holding time of calls, blocking models and loss estimates, lost calls cleared systems with infinite and finite subscribers, lost calls returned systems and lost calls held system, Delay systems and Erlang C formula.

UNIT IV

Control of Switching Systems: Call processing functions, sequence of operations, signal exchanges, state transition diagrams; common control, Reliability availability and security; Stored program control, processor architecture, centralized SPC, distributed SPC, Level3, Level2 and Level-1 processing, SPC software, system software and Language processor, SDL, application software.

UNIT V

Signalling : Customer line signalling, AF junctions and trunk circuits, outband and inband signalling, PCM and inter register signalling, Common channel signaling, general principles and network, CCITT signaling system No. 6 and 7, HDLC protocol, Signal units, the signaling information field. Packet Switching: Packets formats, statistical multiplexing, routing control, dynamic, virtual path circuit and fixed path routing, flow control, X.25 protocol, frame relay, TCP/IP, ATM cell, ATM service categories, ATM switching, ATM memory switch, space memory switch, memory-space, memory-space-memory switch, Banyan network switch..

Text Book

Telecommunication switching System and networks, Thiagarajan Viswanathan, PHI.

Reference Books

1. Telecommunication switching, Traffic and Networks, J.E. Flood, Pearson education.
2. Digital Telephony, J.C. Bellamy, John Wiley, 3rd ed.