

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Electrical Engineering

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Electrical Machines (203106209)

Type of Course: BTech

Prerequisite: Knowledge of basics of Electrical Engineering.

Rationale: Knowledge of different electrical machines is essential for student to understand applications of various types of electrical machines which are employed in industries, power stations, domestic and commercial appliances etc. The knowledge acquired by the students will help them to design, test, trouble-shoot problems in electrical motors and generators.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
3	0	0	3	60	-	20	20	-	100

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	Principles of Electromagnetic Energy Conversion: Forces and Torques in Magnetic Field Systems; Singly Excited and Multi- Excited Field Systems; Elementary Concepts of Rotating Machines; ventilation and cooling, machine ratings, leakage and harmonic fluxes.	15%	7
2	Transformer: Working principle, Construction, Types, EMF equation, resistance and leakage reactance, Equivalent circuit, transformer testing, Transformer losses, Effect of load, Regulation of transformer, Auto transformer, Instrument transformers, Current transformers, Potential transformers, Three phase transformer.	15%	7
3	Direct-Current Machines: DC generator: Constructional features, type EMF equation of DC generator, Methods of excitation, condition for maximum efficiency; Armature reaction; commutation, Characteristic of a DC shunt generator. DC motor: working principle, voltage equation, condition for maximum power, torque developed, characteristics of DC motors, starting of DC motors, 3-point starter and 4-point starter, speed control methods of DC motors.	27%	12

4	Induction Machines: 3-phase induction machine: Construction, type, Rotating Magnetic Field; principle of operation, Slip; rotor circuit parameter, Equivalent circuit, testing, torque production; full load torque, starting torque and maximum torque and its relations; Torque-Slip characteristic; Speed control, Starting methods, Induction generator, Applications. 1-phase induction motor: double revolving theory, starting methods, application.	27%	12
5	Synchronous Machines: Alternator: Construction, basic principle, EMF equation, Equivalent circuit, O.C. and S.C. characteristics, alternator on load. Synchronous Motor: Basic principle, methods of starting, applications.	9%	4
6	Special Purpose Motor:: Stepper Motor, Servo Motor, BLDC Motor	7%	3

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Electrical Technology (Vol-II) (TextBook)
B L Theraja & A K Theraja; S Chand
2. Electrical Machinery
Dr P.S. Bhimbra; Khanna Publishers
3. Electrical Machinery
A E Fitzgerald, Charles Kingsley, Jr. Stephen D. Umans; McgrawHil
4. Electrical Machine
Smarajit Ghosh; Pearson
5. Electrical Machine
D P Kothari & I J Nagrath; TATA McgrawHill

Course Outcome:

After Learning the course the students shall be able to:

1. Explain the electromagnetic system for converting electrical energy into mechanical energy.
2. Explain the construction, working principle and applications of different electrical machines.
3. Understand the functions of different electrical machines and its extent of application in daily life.
4. Demonstrate speed control of different electrical motors and its role in automation.
5. Test different electrical machines and determine their performance parameters.
6. Identify the application of special purpose motors.

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Electrical Engineering

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Electrical Machines Lab (203106210)

Type of Course: BTech

Prerequisite: Knowledge of basics of electrical engineering.

Rationale: Practical aspects of this subject will make the students capable of performing various tests on the electrical machines and to determine the performance parameters of electrical machines.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/	Tut Hrs/	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
0	0	2	1	-	30	-	-	20	50

Lect - Lecture, Tut - Tutorial, Lab - Lab, T - Theory, P - Practical, CE - CE, T - Theory, P - Practical

Course Outcome:

After Learning the course the students shall be able to:

After Learning the course the students shall be able to:

1. Interpret various characteristics of DC Machines.
2. Estimate various parameters after conducting different tests on DC machine.
3. Estimate various parameters after conducting different tests on induction machine.
4. Assess the performance of transformers.
5. Illustrate the speed control of DC motor and induction motor.

List of Practical:

1. **To study construction details of DC machine and draw sketches of different components.**

To study construction details of DC machine and draw sketches of different components.

2. **To study 3 point and 4 point starter.**

To study 3 point and 4 point starter.

3. **To obtain external characteristics of self excited DC shunt generator.**

To obtain external characteristics of self excited DC shunt generator.

4. **To perform speed control of DC shunt motor by armature control and field control.**

To perform speed control of DC shunt motor by armature control and field control.

5. **To perform open circuit and short circuit test on a single phase transformer.**

To perform open circuit and short circuit test on a single phase transformer.

6. **To perform load test on single phase transformer.**

To perform load test on single phase transformer.

7. To perform parallel operation of two single phase transformer.

To perform parallel operation of two single phase transformer.

8. To perform speed control of three phase induction motor by cascade connection.

To perform speed control of three phase induction motor by cascade connection.

9. To perform load test on three phase induction motor.

To perform load test on three phase induction motor.

10. To perform no load and block rotor test on three phase induction motor to find the performance parameters with the help of equivalent circuit.

To perform no load and block rotor test on three phase induction motor to find the performance parameters with the help of equivalent circuit.

11. To perform no load and block rotor test on single phase induction motor.

To perform no load and block rotor test on single phase induction motor.

12. To perform load test on single phase induction motor.

To perform load test on single phase induction motor.

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Electronics & Communication Engineering

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Digital System Design (203107203)

Type of Course: BTech

Prerequisite: Knowledge of Number Systems and Basic Electronics.

Rationale: The main objective of this subject is to inculcate basic concepts of digital circuits and system, which leads to design of complex digital system such as microprocessors. The course aims to familiarize students with combinational and sequential circuits using digital logic fundamentals.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
3	0	0	3	60	-	20	20	-	100

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De Morgan's Theorem, SOP & POS forms, Canonical forms, Karnaugh maps up to 6 variables, Binary codes, Code Conversion.	20%	10
2	MSI devices: Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display, Half and Full Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Barrel shifter and ALU.	25%	12
3	Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Shift registers, Finite state machines, Design of synchronous FSM, Algorithmic State Machines charts. Designing synchronous circuits like Pulse train generator, Pseudo Random Binary Sequence generator, Clock generation.	25%	13
4	Logic Families and Semiconductor Memories: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing, Memory elements, Concept of Programmable logic devices like FPGA. Logic implementation using Programmable Devices.	15%	5

5	VLSI Design flow: Design entry: Schematic, FSM & HDL, different modeling styles in VHDL, Data Types and objects, Dataflow, Behavioral and Structural Modeling, Synthesis and Simulation in VHDL :constructs and codes for combinational and sequential circuits.	15%	5
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***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Modern Digital Electronics
R. P. Jain; Tata McGraw-Hill Education
2. Fundamentals of Logic Design
Charles H. Roth, Jr., & Larry L. Kinney; Cengage Learning

Course Outcome:

After Learning the course the students shall be able to:

- 1.Design and analyze combinational logic circuits.
- 2.Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder.
- 3.Design & analyze synchronous sequential logic circuits.
- 4.Use HDL & appropriate EDA tools for digital logic design and simulation.

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Electronics & Communication Engineering

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Digital System Design Lab (203107204)

Type of Course: BTech

Prerequisite: Knowledge of Number Systems and Basic Electronics

Rationale: The main objective of this subject is to inculcate basic concepts of digital circuits and system, which leads to design of complex digital system such as microprocessors. The course aims to familiarize students with combinational and sequential circuits using digital logic fundamentals

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
0	0	2	1	-	30	-	-	20	50

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Course Outcome:

After Learning the course the students shall be able to:

1. Design and analyze combinational logic circuits.
2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder.
3. Design & analyze synchronous sequential logic circuits.
4. Use HDL & appropriate EDA tools for digital logic design and simulation.

List of Practical:

1. Code converter (binary to gray/gray to binary code)

To design and realize operation of a combinational circuit to convert binary to gray/gray to binary code

2. Adder (half-adder and full-adder) combinational circuit

To design and realize operation of half-adder and full-adder combinational circuit

3. Subtractor (half subtractor and full subtractor) combinational circuit

To design and realize operation of half subtractor and full subtractor combinational circuit

4. Multiplexer.

To design and realize operation of multiplexer.

5. Encoder and decoder

To design and realize operation of encoder and decoder

6. SR flip flop

To design and implement SR flip flop

7. JK flip flop

To design and implement JK flip flop

8. 4-bit ripple counter

To design and implement 4-bit ripple counter

9. Shift Register

To design and implement Shift Register

10. Introduction to VHDL

Introduction to VHDL

11. Introduction of Xilinx ISE with examples of basic gates

Introduction of Xilinx ISE with examples of basic gates

12. Implementation of All Universal Gates using VHDL.

Implementation of All Universal Gates using VHDL.

13. Implementation of Half Adder and Full Adder using VHDL

Implementation of Half Adder and Full Adder using VHDL

14. Implementation of multiplexer using VHDL

Implementation of multiplexer using VHDL

15. Implementation of D – Flipflop and T- Flipflop using VHDL.

Implementation of D – Flipflop and T- Flipflop using VHDL.

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Biomedical Engineering

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Simulation and Design Tools (203111204)

Type of Course: BTech

Prerequisite: Basic knowledge of Electronics circuit design and Mathematics

Rationale: The course provides introduction to Simulation and Designing softwares for electronic circuit design. Using simulation software the students can design and analyze various analog and digital circuits. The students can design PCB layout for the desired circuits using PCB design tools. Using simulation software like MATLAB/SCILAB various electronics and mathematical concept can be implemented.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/	Tut Hrs/	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
0	0	2	1	-	30	-	-	20	50

Lect - Lecture, Tut - Tutorial, Lab - Lab, T - Theory, P - Practical, CE - CE, T - Theory, P - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	Introduction to MultiSIM software: General purpose circuit simulation using Schematic Editor, Introduction to netlist command based Multisim simulation, Basic netlist commands. Basic circuit analyses: DC, AC Transient.	56%	15
2	Introduction to PCB Design: Schematic Entry, Netlist Creation, Working with component libraries, Design of Boards, Layout of Parts, Optimizing Parts Placements, Pads and Via, Manual and Auto Routing, Handling Multiple Layers.	22%	5
3	Introduction to SCILAB/MATLAB: Introduction to SCILAB/MATLAB, SCILAB/MATLAB functions. Writing simple programs using SCILAB/MATLAB, Handling arrays, files, plotting of functions etc. Writing SCI/.m files for Creation of analog & discrete signals, Plotting of signals etc. Simulation of electronic circuits using SCILAB/MATLAB.	22%	10

*Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

- MATLAB and SIMULINK for Engineers
Agam Tyagi; Oxford Higher Education
- Modeling and Simulation in Scilab/Scicos
Stephen L. Campbell; Springer

Useful Links:

1. <http://www.ni.com/multisim>
2. <https://www.coursera.org/course/matlab>
3. www.scilab.org

Course Outcome:

After Learning the course the students shall be able to:

After Learning the course the students shall be able to:

1. Design the electronics circuits using software tools like Multisim/Orcad/P-Spice etc.
2. Simulate various analog and digital circuits using Multisim/Orcad/P-Spice
3. Able to design PCB for given circuit using PCB Software like EAGLE, ExpressPCB, OrCAD.
4. Use open source SCILAB tool and write simple programs
5. Plot various waveforms using SCILAB.
6. Simulate basic electronic system blocks using SCILAB

List of Practical:

1. **Introduction Of Matlab Software.**
2. **Generate The Simple Plots Of Sine, Cosine, Square And Exponential Waveforms Using Matlab.**
3. **Generate The Simple Plots Of Discrete Sine, Cosine, Square And Exponential Waveforms Using Matlab.**
4. **Matlab As A Tool For Solving Laplace Transform.**
5. **Write A Matlab Program For Matrix Operations.**
6. **Introduction Of Simulink.**
7. **Introduction To Multisim.**
8. **Part A: To Study The Applications Of A P-N Junction Diode As A Half Wave Rectifier. Part B: To Simulate Clamper Circuits.**
9. **To Verify The Characteristics Of Npn Transistor In Common Base Configuration.**
10. **Simulation Of Class A Power Amplifier Circuit Using Multisim.**
11. **Simulation Of Integrator Circuit Using Op-Amp Using Multisim.**
12. **Simulation Of Gates Using Multisim.**
13. **Simulation Of 4 X 1 Multiplexer Using Multisim.**
14. **Simulation Of SR Flip-Flop Using Multisim.**
15. **Simulation Of Asynchronous Counter Using.**

16. To Design And Simulate The Serial In/Serial Out Resistor Using Multisim.

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Biomedical Engineering

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Control Theory (203111205)

Type of Course: BTech

Prerequisite: Knowledge of Linear differential equations, Different equations and its solution and Laplace transform

Rationale: The course explores the fundamentals of control systems, understanding and predicting system behavior and design and analysis of closed loop control systems

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
3	0	0	3	60	-	20	20	-	100

Lect - Lecture, Tut - Tutorial, Lab - Lab, T - Theory, P - Practical, CE - CE, T - Theory, P - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	Introduction to Control Systems: Introduction, Examples of Control Systems, Closed-Loop Control versus n-Loop Control, Digital Computer Control, The Control Problem.	5%	3
2	Mathematical Modeling of Control Systems: Introduction, Transfer Function and Impulse-Response Function, Automatic Control Systems, Transformation of Mathematical Models with MATLAB. Mathematical Modeling of Mechanical Systems, Mathematical Modeling of Electrical Systems, and Block diagram Model, Signal flow graph.	15%	8
3	State Variable Models: Concept of State Variable, State equation, State-Space Representations of Transfer-Function Systems, Transformation of System Models with MATLAB, Solving the Time-Invariant State Equation, Some Useful Results in Vector-Matrix Analysis.	15%	6
4	Feedback Characteristics of Control System: Feedback and non-feedback Systems, Reduction of parameters variations by use of feedback, Control over System dynamics by use of feedback, Control of the effects of disturbance signal by use of feedback, Linearizing effect of feedback, Regenerative feedback.	5%	3

5	Time response analysis: Design Specifications and Performance Indices: Standard Test signal, Time response of first order systems, Time response of second order systems, Steady-state errors and errors constants, Effect of adding zero to a system, Design specifications of second order systems, Design consideration of higher order systems, Performance Indices.	10%	5
6	Concept of Stability and algebraic Criteria: The Concept of Stability, Necessary condition of stability, Hurwitz stability criterion, Routh stability criterion, Relative stability analysis.	5%	3
7	Control Systems Analysis and Design by the Root-Locus Method: Introduction, Root-Locus Plots, Plotting Root Loci with MATLAB, Root-Locus Plots of Positive Feedback Systems, Root-Locus Approach to Control-Systems Design.	10%	4
8	Control Systems Analysis and Design by the Frequency-Response Method: Introduction, Correlation between time and frequency response, Polar plots, Bode plots, All pass and minimum phase systems, Log magnitude versus Phase plots.	15%	6
9	Stability in frequency domain: Introduction, Mathematical Preliminaries, Nyquist stability criterion, assessment of relative stability using Nyquist criterion.	10%	3
10	PID Controllers and Modified PID Controllers: Introduction, Ziegler–Nichols Rules for Tuning PID Controllers, Design of PID Controllers with Frequency-Response Approach, Modifications of PID Control Schemes, Two-Degrees-of-Freedom Control.	10%	5

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Modern Control System
Richard C. Dorf and Robert H. Bishop
2. Modern Control Engineering
Katsuhiko Ogata; Prentice Hall of India
3. Control Systems Engineering
Nagrath and Gopal; New Age Publication
4. Automatic Control Systems
Benjamin C.Kuo; John Wiley & Sons
5. Feedback and Control Systems
Joseph J Distefano

Course Outcome:

After Learning the course the students shall be able to:

After learning the course the students will be able to:

1. Apply systems theory to complex real world problems in order to obtain models that are expressed using differential equations, transfer functions, and state space equations.
2. Predict system behavior based on the mathematical model of that system where the model may be expressed in time or frequency domain.
3. Analyze the behavior of closed loop systems using tools such as root locus, Routh Hurwitz, Bode, Nyquist plot.
4. Obtain models of dynamic systems in transfer function and state space forms.
5. Design of PID Controllers with Frequency-Response Approach.

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Biomedical Engineering

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Control Theory Lab (203111206)

Type of Course: BTech

Prerequisite: Knowledge of Linear differential equations, Different equations and its solution and Laplace transform

Rationale: The course explores the fundamentals of control systems, understanding and predicting system behavior and design and analysis of closed loop control systems

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/	Tut Hrs/	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
0	0	2	1	-	30	-	-	20	50

Lect - Lecture, Tut - Tutorial, Lab - Lab, T - Theory, P - Practical, CE - CE, T - Theory, P - Practical

Course Outcome:

After Learning the course the students shall be able to:

After learning the course the students will be able to:

1. Analyze the response of the closed and open loop systems.
2. Analyze the stability of the closed and open loop systems.
3. Develop the mathematical model of the some electrical and mechanical systems.
4. Predict system behavior based on the mathematical model of that system using MATLAB.
5. Analysis effect of PID controller on system.

List of Practical:

1. Introduction to MATLAB for Control System.
2. Introduction to simulink and various block sets.
3. Analysis different input signals to control system.
4. Analysis of linear time-invariant systems and representation.
5. Write a MATLAB program for reduction of block diagram.
6. Plotting response of first order circuit and second order circuits with the help of MATLAB programming.
7. Obtain the root locus plot for the system using MATLAB.
8. Obtain the bode plot for the system using MATLAB.

9. Obtain the Nyquist plot for the system using MATLAB.
10. Basic concept of state space and its conversion using MATLAB.
11. Simulation of control system represented in state space form.
12. Analysis effect of P, PD, PI, PID controller on system.

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Mechatronics

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Engineering Thermodynamics (203113201)

Type of Course: BTech

Prerequisite: Elements of Mechanical Engineering

Rationale: Knowledge of Engineering Thermodynamics is required to design any device involving the interchange between heat and work or the conversion of material to produce heat.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
3	1	0	4	60	30	20	20	20	150

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	<p>BASICS OF THERMODYNAMICS::</p> <p>(a) Thermodynamic System, properties, process, cycle, thermodynamic equilibrium, Quasi-static Process, Zeroth Law of thermodynamics, Work and Heat transfer, flow work.</p> <p>(b) First Law of thermodynamics, internal energy, proof of internal energy as a point function, application of first law to non-flow process and steady flow process.</p>	20%	10
2	<p>SECOND LAW OF THERMODYNAMICS AND ENTROPY::</p> <p>(a) Second law of thermodynamics: Limitations of the First Law, Thermal Reservoir, Heat Engine, Heat pump and Refrigerator, Parameters of performance, Second Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence, PMM of Second kind, reversibility and irreversibility, causes of irreversibility, Carnot cycle, Carnot theorem, Absolute thermodynamic temperature scale.</p> <p>(b) Entropy: Clausius theorem, Entropy - as a property, the inequality of Clausius, Entropy principle and its applications, Entropy change during different thermodynamic processes.</p>	25%	10
3	<p>PROPERTIES OF PURE SUBSTANCE::</p> <p>Thermodynamic properties of pure substances in solid, liquid and vapour phases, Phase Transformations, dryness fraction, Triple point, critical state, p-v, p-T, T-s, h-s diagrams, P-V-T surfaces, Properties and processes in ideal vapour, use of steam tables and Mollier's diagram in determination of steam properties, energy interaction and entropy calculations for various thermodynamic processes.</p>	15%	8

4	<p>PROPERTIES OF GASES MIXTURE::</p> <p>(a) Equation of state: Ideal gas equation of state, deviation of Real gas from ideal gas, van der waal's equation of state, correction for the intermolecular attractions, Evaluation of constants a and b, virial expansions, limitations of the van der Wall's equation, Reduced coordinates, compressibility factor, the law of corresponding states as per van der Waal's principle.</p> <p>(b) Mixture of perfect gases: Mass Fraction, Mole fraction, Dalton's Law of additive pressure, Properties of mixture of ideal non reactive gases – gas constant, molecular weight, specific heat, internal energy, enthalpy and entropy.</p>	15%	8
5	<p>AVAILABILITY AND IRREVERSIBILITY::</p> <p>(a) Availability and Irreversibility: Available energy, availability of a closed system, availability of steady flow system, Helmholtz function, Gibbs functions, Irreversibility for closed and open system, Second law efficiency.</p> <p>(b) Thermodynamic Relationships: Maxwell's equations, T-ds equations, difference in heat capacities, coefficient of Volume expansion and isothermal compressibility, adiabatic compressibility, ratio of specific heat, energy equations, Joule-Kelvin effect, Clausius – Clapeyron equation.</p>	25%	12

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Thermodynamics - An Engineering Approach (TextBook)
Cengel & Boles; McGraw Hill
2. Engineering Thermodynamics
P.K. Nag; Tata McGraw Hill
3. Fundamental of Engineering Thermodynamics
R. Yadav; CPH Publications
4. Thermal Science & Engineering
D.S. Kumar; S.K. Kataria & Sons
5. Thermodynamics
C.P. Arora; Tata McGraw Hill
6. Engineering Thermodynamics
M.Achuthan; Prentice Hall India
7. Fundamentals of Engineering Thermodynamics
Moran & Shapiro; 7th Edition

List of Tutorial:

1. **Problems based on Basic Concept And First Law of Thermodynamic.**
2. **Problems solving related to Second Law and Concept of Entropy.**
3. **Study about Properties of Pure Substance.**
4. **Availability and irreversibility.**

5. Study about Phase Change Heat Transfer.

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Applied Science & Humanities

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Transforms and PDE (203191201)

Type of Course: BTech

Prerequisite: Basic Concepts of Ordinary Differential Equations, Transforms and Fundamentals of Calculus.

Rationale: The course provides solution techniques of Partial Differential Equations and Transforms.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
3	2	0	5	60	-	20	20	-	100

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	UNIT-1-LAPLACE TRANSFORM: Laplace Transform, Linearity of Laplace Transform, Laplace transform of elementary function, Inverse Transform, First Shifting Theorem, Differentiation and Integration of Transform, Transform of Derivatives and Integrals, Unit Step Function, Second Shifting Theorem, Dirac's Delta Function, Convolution theorem, Partial Fraction, Solution of Ordinary Differential Equations, Evaluation of integrals by Laplace transform	26%	12
2	UNIT-2-Fourier Series, Fourier Integral and Fourier Transform: Periodic Function, Trigonometric series, Fourier Series, Function of any period $p=2L$, Even and Odd function, Half Range Expansion, Fourier Integral, Fourier sine and cosine Integral, Fourier transforms	18%	8
3	UNIT-3-Z- Transform: Linearity, Z- transform of elementary functions, Shifting theorem, initial and final value theorem, Convolution theorem, inversion of Z- transform, solution of difference equations by Z- Transforms	16%	7

4	<p>UNIT-4 Partial Differential Equations:</p> <p>Definition of Partial Differential Equations, First order partial differential equations, solutions of first order linear PDEs; Solution to homogenous and non-homogenous linear partial differential equations of second order by complimentary function and particular integral method. Second-order linear equations and their classification, Initial and boundary conditions, D'Alembert's solution of the wave equation; Duhamel's principle for one dimensional wave equation. Heat diffusion and vibration problems, Separation of variables method to simple problems in Cartesian coordinates. The Laplacian in plane, cylindrical and spherical polar coordinates, solutions with Bessel functions and Legendre functions. One dimensional diffusion equation and its solution by separation of variables.</p>	40%	18
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***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Advanced Engineering Mathematics
Erwin Kreyszig; Willey India Education
2. Transforms and Partial Differential Equations
Manish Goyal and N.P. Bali; University Science Press; Second Edition, 2010

Course Outcome:

After Learning the course the students shall be able to:

After learning the course the students will be able to:

- Solve differential equation by Laplace transform
- Evaluate differential equation using Z-transform
- Determine Partial Differential Equations

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of CDC

SYLLABUS FOR 3rd Sem BTech PROGRAMME Professional Communication Skills-1 (203193201)

Type of Course: BTech

Prerequisite:

Rationale: Knowledge and application of English, Aptitude and Management Skills are crucial for better employability as well as professionalism

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
1	1	0	2	-	-	-	100	-	100

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	Technical Writing: Email etiquette & Email writing Letter Writing (Types of letters & Layout): <ul style="list-style-type: none"> Trains students on detailed email and letter writing etiquette. Students will be able to write formal letters following certain stipulated formats. They will learn different types of letters for different official purposes. 	10%	6
2	Interpersonal Communication at Workplace: Dynamics of communication: <ul style="list-style-type: none"> To develop the confidence to handle a wide range of demanding situation more effectively at the workplace To enable the students to analyse their own interpersonal communication style. 	5%	2
3	Debate: The three minute debate planner: <ul style="list-style-type: none"> To enable the students to generate effective critical thinking into primary issues in the given topic. Students will be able to resolve controversies and recognize strengths and weaknesses of arguments. 	10%	3
4	Goal setting & Tracking: <ul style="list-style-type: none"> To enable the students to define strategies or implementation steps to attain the identified goals and make progress everyday. 	5%	2
5	Time Management & Task Planning (Case –study): <ul style="list-style-type: none"> To enable the students to identify their own time wasters and adopt strategies to reduce them. To enable students to clarify and prioritise their objective and goals by creating more planning time 	3%	2
6	Reading Comprehension: Intermediate level: <ul style="list-style-type: none"> To enable the students develop the knowledge, skills, and strategies they must possess to become proficient and independent readers 	5%	2

7	Listening Skills: Small everyday conversation & comprehension: <ul style="list-style-type: none"> Provides practice on understanding accents and day to day conversations. Listening to English conversations in different context. 	10%	1
8	Information design and writing for print and online media: Blog Writing: <ul style="list-style-type: none"> To enable students to design information that is targeted to specific audiences in specific situation to meet defined objectives. To create blogs and share their own knowledge and experience to the world. 	3%	2
9	Advanced vocabulary Building:: <ul style="list-style-type: none"> The students will expand their vocabulary so as to enhance their proficiency in reading and listening to academic texts, writing, and speaking. The students will attain vocabulary to comprehend academic and social reading and listening texts. The students will develop adequate speaking skills to communicate effectively. 	5%	5
10	Picture Perception: <ul style="list-style-type: none"> To prepare the students for a test for basic intelligence and IQ, generally done on the first day of SSB (Sashastra Seema Bal is one of India's Central Armed Police Forces) 	5%	1
11	Game of Truth (Activity): <ul style="list-style-type: none"> To make the students think of significance of certain things in their life. To make them share their thoughts and perception of matters in life, with others. 	0%	1
12	Appreciation, Apology and Acknowledgement letters: <ul style="list-style-type: none"> To enable the students to maintain productive business relationship through different types of letters. To enable the students to express their feelings without speaking out loud. 	7%	2
13	The Art of Negotiation: <ul style="list-style-type: none"> To enable the students to reach an agreement for mutual benefits through negotiation. To enable the students to learn a process by which compromise or agreement is reached while avoiding argument and dispute. 	2%	1
14	Coding & decoding, series, analogy, odd man out and Visual reasoning: <ul style="list-style-type: none"> The topic consist of Coding and Decoding ,Series, Analogy ,Odd Man Out , Visual Reasoning which going to help students to sharpen their brain 	5%	2
15	Profit and loss, Partnership and averages: <ul style="list-style-type: none"> This topic is going to help student to understand Basic terminologies in profit and loss , Partnership, Averages , Weighted average ,Mixtures and alligations 	5%	3
16	Job Vs Career, Career Planning Basics: <ul style="list-style-type: none"> This topic is going to help student to understand Basic terminologies in profit and loss , Partnership, Averages , Weighted average ,Mixtures and alligations 	4%	2
17	Data arrangement and blood relations: <ul style="list-style-type: none"> Students are able to understand Linear Arrangement, Circular Arrangement ,Multi-dimensional Arrangement ,Blood Relations which is very helpful to solve logical reasoning section in aptitude 	5%	2

18	Set theory: <ul style="list-style-type: none"> This topic will help students to recall Set definition and formulas, Power set , Sub set, Set multiplication which they already studied at school level 	3%	1
19	Algebraic expression: <ul style="list-style-type: none"> This topic will help student to understand Remainder of an expression ,Factors, multiples, HCF and LCM of expressions, Finding maxima and minima 	3%	2
20	Surds indices and simplification: <ul style="list-style-type: none"> Students are able to understand Surds, Indices ,Simplification it will be slight exercise of the same 	3%	1
21	Attention to Detail: <ul style="list-style-type: none"> This topic comprises of String matching ,Text and image comprehension Qs , Decision based Qs which is the base of Data Interpretation questions 	2%	2

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Business Correspondence and Report Writing
SHARMA, R. AND MOHAN, K.
2. Communication Skills
Kumar S And Lata P; New Delhi Oxford University Press
3. Practical English Usage
MICHAEL SWAN
4. A Remedial English Grammar for Foreign Student
F.T. WOOD
5. On Writing Well
William Zinsser; Harper Paperbacks,2006; 30th anniversary edition
6. Oxford Practice Grammar,
John Eastwood; Oxford University Press
7. Quantitative Aptitude for Competitive Examinations
Dr. R.S. Aggarwal

Course Outcome:

After Learning the course the students shall be able to:

1. Write, read and understand workplace English.
2. Speak and participate in oral organizational communication

List of Tutorial:

1. **Game of Truth**
2. **Listening Skills: Small everyday conversation & comprehension (practice & test)**
3. **Appreciation, Apology and Acknowledgement letters (2 hours)**
4. **Debate (2 hours)**
5. **Advanced vocabulary Building (3 hours) • Phrasal verbs • Idiomatic Expression(chart Activity) • Developing Technical vocabulary(Memory Game)**
6. **Letter Writing (4 hours)**

