

**SCHEME OF EXAMINATION  
&  
DETAILED SYLLABUS  
For  
3 Years  
(B.TECH) DEGREE  
ELECTRONICS AND COMMUNICATION ENGINEERING**

**ETERNAL UNIVERSITY  
BARU SAHIB  
DISTT. SIRMOUR (HIMACHAL PRADESH)**

**FIRST SEMESTER EXAMINATION**

Code No.	Paper	L	T/P	Credits
<b>THEORY PAPERS</b>				
BTMAT101	Applied Mathematics – I	3	1	4
BTPHT101	Applied Physics – I	3	1	4
BTCHT101	Engineering Chemistry	3	0	3
BTMET102	Engineering Graphics	2	2	4
BTCST101	Introduction to Computers and IT Tools	2	0	2
BTEET101	Basic Electrical Engineering	3	1	4
BTHUT101	Professional Communication skills in English –I	2	1	3
<b>Practical /VIVA VOCE</b>				
BTPHL101	Applied Physics Lab-I	0	2	1
BTCHL101	Engineering Chemistry Lab	0	2	1
BTEEL101	Basic Electrical Engineering Lab	0	2	1
BTCSL101	Automation Tools & Web designing Lab	0	2	1
BTMEL102	Manufacturing Practices	0	3	1
BTHUL101	# Community Service and Welfare	0	1	1
	<b>TOTAL</b>	18	18	30

#NON UNIVERSITY EXAMINATION SYSTEM

**SECOND SEMESTER EXAMINATION (GROUP-A)**

<b>Code No.</b>	<b>Paper</b>	<b>L</b>	<b>T/P</b>	<b>Credits</b>
<b>THEORY PAPERS</b>				
BTMAT102	Applied Mathematics – II	3	1	4
BTPHT102	Applied Physics – II	3	1	4
BTCHT102	Environment chemistry	2	1	3
BTCST102	Problem Solving and Programming in C	2	0	2
BTECT101	Basic Electronics	3	1	4
BTMET101	Engineering Mechanics	3	0	3
BTHUT102	Professional Communication Skills in English –II	2	1	3
<b>LAB/VIVA VOCE</b>				
BTPHL102	Applied Physics – II Lab	0	2	1
BTCHL102	Environment Chemistry Lab.	0	2	1
BTCSL102	C programming Lab	0	4	2
BTECL101	Basic Electronics Lab	0	2	1
BTMEL101	Engineering Mechanics Lab	0	2	1
BTHUL102	#Comparative Study of Religions	1	0	1
	<b>TOTAL</b>	<b>19</b>	<b>17</b>	<b>30</b>

### THIRD SEMESTER EXAMINATION

Course Code	Paper/Subject Name	L	T/P	Credits
<b>THEORY PAPERS</b>				
BTMAT203	Applied Mathematics-III	3	1	4
BTECT202	Analog Electronics	3	1	4
BTECT203	Signal & Systems	3	1	4
BTECT204	Circuits and Systems	3	1	4
BTCST204	Object Oriented Programming using C++	3	1	4
BTECT205	Electronic Measurement & Measuring Instruments	3	1	4
<b>LAB/VIVA VOCE</b>				
BTECL202	*Analog Electronics Lab.	0	2	1
BTECL203	*Circuits & Systems Lab.	0	2	1
BTCCL203	C++ Programming Lab.	0	2	1
BTECL204	Electronic Measurement & Measuring Instruments Lab	0	2	1
<b>TOTAL</b>		<b>18</b>	<b>14</b>	<b>28</b>

**\*Some lab experiments are to be performed using any circuit simulation software e.g. PSPICE/MATLAB.**

#### FOURTH SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
<b>THEORY PAPERS</b>				
BTEET202	Electrical Machines and Drives	3	1	4
BTECT206	Digital Circuits & Systems – I	3	1	4
BTCST205	Data Structures	3	1	4
BTECT208	Communication Systems & Circuits – I	3	1	4
BTECT209	Electromagnetic Fields & Transmission Lines	3	1	4
BTCST209	Operating Systems	3	1	4
<b>LAB/VIVA VOCE</b>				
BTEEL202	Electrical Machines & Drives Lab	0	2	1
BTECL205	*Digital Circuits & Systems – I Lab.	0	2	1
BTC SL204	Data Structures Lab.	0	2	1
BTECL206	*Communication Systems & Circuits – I Lab.	0	2	1
BTC SL208	Operating Systems Lab	0	1	1
	<b>TOTAL</b>	<b>18</b>	<b>15</b>	<b>29</b>

\*Some lab experiments are to be performed using any circuit simulation software, such as PSPICE. and MATLAB.

#### **IV Semester Project Work/Practical Training:**

**6** weeks Project Work/Practical Training will be held after fourth semester. Students will submit a project report of the work done. However, Viva-Voce will be conducted in the fifth semester.

Class Project work such as PCB Designing/ Software (PSPICE/ORCAD/MATLAB) based Project, Hardware Project (Analog/Digital/Communication) based may be implemented.

## FIFTH SEMESTER

Code No.	Paper	L	T/P	Credits
<b>THEORY PAPERS</b>				
BTECT310	Digital Circuits & Systems – II	3	1	4
BTECT311	Microprocessor Systems & Applications	3	1	4
BTCST311	Computer Architecture	3	1	4
BTECT312	Communication Systems & Circuits – II	3	1	4
BTECT313	Control Engineering	3	1	4
BTHUT303	Principle of Management and Organizational Behaviour	3	1	4
<b>LAB/VIVA VOCE</b>				
BTECL307	Digital Circuits & Systems – II Lab.	0	2	1
BTECL308	Microprocessor Lab.	0	2	1
BTECL309	Communication Systems & Circuits – II Lab.	0	2	1
BTECL310	Control Engineering Lab.	0	2	1
BTECP301	# Project work/practical training viva voce	0	1	1
	<b>TOTAL</b>	<b>18</b>	<b>15</b>	<b>29</b>

# Non university examination system

## SIXTH SEMESTER

Code No.	Paper	L	T/P	Credits
<b>THEORY PAPERS</b>				
BTECT314	Microwave Engineering	3	1	4
BTCST206	Software Engineering	3	1	4
BTCST315	Computer Networks	3	1	4
BTECT315	VLSI Design	3	1	4
BTECT316	Telecommunication Networks	3	1	4
BTECT317	Digital Signal Processing and its applications	3	1	4
<b>LAB/VIVA VOCE</b>				
BTECL311	Microwave Engineering Lab	0	2	1
BTCCL205	Software Engineering Lab	0	2	1
BTECL312	VLSI Design Lab	0	2	1
BTECL313	Telecommunication Networks Lab	0	2	1
BTECL314	Digital Signal Processing Lab	0	2	1
BTHUL303	# Foreign Language	0	1	1
	TOTAL	18	17	30

# Non university examination system

### VI Semester Practical Training:

6 weeks training will be held after sixth semester. Students will submit a project report of the work done. However, Viva-Voce will be conducted in the seventh semester.

Note: This practical training will be done in university campus or in recognized Organizations/Industries. If training held in university campus that training will be provided in the form of various courses/streams covered in previous semesters like operating systems(Linux/Unix/Windows etc),Networking(Microsoft certifications, CISCO certifications) ,VHDL, Embedded Systems, Microcontrollers ,VLSI,C++ , C# etc.

**Paper Code: BTMAT101**  
**Paper: APPLIED MATHEMATICS – I**

**L T C**  
**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student have to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student have to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**Unit 1:** Brief review of Matrices, Complex Matrices ( Hermitian and Skew-Hermitian matrices, Unitary matrix), solution of Linear System of equations, Rank of Matrix, Gauss Jordan Method, Normal form of a Matrix, Consistency of a Linear system of equations, system of Linear Homogenous Equation, Eigen Values, Eigen Vectors ,Reduction to Diagonal Form Quadratic form and their reduction to Canonical form.

[10]

**Unit II:** Linear Differential equations of second order with constant coefficients:

Complementary functions, particular integrals, Variation of Parameters, Solution of homogenous differential equation-Cauchy and Legendre form. Area under the curve, Length of an arc of a curve, Reduction formulae for evaluating

$$\int_0^{\pi/2} \sin^n \theta d\theta \quad , \quad \int_0^{\pi/2} \cos^n \theta d\theta \quad , \quad \int_0^{\pi/2} \sin^n \theta \cos^n \theta d\theta$$

[10]

**Unit III:** Function of Several Variables, Limit and Continuity, Partial Derivatives, Higher order partial derivatives, Euler's Theorem, Jacobians, Maxima Of functions of two variables, Lagrange's Method of Multipliers, Double and Triple Integrals, Change of Variables, Application of double and triple integrals.

[10]

**Unit IV:** De Moivre's Theorem and roots of Complex Number, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses. Summation of Series - 'C+iS' Method. Convergence of Infinite Series, Comparison Test, D'Alembert's ratio test, Cauchy's root test, Alternating Series , Leibnitz Test.

[10]

**TEXT BOOKS:**

1. Bali, N.P., A Text Book of Engineering Mathematics, Laxmi Publications, New Delhi
2. Jain, R.K. and Iyengar, S.R.K., "Advanced Engineering Mathematics", Narosa, Pub House

**REFERENCE BOOKS:**

1. E.Kresyig, "Advanced Engineering Mathematics" , 5<sup>th</sup> Edition ,John Wiley & Sons,1999.
2. "Advanced Engineering Mathematics " , Dr.A.B.Mathur, V.P.Jaggi (Khanna Publications), 2nd ed.

**Paper Code: BTPHT101**  
**Paper: APPLIED PHYSICS – I**

**L T C**  
**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

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**Part III** should consist of SIX questions out of which student have to attempt FOUR questions each of TEN marks. This part is of 40 marks.

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**UNIT I**

Interference of Light: Interference due to division of wavefront and division of amplitude, Young's double slit expt., Interference, Principle of Superposition, Theory of Biprism, Interference from parallel thin films, wedge shaped films, Newton rings, Michelson interferometer.

Diffraction: Fresnel Diffraction, Diffraction at a straight edge, Fraunhofer diffraction due to N slits, Diffraction grating, absent spectra, dispersive power of Grating, resolving power of prism and grating.

(No. of Hrs. 8)

**UNIT II**

Polarization: Introduction, production of plane polarized light by different methods, Brewster and Malus Laws. Double refraction, Quarter & half wave plate, Nicol prism, specific rotation, Laurent's half shade polarimeter.

Optical Instruments : Ramdson & Huygen Eye pieces, Electron microscope.

(No. of Hrs. 7)

**UNIT III**

Laser: Introduction, temporal and spatial coherence, principle of Laser, stimulated and spontaneous emission, Einstein's Coefficients, He-Ne Laser, Ruby Laser, Application of Lasers.

Fibre Optics: Introduction, numerical aperture, step index and graded index fibres, attenuation & dispersion mechanism in optical fibers (Qualitative only), application of optical fibres, optical communication (block diagram only)

(No. of Hrs. 8)

**UNIT IV**

Mechanics: Central and non-central forces, Inverse square force, SHM, Damped, undamped and forced Oscillations.

Special theory of Relativity: Frame of reference, Michelson-Morley experiment, basic postulates of special relativity, Lorentz transformations (space – time coordinates & velocity only), mass energy relation.

(No. of Hrs. 8)

**Text Books:**

1. A. Ghatak, "Optics"
2. N. Subrahmanyam and Brij Lal, "Optics"
3. Jenkins and White, "Fundamentals of Optics"
4. C. Kittel, "Mechanics", Berkeley Physics Course, Vol.- I.
5. A. Beiser, "Concepts of Modern Physics"

**Paper Code: BTCHT101**  
**Paper: Engineering Chemistry**

<b>L</b>	<b>T</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>3</b>

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

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**UNIT I: WATER TECHNOLOGY**

Introduction and specifications of water, Hardness and its determination (EDTA method only), Alkalinity, Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embrittlement & corrosion : causes & prevention, Removal of silica & dissolved gases; carbonate & phosphate conditioning, Water softening processes : Lime – soda process, Ion exchange method, colloidal conditioning & calgon treatment , Water for domestic use.

[Hrs:8]

**UNIT II: FUELS**

Classification, calorific value of fuel, (gross and net), Determination of calorific value of fuels, bomb calorimeter, Boy's Gas calorimeter, Solid fuels - Proximate and ultimate analysis, High & Low temperature carbonization, manufacture of coke (Otto-Hoffmann oven), Liquid Fuels – Petroleum-Chemical composition, fractional distillation, Cracking - Thermal & catalytic cracking, Octane & Cetane No. and its significance.

[Hrs:8]

**UNIT III: PHOTOCHEMISTRY & CORROSION AND ITS CONTROL**

Introduction, Laws of photochemistry, photochemical reaction, quantum yield, fluorescence, phosphorescence, photosensitized reaction, photosynthesis, laser. Introduction to corrosion, Oxidation corrosion, rusting of iron, types of corrosion, factors affecting corrosion, control of corrosion.

[Hrs:9]

**UNIT IV: CATALYSIS & INSTRUMENTAL METHODS OF ANALYSIS**

Characteristics, types and theories of catalysis, concept of promoters, inhibitors and poisons, Homogenous catalysis (mechanisms of acid-base and Enzyme), catalysis by metal salts, Heterogenous catalysis (mechanism of surface reactions). Introduction and principle: UV Visible spectroscopy, IR spectroscopy, NMR spectroscopy, Gas chromatography.

[Hrs:9]

**REFERENCE BOOKS:**

1. Chemistry in Engineering & Technology (Vol I & II) (Latest ed.), By J.C. Kuriacose & J. Rajaram
2. Principles of Physical Chemistry, (Latest ed.), Puri B.R., Sharma L.R. and Pathania, M.S.
3. Text book of Engg. Chemistry, S. Chand & Co., (Latest ed.), S.S. Dara.
4. Text book of Engg. Chemistry , By Dr. Deepak Pathania , Satyaprakashan, New Delhi

**Paper Code: BTMET102**

**L P C**

**Paper: Engineering Graphics**

**2 2 4**

**Instructions to the paper setters:**

**Max Marks = 100**

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**Part III** should consist of SIX questions out of which student have to attempt FOUR questions each of TEN marks. This part is of 40 marks.

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**UNIT I**

**General:** Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications, Projections of Point and Lines: Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, inclinations, and true lengths of the lines, , shortest distance.

**Unit II**

**Projections of Plane:** Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

**Unit III**

**Projection of Solids:** Simple cases when solid is placed in different positions, Axis faces and lines lying in the faces of the solid making given angles. Sections of Solids.

**Unit-IV**

Isometric Projection

Nomography: Basic Concepts and use.

**Text Books:**

1.Engineering drawing by N.D.Bhatt (Charotar Publications).

**Reference Books:**

1. Engineering Drawing by S.C.Sharma & Navin Kumar (Galgotia Publications)
2. Engineering Drawing by Venugopalan.
3. Engineering Drawing by P.S.Gill

**Paper Code: BTCST101**

**Paper: Introduction to Computers and IT Tools**

<b>L</b>	<b>T</b>	<b>C</b>
<b>2</b>	<b>0</b>	<b>2</b>

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

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*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

### **UNIT I**

Introduction to Computer:

Overview of Computer organization;

computer applications in various fields of science and management.

Data representation: Number systems, character representation codes, Binary, hex, octal codes and their inter conversions.

Binary arithmetic, Floating-point arithmetic, signed and unsigned numbers.

[No. of Hrs. 5]

### **UNIT II**

Introduction to OS and Office Automation

Concept of computing, Introduction to Operating Systems such as DOS, windows 2000/Xp, UNIX, Client Server Technology, etc. (only brief user level description).

Introduction to World Processing, Spread Sheet & Presentation software e.g. MS-Word, MS-Excel, MS-Power Point.

[No. of Hrs. 6]

### **UNIT III**

Introduction to Auto CAD

Coordinate System, 2D drafting: lines, circles, arc, polygon, etc., Editing, 3D, Solid modeling, Rendering, Use of Auto CAD for engineering drawing practices.

[No. of Hrs. 10]

### **UNIT IV**

Web Technologies

Introduction to World Wide Web, Search engines, e-mail, news, gopher, Audio & Video Conferencing, Internet Protocols: FTP, telnet, TCP/IP, SMTP, HTTP, Languages used for WEB Technology: HTML, practical examples using DHTML and Static HTML

[No. of Hrs. 10]

### **Text Books:**

1. Rajaraman, "Fundamentals of Computers", Prentice Hall of India, 3<sup>rd</sup> Edition.
2. Mark Middlebrook, "Autocad 2004 for Dummies", Pustak Mahel Prakashan, 2000.
3. Alexis Leon & Mathews Leon, "Fundamentals of Computer Science & Communication Engineering", Leon Techworld, 1998.

**Reference Books:**

1. Omura, "Mastering Autocad 2000 for Mechanical Engineers" BPB Publications, 2<sup>nd</sup> Edition, 1998.
2. A.S. Tanenbaum, " Computer Networks", Pearson Education India Ltd., 3<sup>rd</sup> Edition, 2002.

**Paper Code: BTEET101**

**Paper: BASIC ELECTRICAL ENGINEERING**

<b>L</b>	<b>T</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>4</b>

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

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**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

### **UNIT I**

Circuit Analysis

Ohm's Law, KCL, KVL Mesh and Nodal Analysis, Circuit parameters, energy storage aspects, Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer Theorem, Millman's Theorem, Star-Delta Transformation. Application of theorem to the Analysis of dc circuits.

[No. of Hrs. 10]

### **UNIT II**

A.C.Circuits

R-L, R-C, R-L-C circuits (series and parallel), Time Constant, Phasor representation, Response of R-L, R-C and R-L-C circuit to sinusoidal input Resonance-series and parallel R-L-C Circuits, Q-factor, Bandwidth.

[No. of Hrs. 10]

### **UNIT III**

Measuring Instruments

Principles, Construction and application of moving coil, moving iron, dynamometer type, induction type instruments, extension of range of ammeter, voltmeter (shunt and multiplier), Two-wattmeter method, for the measurement of power, Cathol-ray Oscilloscope and Applications.

[No. of Hrs. 10]

### **UNIT IV**

Transformers

Construction and Working principles and phaser diagrams of Single-phase Transformer, Emf equation, Equivalent circuit, Regulation and efficiency, and Auto transformer.

Three Phase Circuits: Phase and line voltages and currents, balanced star and delta circuits, power equations, Importance of power factor and earthing, types and construction of storage battery, capacity and efficiency

[No. of Hrs. 10]

**Text Books:**

1. P.C. Sen “Principles of Electric Machines and Power Electronics”, Wiley Eastern 2003.
2. Vincent DEL TORO “Electrical Engineering Fundamental’s Prentice Hall India”, Ed 2002.

**Paper Code: BTHUT101**

**L T C**

**Paper: Professional Communication Skills in English – I**

**2 1 3**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

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**Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.**

### **Unit I**

Remedial Grammar: Errors of Accidence and syntax with reference to Parts of Speech; Agreement of Subject and Verb; Tense and Concord; Conditional Clauses; Use of connectives in Complex and Compound sentences; Question tags and short responses.

[No. of Hrs: 06]

### **Unit II**

Vocabulary and Usage: Word Formations (by adding suffixes and prefixes); Technical Word Formation; Synonyms, Antonyms, Homophones, and Homonyms; One Word Substitution; Misappropriations; Indianisms; Redundant Words; Phrasal Verb Idioms.

[No. of Hrs: 06]

### **Unit III**

#### **Technical Writing:**

(A) Scientific Attitude and Impersonal Style; Plain Statements, Definitions; Description and Explanations (of objects, instruments, Processes, Scientific Principles, etc.)  
Summarizing and abstracting; Expressing ideas within a restricted word limit; Paragraph Writing (Paragraph division, introduction and the conclusion, Variety in sentences and paragraphs)

Interpretation and use of charts, graphs and tables in technical writing.

Punctuation

(B) Reading at various speeds (slow, fast, very fast); reading different kinds of texts for different purpose (e.g. for relaxation, for information, for discussion at a later stage, etc.); reading between the lines.

Comprehension of Unseen Passages

[No. of Hrs: 10]

### **Unit IV**

Text: The following prose pieces from Best Science Writing : Reading and Insights edited by Robert Gannon prescribed text (Hyderabad: University Press (India) Limited, 1991).

1. Chapter 2: "After 63 years, Why Are They Still Testing Einstein?" by C.P. Gilmore
2. Chapter 5: "Star Wars : The Leaky Shield" By Carl Sagan
3. Chapter 10: "Chaos : The Ultimate Asymmetry" by Arthur Fisher
4. Chapter 11: "Bill Moss, Tentmaker" by Robert Gannon

5. Chapter 12: “Totality - A Report” by Michael Rogers

[No. of Hrs: 10]

**Text Books:**

1. Maison, Margaret M. Examine Your English, Hyderabad: Orient Longman, 1980
2. Sharma, R.S. Technical Writing. Delhi: Radha Publication, 1999
3. Sudarsanam, R. Understanding Technical English. Delhi: Sterling Publishers Pvt. Ltd., 1992

## Labs

**Paper Code: BTPHL101**

**P      C**

**Paper: APPLIED PHYSICS LAB – I**

**2      1**

### **List of Experiments**

- (1) To plot a graph between the distance of the knife-edge from the center of the gravity and the time period of bar pendulum. From the graph, find
- (2)
  - (a) The acceleration due to gravity
  - (b) The radius of gyration and the moment of inertia of the bar about an axis.
- (3) To determine the moment of inertia of a flywheel about its own axis of rotation.
- (4) To determine the value of acceleration due to gravity using Kater's pendulum.
- (5) To determine the frequency of A.C. mains using sonometer and an electromagnet.
- (6) To determine the frequency of electrically maintained tuning fork by Melde's method.
- (7) To determine the dispersive power of prism using spectrometer and mercury source.
- (8) To determine the wavelength of sodium light by Newton's Ring.
- (9) To determine the wavelength of sodium light using diffraction grating.
- (10) To determine the refractive index of a prism using spectrometer.
- (11) To determine the specific rotation of cane sugar solution with the help of polarimeter.
- (12) To find the wavelength of He-Ne Laser using transmission diffraction grating.
- (13) To determine the numerical aperture (NA) of an Optical Fibre.

- (14) Compute simulation (simple application of Monte Carlo) e.g. Brownian motion, charging & discharging of capacitor.

Note: Any 8-10 experiments out of the list may be chosen. Proper error – analysis must be carried out with all the experiments.



**Paper Code: BTCHL101**  
**Paper: Engineering Chemistry Lab**

**P**      **C**  
**2**      **1**

### **List of Experiments**

1. Determine the percentage composition of sodium hydroxide in the given mixture of sodium hydroxide and sodium chloride.
2. Determine the amount of Oxalic acid and Sulphuric acid in one litre of solution, given standard sodium hydroxide and Potassium Permanganate.
3. Determine the amount of copper in the copper ore solution, provided hypo solution.
4. Argentometric titration one each by Vohlard's method and by Mohr's method.
5. Complexometric titrations.
6. Determine the surface tension of a liquid using drop weight method.
7. Determine viscosity of a given liquid (density to be determined).
8. Determine the cell constant of a conductivity cell and titration of strong acid/strong base conductometrically.
9. To Determine the %age of chlorine in given sample of water.
10. To separate the given mixture by paper chromatography.
11. To determine the saponification value of given oil.
12. To determine the flash and fire point of given sample of oil using Pensky Marten flash point apparatus.
13. To verify the Beer's law and find out the concentration of the unknown solution by spectrophotometer.

### **REFERENCE BOOKS:**

1. Vogel's Textbook of Quatitative Chemical Analysis, Revised by G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney.
2. Applied Chemistry: Theory and Practice by O.P. Vermani and A.K. Narula.
3. Laboratory Manual on Engg. Chemistry by S.K. Bhasin and Sudha Rani.

**Paper Code: BTEEL101**

**Paper: Electrical Engineering Lab**

**P  
2**

**C  
1**

List of Experiments

1. Verification of Thevenin's theorem
2. Verification of Superposition theorem,
3. Verification of Norton theorem,
4. Verification of Max. power transfer theorem,
5. Verification of Reciprocity theorem
6. Phasor Diagram and Power factor of LCR circuit.
7. Measurement of Power and Power factor in single phase Load using three ammeters/voltmeters.
8. Calibration of Energy Meter/Wattmeter/Voltmeter/Ammeter
9. Two wattmeter method of measuring power in three phase circuit (resistive load only)
10. Load test on Single Phase Transformer, Regulation and Efficiency of Transformer
11. Short Circuit/Open Circuit tests on Single Phase transformer
12. To find out resonance and quality factor of a series circuit.
13. To find out resonance and quality factor of a parallel circuit.
14. Verification of KCL and KVL.

Note: At list 10 experiments to be performed

**Paper Code: BTCSL101**

**P C**

**Paper: Automation Tools & Web designing Lab**

**2 1**

### List of Experiments

1. Use Microsoft-Word to perform the following:
  - a) Send out invitation letter to several people using mail merge facility.
  - b) Create tabular data in word and insert graph to represent data.
  - c) Create a Macro and use it in an application.
  
2. Use Microsoft-Excel to perform the following:
  - a) Create a Macro and use it in an application
  - b) Enter the name and marks of 10 students and perform various mathematical functions on it.
  - c) Enter first quarter performance of five companies and create a pie chart showing there shareholders in the market.
  
3. Use Microsoft Power-Point to perform the following
  - a) Create a slide show on any subject of your choice using minimum five slides.
  - b) Create slideshow in operating sound.
  - c) Create an animation using group, ungroup, order, textbox image insert etc.
  
4. Use HTML to design a Home page for IGIT using all the features of HTML like buttons, frames, marquee check boxes etc..
  
5. Use AutoCAD to do the following:
  - a) Use of Drawing & Editing Properties: Modify Object Properties and a know how of layers, colors and prototype drawing.
  - b) Draw line (Poly line, multi line, linear line), polygon, ellipse, circle, arc, rectangle and use cross hatching, regions, boundary, spline, donut, fillet and extent commands.
  - c) Dimensioning commands, styles, control scale factors, drawing set-up, grip editing objects snaps, utility commands.
  - d) Projection of points, lines and solids,
  - e) Section of Solids
  - f) Development and Intersection of Surface
  - g) Isomeric Projections

Create a WEB page containing hyperlinks to the pages having information about Science and Technology.

**Paper Code: BTMEL102**  
**Paper: Manufacturing Practices**

**P**     **C**  
**3**     **1**

#### UNIT I

**Fitting Shop:** Learning use of fitting hand tools, marking tools, marking gauge.

Exercises: Jobs made out of MS Flats, making saw – cut filling V-cut taper at the corners, circular cut, fitting square in square, triangle in square.

To make a square piece of mild steel.

To make a V-matching joint of mild steel.

**Foundry Shop:** Introduction to moulding materials, moulds, use of cores, tools and equipments used in foundry.

To make a single piece pattern mould.

To make split pattern mould.

#### UNIT II

**Smithy and Forging Shop:** Introduction to forging tools , equipments and operations.

To make a ring of mild steel by cold forging process.

To make S hook by hot forging process.

To make Chisel by hot forging process.

#### UNIT III

**Welding Shop:** Electric arc welding, Edge preparations, Exercises making of various joints.

Bead formation in horizontal, vertical and overhead positions.

To make a lap joint .

To make a T joint.

To make a V-butt joint.

Gas Welding: Oxy-Acetylene welding and cutting of ferrous metals.

Soldering: Dip soldering.

Brazing: With Oxy-Acetylene gas.

#### UNIT 4

**Wood Working Shop:** Various types of timber and tools, making of various joints, Pattern making.

To make a “ T” lap joint.

To make Mortise joint.

**Machine Shop:** Introduction to various Machine tools and machine parts such as Lathes, Drilling machine, Grinders etc. Cutting tools and operations.

Facing and turning on mild steel rod on Lathe machine.

To make a Groove on Lathe machine.

Taper turning operation on Lathe machine.

**Paper Code: BTHUL101**  
**Paper: Community Service and Welfare**

**P C**  
**1 1**

## SECOND SEMESTER

<b>Paper Code: BTMAT102</b>	<b>L</b>	<b>T</b>	<b>C</b>
<b>Paper: Applied Mathematics – II</b>	<b>3</b>	<b>1</b>	<b>4</b>

**Instructions to the paper setters:****Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

### UNIT – I

Laplace Transformation: Laplace Transformation, Inverse Laplace transformation Convolution Theorem, application to linear differential equations with constant coefficients, Unit step function, impulse functions / periodic functions.

[ Hrs.: 10]

### UNIT – II

Fourier Series: Fourier Series, Euler's formulae, even and odd functions, having arbitrary periods, half range expansion,.

Fourier Transforms: Fourier transform, Sine and Cosine transforms

Vector Calculus: Scalar and Vector point function and gradient ,Divergence.Curl with geometrical physical interpretations,

Directional: derivatives,properties.line integrals and applications to work done,green's lemma,Stokes Theorem and Gauss Divergence Theorem (without poof)

[ Hrs.: 10]

### UNIT – III

Special Functions: Beta and Gamma functions, Bessels functions of first kind, Recurrence relations, modified Bessel functions of first kind, Ber and Be functions, Legendre Polynomial,

Rodrigue's formula, orthogonal expansion of function.

[ Hrs.: 10]

#### **UNIT – IV**

Partial Differential Equation: Formation of first and second order linear equations, Laplace, Wave and heat conduction equation, initial and boundary value problems.

[ Hrs.: 10]

#### **TEXT BOOKS:**

1. E. Kresyig, "Advanced Engineering Mathematics", 5<sup>th</sup> Edition, John Wiley & Sons, 1999.
2. B.S. Grewal, "Higher Engineering Mathematics", 40<sup>th</sup> Ed. 2007,

#### **REFERENCE BOOKS:**

1. B.S. Grewal, "Elementary Engineering Mathematics", 13<sup>th</sup> Ed., 2008.
2. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, 9<sup>th</sup> Revised Edition, 2001.
3. Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999.
4. Shanti Narayan, "Differential Calculus", S.Chand & Company, 1998

**Paper Code: BTPHT102**

**Paper: APPLIED PHYSICS – II**

<b>L</b>	<b>T</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>4</b>

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

**Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.**

### **UNIT I**

Electromagnetic Theory (EMT)

Motion of Charged Particles in crossed electric & magnetic fields, Velocity Selector & Magnetic focussing, Gauss law, continuity equation, inconsistency in Ampere's Law, Maxwell's equations (differential and integral forms), Poynting vector, Poynting Theorem (Statement only), propagation of plane electromagnetic waves in conducting and non-conducting medium.

[No. of Hrs. 8]

### **UNIT II**

Quantum Mechanics & Statistical Physics:

De-Broglie Hypothesis, Davisson Germer experiment, wave function and its properties, expectation value, Wave Packet, Uncertainty principle. Schrodinger Equation for free Particle, Time Dependent Schrodinger Equation, Particle in a box (1-D), Single step Barrier, Tunneling effect.

Qualitative Features of Maxwell Boltzman, Bose-Einstein and Fermi-Dirac statistics distribution, functions & their comparison (no derivation)

[No. of Hrs. 8]

### **UNIT III**

Solid State Physics

Formation of energy bands in metals, semiconductors and insulators; intrinsic and extrinsic semiconductors, Fermi energy levels for doped, undoped semiconductors and pn junction; Tunnel diode, Zener diode.

Superconductivity: Meissner Effect, Type I and Type II Superconductors, BCS theory (Qualitative only), London's equation, properties of superconductors & applications.

[No. of Hrs. 8]

### **Unit IV**

X-Rays: production and properties, Crystalline and Anorphous solids (Brief) Bragg's Law, Applications.

Ultrasonics: Introduction, Production of Ultrasonics (Magnetostriction and piezoelectric methods), engineering applications.

[No. of Hrs. 8]

**Text Books:**

1. Concept of Modern Physics : A. BEISER
2. Atomic Physics : Rajam
3. Greiner : Quantum Physics
4. Griffith : Introduction to Electrodynamics

**Reference Books**

1. Electromagnetic waves and Radiating Systems :Jordan & Balmain
2. Solid State Physics : Kittel
3. Solid State Physics : R.L. Singhal
4. Quantum Mechanics : Schiff

**Paper Code: BTCHT102**

**Paper: Environment Chemistry**

<b>L</b>	<b>T</b>	<b>C</b>
<b>2</b>	<b>1</b>	<b>3</b>

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

## **UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

Definition, scope and importance, need for public awareness, introduction to concept of green technology. (2 lectures)

### **ENVIRONMENTAL CONSERVATION AND MANAGEMENT**

(7 lectures)

Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forest and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources-green fuel.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

## **UNIT-II: ENVIRONMENTAL POLLUTION & CONTROL**

(7 lectures)

Air Pollution - Types of pollutants, source, effects, sink & control of primary pollutants– CO, NO<sub>x</sub>, HC, SO<sub>x</sub> and particulates, effect of pollutants on man & environment: photochemical smog, acid rain and global warming, CO<sub>2</sub> Sequestration.

Water Pollution - Classification of Pollutants, their sources, waste water treatment (domestic and industrial).

Soil Pollution – Composition of soil, classification and effects of solid pollutants and their control.

Solid Waste Pollution – Classification, waste treatment and disposal methods; composting, sanitary land filling, thermal processes.

Hazardous wastes - Classification, radioactive, biomedical & chemical, treatment and disposal-Physical, chemical and biological processes.

**UNIT-III: CHEMICAL TOXICOLOGY** (4 lectures)

Toxic chemicals in the environment, Impact of toxic chemicals on enzymes, biochemical effects of arsenic, cadmium, lead, chromium, mercury, biochemical effects of pesticides.

**ECO-FRIENDLY POLYMERS** (5 lectures)

Polymer synthesis, Environmental degradation of polymers, photodegradable polymers, hydrolysis and hydro-biodegradable polymers, biopolymers and bioplastics, thermal degradation of plastics during recycling.

**UNIT-IV: GREEN TECHNOLOGY** (3 lectures)

Introduction, Basic principles of green technology, concept of Atom economy, Tools of Green technology, zero waste technology.

**ENVIRONMENTAL MANAGEMENT SYSTEMS** (4 lectures)

Objectives, Components, Environmental Impact Assessment, Some important Environmental laws, Green bench, Carbon Credits, Environmental Management System standards-ISO 14000 series.

**REFERENCE BOOKS:**

1. Roger Perman et. al., Natural Resources & Environmental Economics, 2nd Ed., Longman, USA, 2000
2. Stern, A.C. (1980), Air Pollution, Vol. 1-VIII, Academic Press.
3. James M., Lynch & Alan Wiseman, Environmental Bio-monitoring : The Biotechnology Ecotoxicology Interface, Cambridge University Press, 1998.
4. John Glasson, Riki Therivel and Andrew Chadwick, Introduction to Environmental Impact Assessment, 2nd Ed., UCL Press, Philadelphia, USA, 1994.
5. Richard K. Morgan, Environmental Impact Assessment: A methodological perspective, Kluwar Academic Publications, Boston, 1998.
6. Gabriel Bitton, Wastewater Microbiology, 2nd Ed., Wiley-Liss, New York, 1999.
7. Environmental Chemistry & Pollution Control, S. Chand & Co. (Latest ed.), By S.S. Dara
8. Environmental Chemistry, I.K. Publishers, 2007, Balaram Pani
9. Environmental Chemistry, New Age Int. Publ. (Latest ed.), A.K. De.
10. Environmental Studies, S.K. Kataria Publ. . (Latest ed.), S.K. Dhamija.
11. A text book in Environmental Science, Narosa Publ. 2007, V. Subramanian.



**Paper Code: BTCST102**

**Paper: Problem Solving and Programming in C**

<b>L</b>	<b>T</b>	<b>C</b>
<b>2</b>	<b>0</b>	<b>2</b>

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

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**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

## UNIT I

Introduction to Programming:

Concept of algorithms, Flow Charts, Data Flow diagrams etc., Introduction to the Editing tools such as vi or MS-VC editors, Concepts of the finite storage, bits bytes, kilo, mega and gigabytes. Concepts of character representation, Number Systems & Binary Arithmetic.

[No. of Hrs. 8]

## UNIT II

Programming using C

The emphasis should be more on programming techniques rather than the language itself. The C Programming language is being chosen mainly because of the availability of the compilers, books and other reference materials.

Example of some simple C program. Concept of variables, program statements and function calls from the library (Printf for example)

C data types, int, char, float etc., C expressions, arithmetic operation, relational and logic operations, C assignment statements, extension of assignment of the operations. C primitive input output using getchar and putchar, exposure to the scanf and printf functions, C Statements, conditional executing using if, else. Optionally switch and break statements may be mentioned.

[No. of Hrs. 8]

## UNIT III

Iterations and Subprograms

Concept of loops, example of loops in C using for, while and do-while. Optionally continue may be mentioned.

One dimensional arrays and example of iterative programs using arrays, 2-d arrays Use in matrix computations.

Concept of Sub-programming, functions Example of functions. Argument passing mainly for the simple variables. [No. of Hrs. 8]

#### **UNIT 4**

##### Pointers and Strings

Pointers, relationship between arrays and pointers Argument passing using pointers Array of pointers. Passing arrays as arguments.

Strings and C string library.

Structure and Unions. Defining C structures, passing strings as arguments Programming examples. [No. of Hrs. 8]

#### **Text Books:**

1. Yashwant Kanetkar, "Let us C", BPB Publications, 2<sup>nd</sup> Edition, 2001.
2. Herbert Schildt, "C: The complete reference", Osbourne Mcgraw Hill, 4<sup>th</sup> Edition, 2002.

#### **Reference Book:**

1. Raja Raman, "Computer Programming in C", Prentice Hall of India, 1995.
2. Kernighan & Ritchie, "C Programming Language", The (Ansi C Version), PHI, 2<sup>nd</sup> Edition.

**Paper Code: BTECT101**

**L T C**

**Paper: Basic Electronics**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

**Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.**

**Unit I:**

[ Hours: 10]

Introduction to semiconductor diode, ideal diode, Characteristics of PN junction diode, drift & diffusion currents, Fermi level in intrinsic and extrinsic semiconductor, continuity equation ,Mass Action Law. Zener diode characteristics, Rectifications of Half wave and full wave rectifier, Filters , Unregulated and regulated power supplies ,Tunnel diode, LED,LCD and Photo Diode

**Unit II:**

[ Hours: 10]

Bipolar junction transistor: Introduction, Transistor, construction, transistor operations, BJT characteristics, load line, operating point,

Bias stabilization: Need for stabilization, fixed Bias, emitter bias, self bias, bias stability with respect to variations in  $I_{CO}$ ,  $V_{BE}$  &  $\beta$  ( compensation techniques), Stabilization factors, thermal stability.

Unit – III

Small signal amplifiers, CB ,CE,CC configurations, Hybrid models for transistors at low frequencies, mid band model, gain and impedance,comparison of different configurations

FET (Detail construction, working and characteristics), MOSFET ((Detail construction, working and characteristics), Introduction, Classification, enhancement & Depletion type MOSFETS & enhancement only MOSFET [ Hours: 10]

#### **Unit – IV**

Feedback Amplifiers:

Feedback concept, Classification of Feedback amplifiers, Properties of negative Feedback amplifiers, Impedance considerations in different Configurations, Examples of analysis of feedback Amplifiers

UJT (Detail construction ,working and characteristics),

SCR (Detail construction, working and characteristics [Hours: 10]

Text Books

1. J. Millman and Halkias, “Electronic devices and circuits” TMH, 1999.
2. Salivahanan, Suresh Kumar, Vallavaraj, “Electronic devices and circuits” TMH, 1999

#### **Reference Book**

1. J. Millman and Halkias, “Integrated Electronics, Analog & Digital Circuits & Systems” TMH – 2000.
2. Boylestad & Nashelsky, “Electronic Devices & Circuit Theory” PHI – VIth Edition.
3. Sedra & Smith, “Micro Electronic Circuits” Oxford University Press, 2000
4. J.B.Gupta, “Electronic Devices & Circuits” S. K. Kataria, IInd Edition.

**Paper Code: BTMET101**

**L T C**

**Paper: Engineering Mechanics**

**3 0 3**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

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**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**UNIT I**

Force system: Free body diagram, Equilibrium equations and applications.

Friction: Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, friction of flat pivot and collared thrust bearings, Belt drive- derivation of equation.

$$T_1/T_2 = e^{\mu\theta} \text{ and its application}$$

[No. of Hrs. 8]

**UNIT II**

Distributed Force: Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems, polar moment of inertia.

[No. of Hrs. 8]

**Unit-III**

Fluid and its properties, determination of coefficient of discharge of Venturimeter and Orifice meter, Bernoulli's theorem, Calibration of pressure gauge with the help of dead weight pressure gauge tester.

Kinetics of Particles: Equation of motion, rectilinear motion and curvilinear motion, work energy equation, conservation of energy, impulse and momentum conservation of momentum, impact of bodies, co-efficient of restitution, loss of energy during impact.

[No. of Hrs. 8]

#### **Unit-IV**

Kinematics of Rigid Bodies: Concept of rigid body, type of rigid body motion, absolute motion, introduction to relative velocity, relative acceleration (Corioli's component excluded) and instantaneous center of velocity, Velocity and acceleration polygons for four bar mechanism and single slider mechanism.

[No. of Hrs. 8]

#### **Text Books:**

1. Engg Mechanics by A.K.Tayal (Umesh Publications).
2. Engg Mechanics by Sadhu Singh (Khanna Publishers).

#### **Reference Books:**

1. Engg Mechanics by Irving H. Shames (PHI publications).
2. Engg Mechanics by U.C.Jindal (Galgotia Publications).
3. Engg Mechanics by Beer & Johnston, TMH
4. Engg Mechanics by Subramanyam

**Paper Code: BTHUT102**

**L T C**

**Paper: Professional Communication Skills in English – II**

**2 1 3**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

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### **Unit I**

Basic Concepts in Communication: Communication as sharing; context of communication; the speaker/writer and the listener/reader; medium of communication; barriers to communication; accuracy, brevity, clarity and appropriateness in communication.

[No. of Hrs: 05]

### **Unit II**

Writing Skills: Types of writings (Expository, Descriptive, Analytic, Argumentative, Narrative etc) and their main features. Resumes and CV's and Cover letters. Memos and Notices. Basics of Formal Reports.

[No. of Hrs: 08]

### **Unit III**

Verbal, Non-Verbal and Listening Skills: Elementary Phonetics (Speech Mechanism, The Description of Speech Sounds, The Phoneme, the syllable; Prosodic Features, Word Accent, Features of Connected Speech); Paralanguage and Body language; and Classroom Presentations, Hearing and Listening; Essentials of Good Listening: Achieving ability to comprehend material delivered at relatively fast speed.

[No. of Hrs: 08]

### **Unit IV**

Group Discussion: Use of persuasive strategies including some rhetorical devices for emphasizing (for instance; being polite and firm; handling questions and taking in criticism

of self; turn-taking strategies and effective intervention; use of body language).

[No. of Hrs: 09]

**Text Books:**

1. Bansal, R.K. and J. B. Harrison. Spoken English For India: A Manual of Speech and Phonetics, Hyderabad: Orient Longman, 1983.
2. Lewis, Hedwig. Body Language: A Guide For Professionals. New Delhi: Response Books (A division of Sage Publication), 2000
3. Sides, Charles H. How to Write & Present Technical Information. Cambridge: CUP, 1999.
4. Forsyth, Sandy & Lesley Hutchison. Practical Composition. Edinburgh : Oliver & Boyd, 1981

## LABS

<b>Paper Code: BTPHL102</b>	<b>P</b>	<b>C</b>
<b>Paper: Applied Physics Lab – II Lab</b>	<b>2</b>	<b>1</b>

### *List of Experiments*

1. To determine the value of  $e/m$  of electron by J.J. Thomson method.
2. To determine unknown resistance of a wire by Carey Foster's Bridge.
3. To determine the internal resistance of Leclanche cell using potentiometer.
4. To study the charging and discharging of a capacitor and to find out the time constant.
5. To find the thermal conductivity of a poor conductor by Lee's disk method.
6. To study the thermo emf using thermocouple and resistance using Pt. Resistance thermometer.
  
7. To determine the velocity of ultrasound waves using an ultrasonic spectrometer in a given liquid (Kerosene Oil)
  
8. To measure the frequency of a sine-wave voltage obtain from signal generator and to obtain lissajous pattern on the CRO screen by feeding two sine wave voltage from two signal generator.
  
9. To determine the temp. coefficient of resistance of platinum by Callender & Griffith's Bridge.
  
10. To study Hall effect.
  
11. To determine plank's constant.

**Paper Code: BTCHL102**

**Paper: Environment Chemistry Lab**

<b>P</b>	<b>C</b>
<b>2</b>	<b>1</b>

Practicals will be based on the contents taught in theory

**Paper Code: BTCSL102**

**Paper: C Programming Lab.**

<b>P</b>	<b>C</b>
<b>4</b>	<b>2</b>

List of Experiments

1. Write a program to produce ASCII equivalent of given number
2. Write a program to find divisor or factorial of a given number.
3. Write a program to evaluate the following algebraic expressions after reading necessary values from the user
  - $(ax+b)/(ax-b)$
  - $2.5 \log x - \cos 30 + |x^2 - y^2| + \sqrt{2xy}$
  - $(x^5 + 10x^4 + 8x^3 + 4x + 2)$
4. Write a program to find sum of a geometric series
5. Write a program to cipher a string
6. Write a program to check whether a given string follows English capitalization rules
7. Write a program to find sum of the following series  
 $1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{20}$
8. Write a program to search whether a given substring exist in an input string or not and then delete this string from input string.
9. Write a recursive program for tower of Hanoi problem
10. The fibonacci sequence of numbers is 1,1,2,3,5,8,..... Based on the recurrence relation
$$F(n) = F(n-1) + F(n-2) \text{ for } n > 2$$
Write a recursive program to print the first m Fibonacci number
11. Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices
  - a) Addition of two matrices

- b) Subtraction of two matrices
- c) Finding upper and lower triangular matrices
- d) Trace of a matrix
- e) Transpose of a matrix
- f) Check of matrix symmetry
- g) Product of two matrices.

12. Write a program that takes two operands and one operator from the user perform the operation and then print the answer

13. Write a program to print the following outputs:

1								1				
2	2							2	2			
3	3	3						3	3	3		
4	4	4	4					4	4	4	4	
5	5	5	5	5				5	5	5	5	5

14. Write functions to add, subtract, multiply and divide two complex numbers  $(x+iy)$  and  $(a+ib)$  Also write the main program.

15. Write a menu driven program for searching and sorting with following options:-

- a) Searching
  - (1) Linear searching
  - (2) Binary searching
- b) Sorting
  - (1) Insertion sort
  - (2) Selection sorting

16. Write a program to copy one file to other, use command line arguments.

17. Write a program to mask some bit of a number (using bit operations)

18. An array of record contains information of managers and workers of a company. Print all the data of managers and workers in separate files.

**Code No.BTECL101**

**P C**

**Paper: Basic Electronics Lab.**

**2 1**

Practical will be based on Basic Electronics - I. Some lab experiments must be performed using any circuit simulation software e.g. PSPICE. Following list of Experiments is being recommended:

- 1.To study the waveforms of CRO
2. To study and find characteristics of forward biased PN junction Diode.
2. To study and find characteristics of reversed biased PN junction Diode.
3. To study half wave rectifier and find its efficiency.
4. To study full wave rectifier and find its efficiency.
5. To draw input & output characteristics of common emitter transistor.
6. To draw input & output characteristics of common base transistor.
7. To study the characteristics of UJT.
8. To study the characteristics of MOSFET.
9. To study the characteristics of SCR.
10. To study Zener diode as voltage regulator.
11. To find the voltage the voltage gain of common collector configuration.

**Paper Code: BTMEL101**

**P C**

**Paper: Engineering Mechanics Lab**

**2 1**

List of Experiments

1. To study Low pressure boilers.
2. To study high pressure boilers.
3. Calibration of pressure gauges.
4. To study various discharge measuring devices.
5. To determine the coefficient of discharge of Venturimeter.
6. To determine the coefficient of discharge of Orificemeter
7. To study Bernaulli's apparatus
8. To determine the modulus of rigidity of Torsion apparatus.
9. Calibration of Thermometers.

A minimum of 8 experiments to be performed

**Paper Code: BTHUL102**

**L P C**

**Paper: #Comparative Study of Religions**

**1 0 1**

### THIRD SEMESTER

**Paper Code: BTMAT203**

**L T C**

**Paper: Applied Mathematics -III**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

#### UNIT-1

**Introduction** : Theory of Probability, Probability concepts, random experiment and events, Mathematical Notion, probability function, Law of addition of probability, extension of general Law of addition of probabilities, multiplication law of probability and conditional probability, extension of multiplication Law of Probability, probability of occurrence of  $n$  Independents events, Independent events, condition for mutual independence of  $n$  events, Bayes Theorem,

**Random Variable s and distribution functions:** Random Variable ,distribution Function ,discrete random variable ,probability mass function ,discrete distribution function, continuous random variable, probability density function,, Normal distribution , Poission distribution , binomial distribution,geometric distribution,exponential distribution.

#### UNIT-2

**Measures of Central Tendency:** central Tendency, arithmetic mean, median , mode.

**Measures of Dispersion:** Meaning of Dispersion , range , mean deviation, Standard Deviation,quartile deviation, measures of relative dispersion.

**Bivariate Frequency Distribution** : Bivariate data, Correlation, correlation coefficient, properties of correlation coefficient, calculation of Correlation coefficient from grouped data.

Regression lines ,some important results relating to regression line, Limitation of correlation coefficient.

### **UNIT-3**

#### **Solution Of Algebraic and Transcendental Equations:**

Bisection method, method of false position, secant method, Iteration method, Newton – Raphson Method, Generalized Newton-Raphson Method.

#### **Solution of Simultaneous Algebraic Equations :**

Jacobi's Method, Gauss- Seidal Method, Relaxation Method.

### **UNIT-4**

#### **Finite Differences & Interpolation:**

Introduction,Newton's Forward and Backward Interpolation Formulae. Central Difference Interpolation Formula. Gauss's Forward and Backward Interpolation formulae. Lagrange's Interpolation formula and Newton's Divided Difference formulae.

#### **Numerical Intigration :**

Trapezoidal Rule, Simpson's  $1/3^{\text{rd}}$  and  $3/8^{\text{th}}$  rules, Romberg's Intigration.

#### **Text Books:**

1.Kishore S. Trivedi, "Probability & Statistics with Reliability, Queuing and Computer Science Application, Prentice Hall of India Pvt Ltd., 2000.

2.S.C. Gupta and V. K. Kapoor," Fundamentals of Mathematics Statistics", Sultan Chand & sons, New Delhi , 2001.

3.A.M. Goon, M.K.Gupta & B. Dasgupta,"Fundamental of Statistics", Vol. 1,The World Press Pvt. Ltd. Calcutta ,2000.

4. Numerical Method of Engineering & Sciences: B.S.Grewal: Khanna Publishers.

5. Numerical Methods for Scientific & Engg. Computation: M.K. Jain, S.R.K.Iyengar & R.K.Jain; Wiley Eastern Ltd.

**Paper Code: BTECT202**

**L T C**

**Paper: Analog Electronics**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**Unit – I**

[ Hours: 10]

Multistage amplifier: General cascaded system, RC-coupled amplifier, transformer-coupled amplifier, direct-coupled amplifier, cascaded amplifier, multistage frequency effects.

Oscillators: Hartley, colpitt, RC Phase shift, wein bridge oscillators (using transistors)

**Unit – II**

[Hours: 10]

Power Amplifiers: Power dissipations in transistors, Harmonic distortion, Amplifiers Classification, (Class-A, Class-B, Class-C, Class-AB) Efficiency, Push-pull and complementary Push-pull amplifiers, Tuned amplifiers.

**Unit – III**

[Hours: 10]

Integrated Circuits Building Blocks of Analog ICs: Differential amplifier, Op-amp Model, op-amp DC & AC parameters, virtual ground, Inverting and non-inverting amplifiers, Integrator and Differentiator.

Advantages of IC's over analogue circuits, classification of IC's based on density levels, Introduction to monolithic and hybrid ICs, Basic applications of OPAMP, differential amp,

adders, Voltage to current, current to voltage Converter, Current mirrors, Active loads, Level shifters and output stages, .

#### **Unit – IV**

[ Hours: 10]

Linear & Non Linear Wave shaping: Clipping & Clamping Circuits, Comparators, log/antilog circuits using Op-amps, precision . Active RC Filters: Idealistic & Realistic response of filters (LP, BP, HP), Introduction of All pass & Notch Filter

#### **Text Books**

1. J. Millman and Halkias, “Electronic devices and circuits” TMH, 1999.
2. Salivahanan, Suresh Kumar, Vallavaraj, “Electronic devices and circuits” TMH, 1999
3. Linear integrated circuits,” gayakwad”
4. Linear integrated circuits by jain & Chaudhary

#### **Reference Book**

1. J. Millman and Halkias, “Integrated Electronics, Analog & Digital Circuits & Systems” TMH – 2000.
2. Boylestad & Nashelsky, “Electronic Devices & Circuit Theory” PHI – VIth Edition.
3. Sedra & Smith, “Micro Electronic Circuits” Oxford University Press, 2000
4. J.B.Gupta, “Electronic Devices & Circuits” S. K. Kataria, IIInd Edition.

**Paper Code: BTECT203**  
**Paper: Signal & Systems**

**L T C**  
**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**Unit – I**

Introduction : Basic concepts & Definitions ,Continuous and Discrete – Time Signals & their Classification , Continuous & Discrete – Time system & their properties . Basic Signals.

Linear Time – Invariant Systems : Convolution for continuous- time systems (CTS), convolution for Discrete-time systems (DTS), properties of LTI systems , State variable Description for LTI systems. Correlation.

[ Hours: 10]

**Unit – II**

Fourier Analysis for CTS: Response of LTI systems to Exponential Signals, Periodic signals, Fourier Series , Fourier Transform and its Properties, system Analysis by Fourier Transform.

Fourier Analysis for DTS : Response of LTI system to Exponential Signals, Discrete – Time Fourier series , Discrete- time Fourier transform & its Properties, System Analysis by Fourier Transform.

[ Hours: 10]

**Unit – III**

Time and Frequency Characterization of Signals and Systems: The Magnitude Phase Representation of the Fourier Transform , Linear and Non – Linear phase , phase Delay and Group Delay , Time – Domain properties of Ideal Frequency Selective filters , Time- Domain and Frequency – Domain Aspects of Non – Ideal Filters.

Sampling : The sampling Theorem , Effect of under sampling , Sampling of Band – Pass signals.

[ Hours: 10]

## **Unit - IV**

Laplace Transform : Definition and Properties , Methods of Inversion ,Application to LTI system Analysis.

Z- Transform : Definitions and Properties, Significance and properties of ROC , Inversion of Z-Transform , Application to system Analysis ,The Unilateral Z-Transform and its Properties.

[ Hours: 10]

### **Text Books:**

1. Oppenheim, Wilsky, "Signals & System" PHI IIInd Edition
2. Proakis, "Digital Signal Processing" PHI – IIInd Edition.

### **Reference Books:**

1. S. Haykin, "Signals & System" (Wiley) – 1999
2. S. K. Mitra, "Digital Signal Processing" PHI – IIInd Edition.

**Paper Code: BTECT204**

**L T C**

**Paper: Circuits & Systems**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

**Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.**

### **Unit-I**

Introduction to continuous and discrete signals, their classification and types, periodic waveforms and signal synthesis, LTI systems and their properties; system modeling in terms of differential equations and transient response of R, L, C circuits for impulse, step, ramp, sinusoidal and exponential signals.

[ Hours: 10]

### **Unit-II**

Laplace Transform: Review of properties and applications of Laplace transform of complex waveform and transient response of R, L, C series, parallel, series-parallel circuits for all kinds of **excitations**.

[ Hours: 10]

### **Unit-III**

Graph theory and its applications, two port networks – z, y, ABCD, h, g, inverse ABCD parameters their interconversion, interconnection of two 2-port networks, concept of transform impedance, Network theorems: Reciprocity, Superposition, Thevenin, Norton, Millman, Maximum Power Transfer and Tellegan

[ Hours: 10]

### **Unit IV**

Elements of Network Synthesis: Foster's I and II, Cauer's I & II forms, Synthesis of LC, RC, RL Networks

[ Hours: 10]

**Text Books:**

1. Valkenburg, “ Network analysis” PHI, 2000.
2. D. R. Choudhary, “Networks and Systems” New Age International, 1999.

**Reference Books**

1. Bhise, Chadda, Kulshreshtha, “ Engineering network analysis and filter design” Umesh publication, 2000.
2. Kuo, “Network analysis and synthesis” John Wiley and Sons, 2<sup>nd</sup> Edition.

Code No.:BTCST204

L T C

Paper: Object Oriented Programming using C++

3 1 4

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**UNIT – I**

Introduction: Introducing Object-Oriented Approach related to other paradigms (functional, data decomposition), Characteristics of Object-Oriented Languages.

Basic terms and ideas: Abstraction, Encapsulation, Information hiding, Inheritance, Polymorphism, Review of C, Difference between C and C++, cin, cout, new, delete operators.

[ Hrs: 10]

**UNIT – II**

Classes and Objects: Abstract data types, Object & classes, attributes, methods, C++ class **declaration, State identity and behavior of an object, Constructors and destructors, instantiation** of objects, Default parameter value, Copy Constructor, Static Class Data, Constant and Classes, C++ garbage collection, dynamic memory allocation.

[ Hrs. 10]

**UNIT – III**

Inheritance and Polymorphism: Inheritance, Types of Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Type of Polymorphism – Compile time and runtime, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric polymorphism, Generic function – template function, function name overloading, Overriding inheritance methods

[ Hrs: 10]

## **UNIT – IV**

Files and Exception Handling: Persistent objects, Streams and files, Namespaces, Exception handling, Generic Classes

Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

[ Hrs: 10]

### **TEXT BOOKS:**

1. A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997.
2. R. Lafore, “Object Oriented Programming using C++”, BPB Publications, 2004.
3. Schildt Herbert, “C++ Programming”, 2<sup>nd</sup> Edition, Wiley DreamTech.

### **REFERENCE BOOKS:**

1. D . Parsons, “Object Oriented Programming with C++”, BPB Publication, 1999.
2. Steven C. Lawlor, “The Art of Programming Computer Science with C++”, Vikas Publication, 2002.
3. Yashwant Kanethkar, “Object Oriented Programming using C++”, BPB, 2004.

**Code No.:BTECT205**

**L T C**

**Paper: Electronic measurement & measuring instruments**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**UNIT I:**

**ELECTRONIC INSTRUMENTS**

Electronic voltmeter, VTM Transistor voltmeter ,Electronic Multimeter , CRO's study of various stages in brief, measurement of voltage, current phase and frequency, special purpose oscilloscope measurements of inductance, capacitance, effective resistance at high frequency, Q meters, LCR meter.

**UNIT II:**

**INSTRUMENTS FOR GENERATION AND ANALYSIS OF WAVEFORMS**

Signal generators, function generator, wave analyzer, harmonic distortion analyzer, spectrum analyzer, spectrum analysis.

**INSTRUMENT TRANSFORMER**

Current and potential transformers, constructional features, ratio and phase angle error.

**UNIT III:**

**Transducers**

Principles of operation qualitative treatment of strain gauge, LVDT, thermocouple, piezo-electric crystal and photoelectric transducers , Inductive transducers , capacitive transducers, Electromagnetic Transducers.

**DATA ACQUISITION SYSTEM**

Necessity of recorders, Recording requirements, Graphic Recorders, Strip chart Recorders, Magnetic tape recorders, Digital Tape Recorders.

**UNIT IV:**

**DISPLAY DEVICES**

Electronic Indicating instruments, seven segment display, fourteen segmental display, Nixie tube.

Telemetry:

Introduction, method of data transmission, types of telementary systems and applications.

**BOOKS RECOMMENDED**

1. A.K. Sawhney- Electrical and Electronic Measurements And Instrumentation.
2. B. Stout- Basic Electrical Measurements.
3. D. Cooper – Electronic Instrumentation and Measurement Techniques.
4. Terman & Petit- Electronics Measurement.

**Code No. :BTECL202**

**P C**

**Paper: Analog electronics Lab.**

**2 1**

1. Study and Design the Inverting & Non-inverting Amplifier using Op-Amp.
2. Study and Design the Integrator circuit using Op-Amp.
3. Study and Design the Differentiator circuit using Op-Amp.
4. Study and Design the following filters using op-Amp's & plot the Frequency response curve.
  - (a) Low-Pass.
  - (b) High-Pass.
  - (c) Band Pass Fit.
  - (d) Band Reject.
5. Study and Design the Hartley Oscillator using Transistor.
6. Study and Design the Colpits Oscillator using Transistor.
7. Study and Design the RC-Phase Shift Oscillator using Transistor.
8. Study and Design the Wein Bridge Oscillator using Op-Amp.
9. Study and Design the Class-A Amplifier using Transistor.
10. Study and Design the Class-B Amplifier using Transistor.
11. Study and Design the RC-Coupled Amplifier.
12. Study and Design the Tuned Amplifier .
13. To study Class B Push Pull Amplifier

**Code No. :BTECL203**

**L P C**

**Paper: Circuits & Systems Lab.**

**0 2 1**

Practical will be based on Circuits & Systems. Some lab experiments must be performed using any circuit simulation software e.g. PSPICE. Following list of Experiments is being recommended:

1 (A) TO VERIFY RECIPROCITY THEOREM.

(B) TO VERIFY MAXIMUM POWER THEOREM.

2.(A) TO VERIFY THEVENIN'S THEOREM.

(B) TO VERIFY NORTON'S THEOREM.

3. TO DETERMINE Y AND Z PARAMETER OF NETWORK

4. TO DESIGN CASCADE CONNECTION AND DETERMINE ABCD PARAMETERS (TRANSMISSION PARAMETERS)

5. TO DESIGN SERIES- SERIES CONNECTION AND DETERMINE Z-PARAMETERS.

6. TO DESIGN PARALLEL- PARALLEL CONNECTION AND DETERMINE Y-PARAMETERS.

7. TO DESIGN SERIES-PARALLEL CONNECTION AND DETERMINE h-PARAMETERS.

**Code No. :BTCSL203**

**L P C**

**Paper: C++ Programming Lab.**

**0 2 1**

Practical's will be based on Object Oriented Programming using C++. Following list of Experiments is being recommended:

1. A Class Student Has Three Data Members: Name, Roll, Marks Of 5

Subjects and Member Functions To Assign Streams On The Basis Of The

Table Given Below:

Average Marks	Stream
96% And More	Computer Science
91% - 95%	Electronics
86% - 90%	Mechanical
81% - 85%	Electrical
76% - 80%	Chemical
71% - 75%	Civil

Declare The Class Student And Define The Member Functions.

2. Define A Class Book With The Following Definitions:

Private Members Of Class Book Are:

Book\_No

Book\_Title

Price

Total\_Cost(Int N)

Public Members Of Class Book Are:

Input()

Purchase()

3. Define A Class Serial With Following Specifications:

Private Members:

Serial Code            Integer

Title                    20 Character

Duration                Float

Noofepisodes           Integer

Public Member Function Of Class Serial:

1. A Constructor To Initialize Duration As 30 And Noofepisodes As 10
  2. Newserial() To Accept Values Of Serial Code And Title
  3. Otherentries() To Assign Value To Duration And Noofepisodes With The Help Of Values Passed To The Function
  4. Dispdata() To Display The Data Members On The Screen
4. Design A Program On Concept Of Same Function Name In Base And Derived Class (Overriding).
  5. Program Showing The Concept Of Removing Ambiguity In Case Of Hybrid Inheritance (Virtual Base Class).
  6. Design A Program To Count Total Number Of Letters In A File.
  7. Program To Transfer Data From One File To Another One Character At A Time.
  8. Program To Enter Data Into Hotelfile Using Class, And Count The Total Number Of Customers.
  9. Program On Merging Of Records From 2 Files.
  10. Design A Program To Overload +, --, New Operators.
  11. Design A Program To Show Concept Of Late Binding.
  12. Design A Program To Show Concept Of Exception Handling.
  13. Design A Program To Show Concept Of Containership.

**Code No. :BTECL204**

**L P C**

**Paper: Electronic measurement & measuring instruments Lab.**

**0 2 1**

1. Measurement of displacement using LVDT.
2. Measurement of distance LDR.
3. Measurements of temperature using R.T.D.
4. Measurements of temperature using Thermocouple.
5. Measurements of pressure using Strain Gauge.
6. Measurements of pressure using Piezo – Electric Pick up.
7. Measurements of distance using capacitive pick up.
8. Measurements of distance using inductive transducer.
9. Measurements of speed of DC Motor using Magnetic Pick up.
10. Measurements of speed of DC Motor using Photo Electric Pick up.

## FOURTH SEMESTER

**Code No.:**BTEET202

**L      T      C**

**Paper:** Electrical Machines & Drives

**3      1      4**

-

### **Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

I. .

### **UNIT – 1: D.C. MACHINES.**

DC Generators: Constructional details, principle of operation, emf equation, methods of excitation – self and separately excited generators. Principle of operation of D.C. motor, equivalent circuit, Back emf and torque equation, Characteristics of motors, Types of starters, Testing, brake test and Swinburne’s test, Speed control of D.C. shunt motors.

### **UNIT-2: INDUCTION MOTORS**

Construction - types- principal of operation of three phase induction motors – equivalent circuit, power flow diagram, Application of induction motor and starters ,Determination of efficiency , no load and blocked rotor test, high torque cage motors, cogging and crawling.

Single phase induction motors: Introduction, principle of operation, rotor slip, equivalent circuit, types and starting methods.

### **UNIT-3: SYNCHRONOUS AND SPECIAL MACHINES**

Synchronous generators: Introduction, construction, types, advantages of rotating field alternators, speed and frequency, Excitation system, emf equation, equivalent circuit, parallel operation. Construction of synchronous motor, types of synchronous motors, equivalent circuit and phasor diagram of cylindrical rotor synchronous motor, synchronous condenser, hunting, application of synchronous motors, starters, Introduction to universal motor and stepper motor.

**UNIT-4: THYRISTER INVERTORS, CHOPPERS AND CYCLOCONVERTERS:** Basic inverter circuits, 3 phase inverter 120 degree conduction scheme, Brief introduction to series and parallel inverters, Types of choppers, Output voltage control techniques of choppers, Step up and step down cycloconverters.

**Books**

Electrical Machines, Ashfaq Hussain, Dhanpat Rai, Delhi

Performance of Electrical Machines by J.B. Gupta

Principles of electrical and electronics Engineering by V.K. Mehta & Rohit Mehta

Power Electronics by P.S. Bhimra

Power Electronics by B.R. Gupta

Code No.:BTECT206

L T C

Paper: Digital Circuits & Systems – I

3 1 4

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

#### UNIT – I

Analog & Digital signals, AND, OR, NOT, NAND, NOR & XOR gates, Boolean algebra. Standard representation of Logical functions, K-map representation and simplification of logical functions, Don't care conditions, X-OR & X-NOR simplification of K-maps. Combinational circuits: Multiplexers, Demultiplexers, Decoders & Encoders, Adders & Subtractor, Code Converters, comparators, decoder/drivers for display devices

[Hrs.: 10]

#### UNIT – II

Flip Flops: S-R, J-K, D & T Flip-flops, excitation table of a flip-flop, race around condition. Sequential circuits: Shift registers, Ripple counter, Design of Synchronous counters, 555 Timer and its application as mono-stable, astable and bistable multi-vibrator. Schmitt trigger.

[Hrs.: 10]

#### UNIT - III

A/D and D/A converters: Binary-weighted DAC, R-2R Ladder type networks, Successive-approximation ADC, Linear-ramp ADC, Dual-slope ADC Bipolar-Transistor Characteristics, RTL and DTL circuits, TTL, ECL and CMOS Logic families.

[Hrs.: 10]

#### UNIT - IV

Logic Implementations using ROM, PAL & PLA., Semiconductor Memories: Memory organization & operation, classification and characteristics of memories, RAM, ROM and content addressable memory.

[Hrs.: 10]

**TEXT BOOKS:**

1. R.P. Jain, "Modern Digital Electronics", TMH, 3<sup>rd</sup> Ed, 2004.
2. Morris Mano, "Digital Design", PHI, 2<sup>nd</sup> Ed, 2002.

**REFERENCE BOOKS:**

1. R. J. Tocci, "Digital Systems", PHI, 2000
2. Malvino and Leach, "Digital principles and applications", TMH, 2000.
3. I. J. Nagrath, "Electronics, Analog & Digital", PHI, 1999.
4. B. S. Nai, " Digital Electronics and Logic Design", PHI, 2000.
5. Balabanian and Carlson, "Digital Logic Design Principles", Wiley Pub., 2000.

**Code No: BTCST205**  
**Paper: Data Structures**

	<b>L</b>	<b>T</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>4</b>	

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of **THREE** questions. **Q1** should consist of **TEN** true/false questions each of **ONE** mark. **Q2** should consist of **TEN** multiple choice questions each of **ONE** mark. **Q3** consists of **TEN** short questions each of **TWO** marks. This part is of **40** marks

**Part II** should consist of **SEVEN** questions out of which student has to attempt **FIVE** questions each of **FOUR** marks. This part is of **20** marks.

**Part III** should consist of **SIX** questions out of which student has to attempt **FOUR** questions each of **TEN** marks. This part is of **40** marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**UNIT – I**

**Fundamentals of algorithm analysis:** Big ‘O’ notations, Time and space complexity of algorithms, Elementary data structures and their applications

**Arrays:** ordered lists, representation of arrays, sparse matrices, linked lists: singly and doubly linked lists, stacks, queues, multiples stacks and queues, Applications: polynomial arithmetic, infix, postfix and prefix arithmetic expression conversion and evaluations.

**[No. of Hrs: 12]**

**UNIT – II**

**Trees:** Definitions & basic concepts, linked & contiguous tree representation, binary tree, binary tree traversal, insertion, deletion & searching in binary trees, heap trees, heap sort algorithm, height balanced trees (AVL trees).

**Graphs:** Definitions, linked & sequential representation of Graphs, adjacency matrix, operation on graphs, graph traversal, **shortest path algorithms:** Dijkstra’s Algorithm, Floyd Warshall’s Algorithm, and Minimum Spanning Tree Definitions.

**[No. of Hrs: 11]**

**UNIT – III**

**Searching & Sorting:** Hashing: Hash function, Hash table, Internal sort: Radixsort, Insertion sort, Exchange sort, Selection sort, Quicksort, Shellsort, Mergesort, Heapsort, External sort: K-way mergesort, balanced mergesort, polyphase mergesort

**[No. of Hrs: 11]**

**UNIT – IV**

**Files:** Files, Queries and sequential organization; Cylinder surface indexing, Hashed Indexed, Tree Indexing, B-Trees, Trie Indexing, Sequential file organizational, random file organization, Hashed file organization, Inverted files, cellular partitions.

**[No. of Hrs: 10]**

**TEXT BOOKS:**

1. E. Horowitz and S. Sahani, "Fundamentals of Data Structures", Galgotia Booksource Pvt. Ltd, 1999.
2. R. L. Kruse, B. P. Leung, C. L. Tondo, "Data Structures and program design in C", PHI, 2000.

**REFERENCES BOOKS:**

1. Schaum's outline series, "Data Structure", TMH, 2002
2. Y. Langsam et. al., "Data Structures using C and C++", PHI, 1999.
3. Yashwant Kanetkar, "Data Structure through C", BPB, 2005.

**Paper Code: BTECT208**

**L T C**

**Paper: Communication Systems & Circuits – I**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**Unit – I**

Introduction to Electronic Communication systems: Introduction, Electronic communication system, Frequency spectrum of EM waves, Modulation, Bandwidth and information capacity, Transmission

Noise: Internal noise (Thermal, shot, Transit time Miscellaneous); External noise ( Atmospheric, Industrial, Extra Terrestrial); Noise calculations; Noise figure; Noise temperature.

[Hours: 10]

**Unit – II**

Amplitude Modulation systems: Transmission (Principle, spectrum, efficiency, power and current calculation); AM envelop; AM Modulator circuits; AM transmitters; QAM; AM Receivers: Receiver Parameters; (Selectivity, sensitivity, dynamic range, fidelity); TRF Receiver; Superhetrodyne receiver, Low noise Amplifier, Mixer / converter, Noise limiter, Automatic Gain Control circuit

Single sideband communication systems: Single Sideband system, AM SSB full carrier, AM SSB reduced carrier, AM SSB suppressed carrier, AM independent sideband, AM vestigial sideband, Comparison of single sideband transmission to conventional AM, Single sideband generation methods; Single sideband transmitter.

[Hours: 10]

### **Unit – III**

Angle Modulation system: Mathematical Analysis, Deviation sensitivity, Waveforms, Phase deviation and modulation index, Frequency analysis of angle modulated system, Bandwidth requirement of angle modulated system; Noise and angle modulation, Preemphasis and deemphasis, Generation of FM waves, Demodulation of FM waves, Angle Modulation vs. amplitude modulation. [Hours: 10]

### **Unit – IV**

Pulse Analog Modulation, Nyquist theorem: Practical sampling, PAM, PWM and PPM generation and detection.

Noise in CW modulation: Noise calculation in communication system, Noise in Amplitude modulation system, Noise in Angle modulated system, Narrow band noise. [Hours: 10]

### **Text Books:**

1. George Kennedy, "Communication System" TMH – 4th Edition
2. B. P. Lathi, "Modern Digital and Analog Communication System" Oxford University Press – 3rd Edition.

### **Reference Books:**

1. Simon Haykin, "Communication Systems" John Wiley & Sons, Inc 4th Edition.
2. Taub Schilling, "Principles of Communication Systems" TMH, 2nd Edition
3. P. Chakravarti, "Analog Communication Systems" Dhanpatrai & Co.

**Paper Code: BTECT209**

**L T C**

**Paper: ELECTROMAGNETIC FIELDS & TRANSMISSION LINES**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

## **Unit I**

Mathematical Orientation Circuits and Fields, Vector Analysis, Physical Interpretation of Gradient, Divergence and Curl, Vector Relations in other Co-ordinate Systems, Integral, theorems, The Direct Delta, Matrices.

Electrostatics: Fundamental Relations of the electrostatic Field, Gauss's Law, The potential Functions, Field due to a continuous distribution of charge, Equipotential surfaces, Divergence Theorem, Poisson's Equation and Laplace's Equation, Capacitance, Electrostatic Energy, Conditions at a Boundary between Dielectrics, Dirac Delta Representation for a Point Charge, Dirac Delta Representation for an infinitesimal Dipole.

[Hours: 10]

## **Unit II**

Magnetostatics: Magnetic Induction and Faraday's Law, Magnetic Flux Density, Magnetic Field Strength H, Ampere, Gauss Law in the Differential Vector Form, Permeability, Energy Stored in a Magnetic Field, Ampere's Law for a Current Element, Volume Distribution of Current and the Dirac Delta, Ampere's Law Force Law, Magnetic Vector Potential, The Far Field of a Current Distribution.

Maxwell's Equations: The Equation of Continuity for Time Varying Fields, Inconsistency of Ampere's Law, Maxwell's Equations, Conditions at a Boundary Surface.

[ Hours: 10]

### **Unit III**

Electromagnetic Waves: Solutions for Free-space conditions, Uniform Plane-wave Propagation, Uniform Plane Waves. The Wave Equations for a Conduction Medium, Sinusoidal Time Variations, Conductors and Dielectrics, Polarization, Direction Cosines, Reflection from different media, Surface Impedance, The Transmission-line Analogy, Poynting's Theorem

[ Hours: 10]

### **Unit IV**

Transmission Lines: Transmission Line equation, characteristic impedance, propagation constant, attenuation and phase constant, computation of primary and secondary constants, line distortion, Loading of line, artificial lines, reflection coefficient, V.S.W.R., reflection loss, efficiency of transmission, U.H.F. Lines-Smith chart, Quarter wave transformer, single and double stub matching U.H.F. lines as circuit elements, Equalizers-classification, inverse networks, Lattice and Bridge T attenuator equalizers phase equalizer, Attenuator-Symmetrical and asymmetrical, Bridge T and Ladder attenuator, variable attenuator.

[Hours: 10]

### **Text Books**

1. E. C. Jordon, K. G. Balman, "Electromagnetic waves & Radiation System" PHI – 2<sup>nd</sup> Edition.
2. S. P. Seth, "Elements of Electromagnetic Fields" Dhanpat Rai & Sons – 2<sup>nd</sup> Edition.

### **Reference Books:**

1. William H. Hayt, "Engineering Electromagnetics", TMN – 5<sup>th</sup> Edition.

Code No: BTCST209

L T C

Paper: Operating Systems

3 1 4

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

### UNIT – I

Introduction, What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation, Segmentation with Paging Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations, Demand Segmentation [ Hrs.: 10]

### UNIT – II

Processes: Process Concept, Process Scheduling, Operation on Processes, Cooperating Processes, Interprocess Communication CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Algorithm Evaluation Process Synchronization: Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors, Synchronization in Solaris 2, Atomic Transactions

[ Hrs.: 10]

### UNIT – III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Combined Approach to Deadlock Handling.

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Device Characteristics-Hardware Consideration, Input or Output Devices, Storage Devices, Channels and Control Units, Independent Device Operation, Buffering, Multiple Paths, Block Multiplexing, Device Allocation Consideration, Secondary-Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability, Stable-Storage Implementation

[Hrs.: 10]

### UNIT – IV

Information Management: Introduction, A Simple File System, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File System File-System Interface: File Concept, Access Methods, Directory Structure, Protection, Consistency Semantics File-System Implementation: File-System Structure, Allocation Methods, Free-Space Management, Directory Implementation, Efficiency and Performance, Recovery. [Hrs: 10]

**TEXT BOOKS:**

1. Silberschatz and Galvin, "Operating System Concepts", Pearson, 5<sup>th</sup> Ed., 2001
2. Dr. R. C. Joshi, "Operating Systems", Wiley Dreamtech, 2005.

**REFERENCES BOOKS:**

1. Tannenbaum, "Operating Systems", PHI, 4<sup>th</sup> Edition, 2000
2. E. Madnick, J. Donovan, "Operating Systems", Tata McGraw Hill, 2001

## LABS

<b>Code No. : BTEEL202</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Paper: Electrical machines &amp; Drives Lab</b>	<b>0</b>	<b>2</b>	<b>1</b>

### LIST OF EXPERIMENTS.

1. Open circuit and load characteristics of separately excited and self excited D.C. generator.
2. Load test on D.C. shunt motor.
3. Load test on D.C. series motor.
4. Swinburne's test and speed control of D.C shunt motor.
5. Load test on three phase induction motor.
6. No load and blocked rotor test on three phase induction motor ( Determination of equivalent )
7. Load test on single phase induction motor.
8. Study of D.C. Motor and induction motor starters.
9. Parallel operation of Altech motors.
10. V. curves of synchronous motor.
11. Load test on 3 phase slip ring induction motor.
12. To study series and parallel Inverters
13. Speed control of motor using thyristor.

Note: at least 8 experiments are to done in laboratory

**Code No. BTECL205**

**L T C**

**Paper: Digital Circuits & Systems - I Lab.**

**0 2 1**

Practical will be based on Digital Circuits & Systems – I. Some lab experiments must be performed using any circuit simulation software e.g. PSPICE. Following list of Experiments is being recommended:

- (1) To verify the truth table of Logic Gates:-AND, OR, NOR, NAND, XOR & NOT.
- (2) To verify the truth table of Half Adder, Full Adder, Half Subtractor & Full Subtractor.
- (3) To design the circuit for BCD to EXCESS-3 code convertor.
- (4) To design the circuit for Binary to Gray & Gray to Binary code convertor.
- (5) To design the circuit for 3-Bit parity checker & Generator.
- (6) To design the circuit for 4:1 Multiplexer using IC-74153 & using Gates.
- (7) To design the circuit for 8:1 multiplexer using two 4:1 Multiplexer's.
- (8) To design the circuit for D-flip flop using NAND-Gates.
- (9) To design the circuit for JK-flip flop using IC-7473.

**Code No. : BTCSL204**  
**Paper: Data Structures Lab.**

<b>L</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>2</b>	<b>1</b>

Practical will be based on Data Structure.

**Code No. : BTECL206**

**L T P**

**Paper: Communication Systems & Circuits – I Lab.**

**0 2 1**

Practical will be based on Communication Systems & Circuits – I.

Following list of Experiments is being recommended:

1. To study Generation of Double Side Band Suppressed Carrier Amplitude Modulation
2. To study reception of Double Side Band Suppressed Carrier Amplitude Modulation
3. To study Generation of Single Side Band Suppressed Carrier Amplitude Modulation
4. To study reception of Single Side Band Suppressed Carrier Amplitude Modulation
5. Introduction to MATLAB by using
  - a. Amplitude Modulation
  - b. Pulse code Modulation
  - c. Frequency Modulation
6. To study Generation of Frequency Transmitter
7. To study Signal sampling & reconstruction
8. To study Pulse Amplitude Modulation and demodulation with sample and hold and flat top.
9. To study Pulse Position Modulation & DC Modulation using the ware input.To study Pulse Width Modulation.

**Code No. : BTCSL208**  
**Paper: Operating systems Lab.**

<b>L</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>1</b>	<b>1</b>

Practical will be based on Operating system.

## FIFTH SEMESTER

Code No.: BTECT310

L      T      C

Paper: Digital Circuits & Systems – II

3      1      4

### **Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

### **UNIT – I**

**Introduction:** Introduction to Computer-aided design tools for digital systems. Hardware description languages, Introduction to VHDL, Data objects, Classes and data types, Operators, Overloading, Logical operators. Types of delays, Entity and Architecture Declaration, Introduction to behavioral, dataflow and structural models.

[Hrs.: 12]

### **UNIT – II**

**VHDL Statements:** Assignment statements, sequential Statements and process, Conditional statements, Case statements, Array and loops, Resolution functions, Packages & Libraries, Concurrent statements.

[ Hrs.: 10]

### **UNIT – III**

**Combinational Circuit Design:** VHDL models and simulation of combinational circuits such as Multiplexers, Encoders, Decoders, Code converters, Comparators, Implementation of Boolean functions etc.

**Sequential Circuit Design:** VHDL Models and simulation of sequential circuits, Flip flops, Shift registers, Counters ,etc.

[ Hrs.: 10]

### **UNIT-IV**

Generics and Configuration, Functions and Procedure, Model simulation, writing a test bench Design with CPLDs and FPGAs: Programmable logic devices: ROM, PLAs, GAL, PEEL, CPLDs and FPGA. Design and implementation using CPLDs and FPGAs.

[ Hrs.: 08]

**TEXT BOOKS:**

1. J. Bhaskar, "A VHDL Primer", Addison Wesley, 1999.
2. C. H. Roth, "Digital System Design using VHDL", PWS Publishing, 2003.
3. Moris Mano, "Fundamentals of Logic Design", Pearson Education, 3<sup>rd</sup> Edition, 2003.

**REFERENCES BOOKS:**

1. M. Ercegovic, T. Lang and L.J. Moreno, "Introduction to Digital Systems", Wiley, 2000
2. J.F. Wakerly, "Digital Design-Principles and Practices", PHL, 2000.
3. Douglas Perry, "VHDL", MGH, 2000.
4. Michae John Sebastian Smith, "Application-Specific Integrated Circuits", Addison-Wesley, 2000.
5. Z. Navabi, "VHDL-Analysis and Modeling of Digital Systems", MGH, 2000.

Code No.:BTECT311

L T C

Paper: Microprocessors Systems & Applications

3 1 4

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

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*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**Unit I**

Introduction to Microprocessors: Evolution of Microprocessors, Microprocessor & Micro controller, Internal architecture of 8 bit Microprocessor 8085, concept of fetch –decode and execute.  
[Hrs.: 10]

**Unit II**

Assembly Language Programming: 8085 instruction set, Addressing Modes, Data Transfer Instructions, Arithmetic and Logic Instructions, Program Control Instructions (Jumps, Conditional Jumps, Subroutine Call). Different examples of programming.

[ Hrs.: 10]

**Unit III**

Memory Interfacing: Types of Memory, RAM and ROM Interfacing with Timing Considerations, DRAM Interfacing, Memory mapped I/O, I/O mapped I/O.(6)

I/O Interfacing: Concept of Interrupt, Interrupt in 8085: Programmed I/O, Interrupt Driven I/O, DMA, Parallel I/O (8255-PPI, Centronics Parallel Port), Serial I/O (8251/8250, RS-232 Standard), 8259-Programmable Interrupt controller, 8237-DMA Controller, 8253/8254-Programmable Timer/Counter

[ Hrs.: 10]

**Unit IV**

Architecture of 16-bit Microprocessors: Internal Organization of 8086, Bus Interface Unit, Execution Unit, Register Pin diagram, Instruction set, Assembly language programming, Assembler directives, Procedures and Macros, System Timing diagram, Interrupt and Interrupt service procedures.

[ Hrs.: 10]

**Text Books:**

1. Singh & Singh, Microprocessor & Interfacing, Satya prakashan, New Delhi
2. R.Gaonkar, Microprocessor Architecture, Programming & Application, Penram International Publishing.
3. Hall D. V., Microprocessors Interfacing, TMH (2<sup>nd</sup> Edition)

**Reference Books:**

1. Liu, G. A. Gibson, Microcomputer Systems: The 8086 / 8088 Family, PHI 2<sup>nd</sup> Ed.
2. M. Rafiquzzaman, Microprocessors Theory & Applications, PHI
3. B. Ram, Microprocessor and Microcomputers, Dhanpat Rai Pub.
4. Naresh Grover, Microprocessors: Comprehensive Studies, Dhanpat Rai Pub.

Code No.:BTCST311

L T C

Paper: Computer Architecture

3 1 4

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

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*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

## UNIT – I

Introduction and overview: Review of digital components, Evolution of computers.

Register Transfer and Microoperation: Register transfer language, register transfer, bus and memory transfer, arithmetic microoperations, logic microoperations, shift microoperations.

Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, timing & control, instruction cycle, memory reference instructions, input-output and interrupts, design of basic computer, design of accumulator logic.

[ Hrs: 10]

## UNIT – II

Microprogrammed Control Unit: Control memory, address sequencing.

Central Processing Unit: Introduction, general register organization, stack organization, instruction formats, addressing modes.

Pipeline and vector processing Parallel Processing, pipelining, arithmetic pipeline, RISC Pipeline, Vector Processing and Array Processors.

[ Hrs: 10]

## UNIT – III

Computer Arithmetic: Introduction, addition and subtraction, multiplication algorithms, division algorithms, floating point arithmetic operation, decimal arithmetic unit, decimal arithmetic operations.

Input-Output Organization: Peripheral devices, input-output interface, asynchronous data transfer, modes of data transfer, priority interrupt, direct memory access, input-output processor.  
[ Hrs: 10]

#### **UNIT – IV**

Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware.

Multiprocessors: Characteristics of multiprocessor, Interconnection Structure, Interprocessor Communication & Synchronization.  
[ Hrs: 10]

#### **TEXT BOOKS:**

1. M Mano, “Computer System and Architecture”, PHI, 1993.

#### **REFERENCES BOOKS:**

1. Malvino, “Digital Computer Electronics: An Introduction to Microcomputers”, McGraw Hill, 1993.
2. J. P. Hayes, “Computer Architecture and Organization”, McGraw Hill, 1998.
3. W. Stallings, “Computer Organization & Architecture”, PHI, 2001.
4. Dandamudi, “Fundamental of Computer Organization & Design”, Wiley Dreamtech, 2005.

**Paper Code: BTECT312**

**L T C**

**Paper: Communication Systems and Circuits– II**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

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**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**Unit I**

Random Process Probability, Random variable, Random Process, mean, moments, correlation & autocorrelation and covariance functions, ergodicity, power spectral density, Gaussian distribution. [ Hours: 10]

**Unit II**

Baseband Modulation: Review of sampling theorem, uniform and non- uniform quantization, PCM, DPCM, DM, ADM, Mary waveforms, companding.

Baseband Detection: Error performance degradation in communication system, maximum likelihood receiver structure, matched filters, error performance of binary signaling, intersymbol interference, demodulation and detection of shaped pulses, channel characterization, eye pattern. [ Hours: 10]

**Unit III**

Band pass modulation and demodulation :ASK ,FSK ,PSK DPSK, QPSK MSK coherent and non coherent detection of ASK ,FSK ,PSK and other keying techniques.

Probability of bit error for coherently detected BPSK FSK differentially, DPSK etc and comparison of bit error performance for various modulation types.

[ Hours: 10]

#### **Unit IV**

Line coding: NRZ, RZ, Walsh codes , AMI coding , High density bipolar code, binary with n-zero substitution codes.

Channel Coding: Discrete memory less channel, Binary symmetric channel, code rate & redundancy, Parity code, linear block codes, convolution codes, Reed Solomon codes.

Shannon Hartley capacity theorem, Shannon limit, entropy, Huffman coding, LZ coding.

[ Hours: 10]

#### **Text Books:**

1. B. P. Lathi, “Modern Digital and Analog Communication System” Oxford University Press – 3<sup>rd</sup> Edition.
2. Taub Schilling, “Principles of Communication Systems” TMH, 2<sup>nd</sup> Edition.

#### **Reference Books:**

1. Simon Haykin, “Communication Systems” John Wiley & Sons Inc, 4<sup>th</sup> Edition
2. W. Tomasi, “Electronic Communication Systems” Pearson Education, 5<sup>th</sup> Edition

**Paper Code: BTECT313**

**L T C**

**Paper: CONTROL ENGINEERING**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

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**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

### **Unit I**

Definitions of Control Systems, Closed Loop and Open Loop Control, Examples of Control Systems; Laplace Transformation and Solution of Differential Equations; Concept of Mathematical model, Linear and Non-Linear Systems, Transfer Function with Simple Examples; Deriving transfer function of physical systems (Mechanical Translational Systems), Armature controlled and field controlled DC servomotors; AC servomotors and deriving their transfer functions; Block Diagram representation and Simplification.

[ Hours: 10]

### **Unit II**

Signal Flow graph, Mason gain formula; Basic Control Actions: Proportional, integral and Derivative controllers, effect of feedback on control system; Transient and steady state response of first order system; Second order system, transient; Routh's Stability criterion, relative stability analysis; Static error co-efficients, position, velocity and acceleration error co-efficient.

[ Hours: 10]

### **Unit III**

Root Locus Techniques Bode Diagram, Minimum and Non-Minimum phase systems; Determination of Transfer from Bode Diagram; Polar Plots; Nyquist Plot; Stability Analysis using; Constant M & N Loci.

[ Hours: 10]

## **Unit IV**

Introduction to Compensators; Definitions of state, state variables, state space, representation of systems; Solution of time invariant, homogeneous state equation, state transition matrix and its properties; Z transform and solution of different equation; Transducers, synchro-transmitter; Stepper Motor, Tachogenerators; Rotating Amplifiers and Magnetic Amplifiers.

[ Hours: 10]

### **Text Books:**

1. I. J. Nagrath, M. Gopal, "Control System Engineering" New Age International, 2000.
2. N. K. Jain, "Automatic Control System Engineering" Dhanpat Rai, 2<sup>nd</sup> Edition.

### **Reference Books:**

1. Ogata, "Modern Control Engineering" EEE, 4<sup>th</sup> Edition.
2. Kuo, "Automatic Control Systems" PHI – 7<sup>th</sup> Edition.

Code No.:BTHUT303

L T C

**Paper: Principle of Management and Organizational Behaviour**

3 1 4

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

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*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

#### **UNIT – I**

Meaning & Nature of Management, Management Systems and Processes, Managerial Skills, Tasks & Responsibilities of a Professional Manager.

[ Hrs.: 10]

#### **UNIT – II**

Planning Types and Process, Management by Objectives, Decision-Making Models, Organizational context of decisions, Problem solving techniques and processes, Controlling: Process and Techniques

[ Hrs.: 10]

#### **UNIT – III**

Organizational Climate, Culture and Managerial ethos, Organizational structure & Design, Managerial Communication.

[ Hrs.: 10]

#### **UNIT – IV**

Individual Determinants of organizational, Behaviours: Perceptions, Learning, Personality, Attitudes & Values, Motivation, Job Anxiety & Stress, Analysing, Interpersonal relations, Group Dynamics, Management of Organizational Conflicts, Management of Change, Leadership Styles & Influence.

[ Hrs.: 10]

**TEXT BOOKS:**

1. Stephen P. Robbins, David & Decenzo, "Fundamentals of Management", 3<sup>rd</sup> Edition, Pearson Education, 2002.
2. Stoner, et. al., "Management", 6<sup>th</sup> Edition, PHI, 2002.
3. J. S. Chandan, "Organisational Behaviour", Vikas Publishing House, 2004.
4. John M. Ivancevich, T. N. Duening, "Business & Management: Principles and Guidelines", biztantra, Dreamtech, 2005.

**REFERENCES BOOKS:**

1. Joseph W. Weiss, "Organisational Behaviour & Change, Managing Diversity, Cross-Cultural Dynamics & Ethics", 2<sup>nd</sup> Edition, Vikas Publishing House, 2003
2. Richard Pettinger, "Introduction to Management", 3<sup>rd</sup> Edition, Palgrave MacMillan, 2002.
3. Udai Pareek, "Understanding Organisational Behaviour", 1<sup>st</sup> Edition, Oxford University Press, 2004.
4. Fred Luthans, "Organisational Behaviour," 9<sup>th</sup> Edition, McGraw Hill International Edition, 2004.

**Code No. : BTECL307**

**L P C**

**Paper: Digital Circuits & Systems – II Lab.**

**0 2 1**

Practical will be based on Digital Circuits & Systems – II. Following list of Experiments is being recommended:

1. Half Adder using
  - a. Data Flow
  - b. Behavioral
  - c. Structural
2. Full Adder using
  - a. Data Flow
  - b. Behavioral
  - c. Structural
3. 8 : 1 Mux using
  - a. Data Flow
  - b. Behavioral
  - c. Structural
  - d. Case
4. Demux using
  - a. Data Flow
  - b. Behavioral
  - c. Structural
  - d. Case
5. BCD to seven segment Decoder
  - a. Structural
  - b. Data Flow
  - c. Behavioral
  - d. Case
6. 3 : 8 Decoder
  - a. Structural
  - b. Data Flow
  - c. Behavioral
  - d. Case
7. Single bit comparator
  - a. Data Flow
  - b. Behavioral
  - c. Structural
8. Four bit comparator
  - a. Case
  - b. For
9. 4 – Bit parallel adder (1) For.
10. SR flip flop with Reset (Behavioral).
11. JK flip flop with Reset (Behavioral).

12. Priority Encoder (8 x 3) using data flow.
13. Decade counter (Structural).
14. Ring Counter (Structural).
15. UP Down Counter (Structural).
16. SIPO Register (Structural).
17. PISO Register (Structural).
18. FSM (Detecting a sequence 1010).
19. Gates (6) using Test Benches.
20. D flip flop using Behavioral.
21. Positive edge triggered D flip flop with reset.
22. Positive edge triggered T flip flop with reset.

**Code No. : BTECL308**

**L P C**

**Paper: Microprocessor Lab.**

**0 2 1**

Practical will be based on Microprocessor System-I. Following list of Experiments may be considered:

Exp 1. Write a program to load register pair HL with 2905H and register pair BC with 3000H & Add & store the result in DE.

Exp 2. Multiply two 8-bit no. Using successive addition & store the result in a particular memory location.

Exp 3. To subtract an 8 bit number from another 8 bit number using 1's compliment & store the result in the given memory location.

Exp 4. To subtract an 8 bit number from another 8 bit number using 2's compliment and store the result in a particular memory location.

Exp 5. To divide two 8 digit numbers stored at the location 8000H & 8001H & store the quotient & remainder at the 8002H & 8003H.

Exp6. To find square of 8 bit numbers using addition of successive odd integer.

Exp 7. To find square root of 8 bit number using successive subtraction of successive odd integers.

Exp 8. To study microprocessor based traffic controller

Exp9: Microprocessor based temperature measurement

Exp10: ADC/DAC using Microprocessor.

**Code No. : BTECL309**

**L P C**

**Paper: Communication Systems & Circuits - II Lab.**

**0 2 1**

Practical will be based on Communication Systems & Circuits – II. Following list of Experiments is being recommended:

1. To verify the sampling theorem
  - (a) Sampling an analog signal
  - (b) Reconstructing the signal from its samples
2. To study pulse amplitude modulation
  - (a) Sample & Hold Circuit
  - (b) Flat – Top sampling
3. To study different data formatting codes (NRZ (L), NRZ(M), RZ, Biphase Manchester, Biphase Mark, Differentially Encoded)
4. To study Time Division Multiplexed Pulse Code Modulation of a signal.
5. To study modulation and demodulation of a signal amplitude shift keying
6. To study modulation and demodulation of a signal by Frequency Shift Keying
7. To study modulation and demodulation of a signal by Phase Shift Keying.
8. To study delta modulation and demodulation
9. To study adaptive delta modulation & demodulation
10. Introduction to Mat Lab (Communication Toolbox).

Implement any one experiment in Mat lab.

**Code No. :BTECL310**

**L P C**

**Paper: Control Engineering Lab.**

**0 2 1**

Practical will be based on Control Engineering. \* Some lab experiments must be performed using any simulation software e.g. MATLAB. Following list of Experiments is being recommended:

1. DC SPEED CONTROL SYSTEM

- (a) To study D.C. speed control system on open loop and close loop.
- (b) To study of Transient performance, another time signal is added at the input of control Circuit.
- (c) To study how eddy current braking is being disturbance rejected by close and open loop.

2. DC MOTOR POSITION CONTROL

- (a) To study of potentiometer displacement constant on D.C. motor position control.
- (b) To study of D. C. position control through continuous command.
- (c) To study of D.C. position control through step command.
- (d) To study of D.C. position control through Dynamic response.

3. AC MOTOR POSITION CONTROL

- (a) To study of A.C. motor position control through continuous command.
- (b) To study of error detector on A.C. motor position control through step command.
- (c) To study of A.C. position control through dynamic response.

4. MAGNETIC AMPLIFIER

- (a) To study Input / Output characteristic of a magnetic amplifier in mode (i) Saturable Reactor, (ii) Self Saturable Reactor.

5. SYNCHRO TRANSMITTER / RECEIVER

- (a) To study of Synchro Transmitter in term of Position v/s Phase and voltage magnitude with respect to Rotor Voltage Magnitude/Phase.
- (b) To study of remote position indication system using synchro transmitter/receiver.

6. PID CONTROLLER

- (a) To observe open loop performance of building block and calibration of PID Controls.
- (b) To study P, PI and PID controller with type 0 system with delay.
- (c) To study P, PI and PID controller with type 1 system.

7. LEAD LAG COMPENSATOR

- (a) To study the open loop response on compensator.

- (b) Close loop transient response.
8. LINEAR SYSTEM SIMULATOR
- (a) Open loop response
- (i) Error detector with gain, (ii) Time constant, (iii) Integrator
- (b) Close loop system
- (I) first order system (II) second order system (III) Third order system
9. Introduction to MATLAB (Control System Toolbox), Implement atleast any two experiment in MATLAB.

**Code No. :BTECP301**

**L P C**

**Paper: Project work/practical training**

**0 1 1**

## SIXTH SEMESTER

**Paper Code: BTECT314**

**L T C**

**Paper: MICROWAVE ENGINEERING**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

### **Unit I**

Review of Maxwell's equation;

Microwaves: Introduction, areas of application

Wave Guide: Rectangular, cylindrical wave guide; Solution of wave equation, modes and field pattern; Propagation properties; Power transmission; Power losses; Excitation of modes.

[ Hours: 10]

### **Unit II**

Components & Elements: S-parameters; Joint, bends, Irise and screws, short-circuit, Attenuator; Cavity resonators (Cylindrical and rectangular), Frequency meter; Hybrid couplers, Magic Tree; Faraday's rotation, Circulator, Phase shifter.

Microwave Tubes: Klystron Amplifier, Reflex- Klystron; Magnetron (cylindrical); Overview of TWT, CFA.

[ Hours: 10]

### **Unit III**

M/W Solid – state Device & MICS: 6.1 M/W Bipolar Transistor; M/W FET; Varactor and Step –Recovery Diodes; pin Diode, Schottky Diode; Parametric Amplifiers; Tunnel Diode , Gunn Diode; Read Diode ,Impatt, Trapatt; Introduction to MIC, Stripline and Microstrips; Introduction to fabrication of MICs;

[ Hours: 10]

### **Unit IV**

Introduction to Microwave Detectors, Mixers, Switches

Microwave Measurements (Measurements of frequency, power, attenuation, phase shift, VSWR, impedance)

Introduction to Microwave filters.

Introduction to Radar: Radar range equation; Overview of pulsed radar; Overview of CW Doppler Radar; Overview of MTI radar.

[ Hours: 10]

### **Text Books:**

1. S.Y. Liao, “Microwave Devices” PHI – 3<sup>rd</sup> Edition.
2. Kulkarni, “Microwave & Radar Engg.” Umesh Publications, 2<sup>nd</sup> Edition.

### **Reference Books:**

1. Rizzi, “Microwave Engg. Passive Circuits” PHI – 2001.
2. R. E. Collin, “Foundation of Microwave Engineering” Mc. Graw Hill, 2<sup>nd</sup> Edition.
3. Kennedy, “Electronic Communication System” TMH, 4<sup>th</sup> Edition.
4. Pozar, “Microwave Engineering” John Wiely, 2003.

Code No.:BTCST206

L T C

Paper: Software Engineering

3 1 4

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

## UNIT – I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models

Software Requirements analysis & specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD & Use case approach, requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS.

[ Hrs.: 10]

## UNIT – II

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, COCOMO-II, Putnam resource allocation model, Risk Management.

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design

[ Hrs.: 10]

## UNIT - III

Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics, Information Flow Metrics

Software Reliability: Importance, Hardware Reliability & Software Reliability, Failure and Faults, Reliability Models, Basic Model, Logarithmic Poisson Model, Software Quality Models, CMM & ISO 9001.

[ Hrs.: 10]

#### **UNIT - IV**

Software Testing: Testing process, Design of test cases, functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing, Path Testing, Data flow and mutation testing, Unit Testing, Integration and System Testing, Debugging, Alpha & Beta Testing, Testing Tools & Standards.

Software Maintenance: Management of Maintenance, Maintenance Process, Maintenance Models, Regression Testing, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

[ Hrs.: 10]

#### **TEXT BOOKS:**

1. K. K. Aggarwal & Yogesh Singh, “Software Engineering”, 2<sup>nd</sup> Ed., New Age International, 2005.
2. R. S. Pressman, “Software Engineering – A practitioner’s approach”, 5<sup>th</sup> Ed., McGraw Hill Int. Ed., 2001.

#### **REFERENCE BOOKS:**

1. Stephen R. Schach, “Classical & Object Oriented Software Engineering”, IRWIN, TMH, 1996.
2. James Peter, W. Pedrycz, “Software Engineering: An Engineering Approach”, John Wiley & Sons, 2004.
3. I. Sommerville, “Software Engineering”, Addison Wesley, 2004
4. K. Chandrasekhkar, “Software Engineering & Quality Assurance”, BPB, 2005.

Code No.:BTCST315

L T C

Paper: Computer Networks

3 1 4

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

### UNIT – I

Uses of Computer Networks, Network Architecture, Reference Model (ISO-OSI, TCP/IP-Overview, IP Address Classes, Subnetting), Domain Name Registration & Registrars

The Physical Layer: Theoretical basis for data communication, transmission media-Magnetic Media, Twisted Pair, Baseband Coaxial Cable, Broadband Coaxial Cable, Fibre Cable, Structured Cabling, Cable Mounting, Cable Testing, Wireless transmission, the telephone system, narrowband ISDN, broadband ISDN and ATM.

[ Hrs.: 10]

### UNIT – II

The Data Link Layer: Data link layer design issues, error detection and correction, data link protocols, sliding window protocols, Examples of Data Link Protocols.

[ Hrs.: 10]

### UNIT - III

The Medium Access Sublayer: The channel allocation problem, multiple access protocols, IEEE standard 802 for LANS and MANS, high-speed LANs, satellite networks, Network devices-repeaters, hubs, switches and bridges.

[ Hrs.: 10]

## **UNIT – IV**

The Network Layer: Network layer design issues, routing algorithms, congestion control algorithm, internetworking, the network layer in the internet, the network layer in ATM networks.

[ Hrs.: 10]

### **TEXT BOOKS:**

1. A. S. Tananbaum, “Computer Networks”, 3<sup>rd</sup> Ed, PHI, 1999.

### **REFERENCE BOOKS:**

1. U. Black, “Computer Networks-Protocols, Standards and Interfaces”, PHI, 1996.
2. W. Stallings, “Computer Communication Networks”, PHI, 1999.
3. Laura Chappell (ed), “Introduction to Cisco Router Configuration”, Techmedia, 1999.
4. Michael A. Miller, “Data & Network Communications”, Vikas Publication, 1998.
5. William A. Shay, “Understanding Data Communications & Networks”, Vikas Publication, 1999.

**Paper Code: BTECT315**

**L T C**

**Paper: VLSI DESIGN**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**Unit I**

Evolution of VLSI, MOS transistor theory – MOS structure, enhancement & depletion transistor, Threshold voltage, MOS device design equations,

CMOS inverter- DC characteristics, static load MOS inverter, pull up/pull down ratio, static & Dynamic power dissipation, CMOS & NMOS process technology – explanation of different stages in fabrication, latch up.

[ Hours: 10]

**Unit II**

Switching characteristics & inter connection effects: Rise time, fall time delays Inverter design with delay constants. Parasitic effect, Super buffer.

CMOS logic gate design: Fan in, fan out Typical NAND, NOR, delays Transistor Sizing XOR, and XNOR gates.

CMOS logic structures: CMOS complimentary logic, Pseudo NMOS logic,

[ Hours: 10]

**Unit III**

Clocked CMOS logic , pass transistor logic , domino , zipper CMOS.

Clocking strategies: clocked system, latches & Registers, system timing set-up & hold timing, signal phase memory structure, 2 phase clocking, Two phase memory structure,

[ Hours: 10]

**Unit IV**

Two phase logic structure; four phase memory & logic structure

VLSI designing methodology – Introduction, VLSI designs flow, Design Hierarchy Concept of regularity, Modularity & Locality, VLSI design style, Design quality. Computer aided design technology: Design capture and verification tools.

[ Hours: 10]

**Text Books:**

1. S. M. Kang, Y. Lebiebici, “CMOS digital integrated circuits analysis & design” TMH, 3<sup>rd</sup> Edition.
2. Weste and Eshrighian, “Principle of CMOS VLSI Design” Pearson Education, 2001.

**Reference Book:**

1. R. J. Baker, H.W.Li, D. E. Boyce, “CMOS Circuit Design, Layout and Simulation” PHI – 2000.
2. J. M. Rabaey, “Digital Integrated Circuits” PHI – 2<sup>nd</sup> Edition.
3. W. Wolf Pearson, “Modern VLSI Design Systems on Silicon” Pearson Education – 2<sup>nd</sup> Edition.
4. J. P. Vyemura, “Introduction to VLSI Circuits and Systems” John Wiely, 1<sup>st</sup> Edition.

**Paper Code: BTECT316**

**L T C**

**Paper: Telecommunication Networks**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**Unit I**

Introduction to Telecommunication networks: Overview of network structure and services, Overview of regulatory bodies and standards.

Evolution of Basic Switching System: Brief Overview of manual system; Brief overview of strowger step-by step system; Brief overview of Cross system; Brief Introduction to Electromagnetic Exchanges

Control of switching system: Stored Programme Control; Centralized SPC, Distributed SPC; Software Architecture, Application Software; Enhanced Services.

[ Hours: 10]

**Unit II**

Vocoders: Channel Vocoder; Formant Vocoder; Linear Predictive coding (LPC) based Vocoder; Pulse Transmission on Transmission line concepts.

Error detection and correction codes: Error detection codes (parity, Linear block codes, cyclic redundancy check (CRC) codes); Burst error detecting and correcting codes; Convolution codes.

Frequency division Multiplexing (FDM): FDM frames and hierarchy

Time Division Multiplexing (TDM): TDM frames and hierarchy; Bit interleaving; Word interleaving

Space division switching: Two stage network; Multistage network; Blocking probabilities, Lee graphs

Time Division Switching: Time Division space switching; Time Division Time Switching; Time multiplexed space switching; Time multiplexed Time Switching; Combination Switching (two stage- TS, ST switch); Multistage Switching networks (TST, STS, n-stage switches); Blocking probabilities, Lee graphs of multistage switching networks.

[ Hours: 10]

### **Unit III**

Network traffic load and parameters

Grade of Service and Blocking Probability

Telecommunication transmission and Subscriber loops: Cable hierarchy for subscriber loops; Reference equivalents (RE); Two wire to four wire interface; Echoes and singing; Echo suppressors and echo cancellers; Subscriber loop interface (SLIC) and BORSCHT functions; Switching Hierarchy and Routing; Transmission Plans; Signaling Techniques; In channel, Voice frequency signaling; PCM signaling; Common channel signaling; Overview of SS6 and SS7 signaling systems

Radio System: Overview of Ionospheric and Tropospheric scatter communication; Line of sight (LOS) microwave communication; Link behavior, Antenna gain; Link budget analysis; Fading and Diversity techniques.

[ Hours: 10]

### **Unit IV**

Satellite communication; Overview of Geosynchronous and geostationary satellites; VSAT system, SCPC; Overview of FDMA , TDMA and CDMA; Satellite link budget analysis; Overview of Coaxial cable system and optical Network (SONET); Circuit switching and packet switching; Overview of Moderns; Overview of ATM (transport mechanism ,cell structure , switching); Overview of ISDN(Architecture,P-ISDN,B-ISDN); Overview of WLL (Wireless loop); Overview of high data Digital Subscriber loops (ADSL(Asymmetrical Digital Subscriber loop), VDSL); Overview of Local Microwave Distribution Services (LMDS); Overview of AIN(Advanced Intelligent Network)

[ Hours: 10]

#### **Text Books:**

1. Thiagarajan Viswanathan, "Telecommunication switching systems and networks" PHI – 2001.
2. J.C. Ballamy, "Digital Telephony" Wiely, 3<sup>rd</sup> Edition.

#### **Reference Books:**

1. J. E. Flood, "Telecommunication switching and traffic networks" Pearson education, 2002.
2. Freeman, "Telecommunication systems engineering" Wiely, New York – 3<sup>rd</sup> Edition.
3. W Tomasi, "Electronics Communication systems" Pearson – 5<sup>th</sup> Edition.
4. B.P Lathi, "Modern analog and digital communication systems" Oxford, 3<sup>rd</sup> Edition.

**Paper Code: BTECT317**

**L T C**

**Paper: Digital Signal Processing & Applications**

**3 1 4**

**Instructions to the paper setters:**

**Max Marks = 100**

Question paper is divided into three parts.

**Part I** should consist of THREE questions. **Q1** should consist of TEN true/false questions each of ONE mark. **Q2** should consist of TEN multiple choice questions each of ONE mark. **Q3** consists of TEN short questions each of TWO marks. This part is of 40 marks

**Part II** should consist of SEVEN questions out of which student has to attempt FIVE questions each of FOUR marks. This part is of 20 marks.

**Part III** should consist of SIX questions out of which student has to attempt FOUR questions each of TEN marks. This part is of 40 marks.

*Note: Examiner must ensure that each Part of the Question paper covers all the four units of the syllabus.*

**Unit I**

DFT, FFT, Algorithms, Hilbert transform, stability, structures of FIR, IIR filters Design of FIR filter using window method, Park Mcdleard method, Effect of finite register length in FIR filter design.

[ Hours: 10]

**Unit II**

Design of IIR filter, Butterworth, chebyshev and elliptic approximation, transformation methods, LP, BP, HP BS filters.

[ Hours: 10]

**Unit III**

Algorithms for optimizations and design of digital filters

Adaptive Filters: Kalman filter, wiener filters, applications in adaptive filtering.

[ Hours: 10]

**Unit IV**

Parametric and nonparametric spatial estimation, introduction to multirate signal processing

Application of DSP to speech and Radar signal processing DSP processor architecture

[ Hours: 10]

**Text Books:**

1. Proakis, "Digital Signal Processing" PHI – 3<sup>rd</sup> Edition.
2. Openheing & Schafer, "Digital Signal Processing" PHI – 1997.

**Reference Books:**

1. S. K. Mitra, "Digital Signal Processing" (PHI) – 2<sup>nd</sup> Edition.
2. Johny Johnson, "Introduction to Digital Signal Processing" PHI – 1992.

LABS

**Code No. :BTECL311**

**L      P      C**

**Paper: Microwave Engineering Lab.**

**0      2      1**

Practical will be based on Microwave Engineering. Following list of Experiments is being recommended:

1. Study of microwave components and set up a microwave bench
2. Find frequency and wavelength from a given microwave source
3. Find low and high VSWR
4. Study and plot characteristics of reflex klystron
5. Study properties of directional coupler
6. Study properties of magic tee
7. Study E and H pattern of horn antenna
8. Study characteristics of gunn diode
9. Study microwave office and design one microwave component of your choice

**Code No. : BTCSL205**

**L P C**

**Paper: Software Engineering Lab.**

**0 2 1**

Practical will be based on Software Engineering.

**Code No. BTECL312**

**L P C**

**Paper: VLSI Design Lab.**

**0 2 1**

Practical will be based on VLSI Design. Following list of Experiments is being recommended:

- (1) Introduction to Tanner tool.
- (2) To study and analyse characteristics of NMOS circuit.
- (3) To study and analyse characteristics of PMOS circuit
- (4) To study transient analysis of CMOS inverter.
- (5) To study DC and transient analysis of CMOS NAND Gate
  
- (6) To study DC and transient analysis of CMOS NOR Gate
  
- (7) To implement D flipflop using nmos and pmos
- (8) To implement SR Latch using nmos and pmos
- (9) To implement Ring Oscillator circuit
- (10) To implement CMOS XOR Gate

**Code No. : BTECL313**

**L P C**

**Paper: Telecommunication Networks Lab.**

**0 2 1**

Practical will be based on Telecommunication Networks. Following list of Experiments is being recommended:

1. Study of Telephone Instrument:
  - a. Keyboard Section
  - b. Dialer Section
  - c. Sound / Speech Section
  - d. Voltage Dropper Section
  - e. Line in/protector section
2. Study of Electronic Private Automatic Branch Exchange (EPABX).
3. Establishing a connection between two telephone instruments using EPABX.
  - a. To make extension to extension connection.
  - b. To redial last dialed number.
4. Identification of possible faults in telephone instrument such as:
  - a. MIC of the handset not working.
  - b. Speaker of the handset not working.
  - c. No. dialing possible in pulse mode.
  - d. Incoming line gets disconnected.
5. Study of Pulse Code Modulation Technique.
  - a. Pulse Code Modulation Transmitter
  - b. Pulse Code Demodulation Receiver
6. Introduction to MATLAB Functions.
  - a. encode ( )
    - i. linear
    - ii. cyclic
    - iii. hamming
  - b. cyclpoly (n, k)
  - c. gfprim df (n, k)
  - d. decode (code, n, k)
  - e. synd table (m)
7. Implementation of Error Detection Code (Hamming code)
  - a. Coder
  - b. Decoder
8. Implementation of Cyclic Codes
  - a. Coder
  - b. Decoder

Project: Case study of any section of Telephone Instrument

**Code No. : BTECL314**

**L      P      C**

**Paper: Digital Signal Processing Lab**

**0      2      1**

**Practical will be based on Digital Signal Processing and Applications. Following list of experiments is being recommended:**

1. To perform matrix functions on matlab.
2. Generation of impulse signal.
3. Generation of step signal.
4. Generation of ramp signal.
5. Convolution of two signals.
6. Cross Correlation and auto correlation of two signals.
7. Implementation of DFT algorithm on matlab.
8. Implementation of IDFT algorithm on matlab.
9. Generation of any function using matlab programming.
10. Implementation of a low pass butterworth IIR filter on matlab.
11. Implementation of a low pass, high pass and band pass FIR filters using various window method on matlab.

**Code No. : BTHUL303**

**L P C**

**Paper: \* Foreign Language Lab**

**0 1 1**

**\*NON UNIVERSITY EXAMINATION SYSTEM**

A college committee will evaluate the performance of the students & marks will be awarded accordingly.