

**Deenbandhu Chhotu Ram University of Science & Technology, Murthal, (Sonapat) Scheme of
 Studies & Examinations under Choice Based Credit System
 Programme: B. Tech. in Mechanical Engineering; Year - 2nd (Semester – IV); Session: 2019-20**

S. No.	Course Code	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	ME 202C	Applied Thermodynamics	3	1	0	25	75	-	100	4	3
2	ME 204C	Fluid Mechanics & Fluid Machines	3	1	0	25	75	-	100	4	3
3	ME 206C	Strength of Materials	3	1	0	25	75	-	100	4	3
4	ME 208C	Materials Engineering	3	0	0	25	75	-	100	3	3
5	ME 210C	Instrumentation & Control	3	1	0	25	75	-	100	4	3
6	ME 212C	Laboratory - I (Thermal)	0	0	2	25	-	75	100	1	3
7	MC203C /MC201C	Constitution of India (Group B) / Environmental Studies (Group A)	3	0	0	25	75	-	100	0	3
Total			18	4	2	175	450	75	700	20	

Note:

- At the end of 4th Semester, the students have to undergo Professional Training (level-2) of atleast 4-weeks from Industry/Institute/Research Lab/Training Centre during summer vacation and its evaluation shall be carried out in the 5th semester.
- For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

L = Lecture, T = Tutorial, P = Practical, AUD = Audit Course, & C =

CreditsNOTE:

- For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.
- Students will be allowed to use non-programmable scientific calculator. However, sharing of calculators will not be permitted in the examination.

Subject: APPLIED THERMODYNAMICS
Subject Code: ME 202C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

UNIT I Introduction to solid, liquid and gaseous fuels–

- Topic No1 Stoichiometry,
- Topic No2 Exhaust gas analysis-
- Topic No3 First law analysis of combustion reactions-
- Topic No4 Heat calculations using enthalpy tables,
- Topic No5 Adiabatic flame temperature-
- Topic No6 Chemical equilibrium and equilibrium composition calculations using free energy.
- Topic No7 Gas power cycles,
- Topic No8 Air standard Otto,
- Topic No9 Diesel and Dual cycles

UNIT II

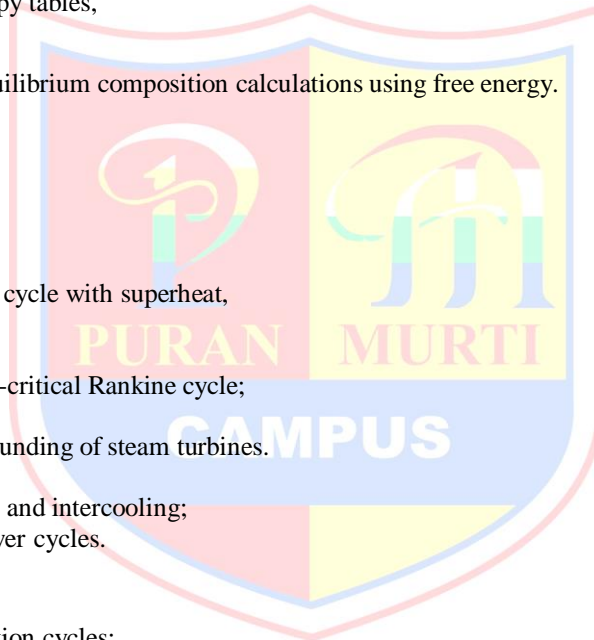
- Topic No10 Vapor power cycles Rankine cycle with superheat,
- Topic No11 Reheat and regeneration;
- Topic No12 Energy analysis;
- Topic No13 Super-critical and ultra super-critical Rankine cycle;
- Topic No14 Analysis of steam turbines,
- Topic No15 Velocity and pressure compounding of steam turbines.
- Topic No16 Air standard Brayton cycle,
- Topic No17 Effect of reheat, regeneration and intercooling;
- Topic No18 Combined gas and vapor power cycles.

UNIT III

- Topic No19 Vapor compression refrigeration cycles;
- Topic No20 Refrigerants and their properties,
- Topic No21 Properties of dry and wet air;
- Topic No22 Use of psychometric chart,
- Topic No23 Processes involving heating / cooling and humidification/ dehumidification,
- Topic No24 Dew point.

UNIT IV

- Topic No25 Basics of compressible flow,
- Topic No26 Stagnation properties,
- Topic No27 Isentropic flow of a perfect gas through a nozzle,
- Topic No28 Choked flow
- Topic No29 Subsonic and supersonic flows- normal shocks-
- Topic No30 Use of ideal gas tables for isentropic flow and normal shock flow-
- Topic No31 Flow of steam and refrigerant through nozzle, super-saturation –
- Topic No32 Compressible flow in diffusers,
- Topic No33 Efficiency of nozzle and diffuser.
- Topic No34 Reciprocating compressors,
- Topic No35 Staging of reciprocating compressors,



Topic No36 Optimal stage pressure ratio,

Topic No37 Effect of inter cooling, minimum work for multistage reciprocating compressors

TEXT BOOKS:

1. Sonntag, R. E, Borgnakke, C. and Van Wylen, G. J., 2003, 6th Edition, Fundamentals of Thermodynamics, John Wiley and Sons.
2. Jones, J. B. and Duggan, R. E., 1996, Engineering Thermodynamics, Prentice-Hall of India

REFERENCES BOOKS:

1. Moran, M. J. and Shapiro, H. N., 1999, Fundamentals of Engineering Thermodynamics, John Wiley and Sons.
2. Nag, P.K, 1995, Engineering Thermodynamics, Tata McGraw-Hill Publishing Co. Ltd



Subject: FLUID MECHANICS AND FLUID MACHINES
Subject Code: ME 204C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

UNIT I Fluid Properties and Fluid Statics:

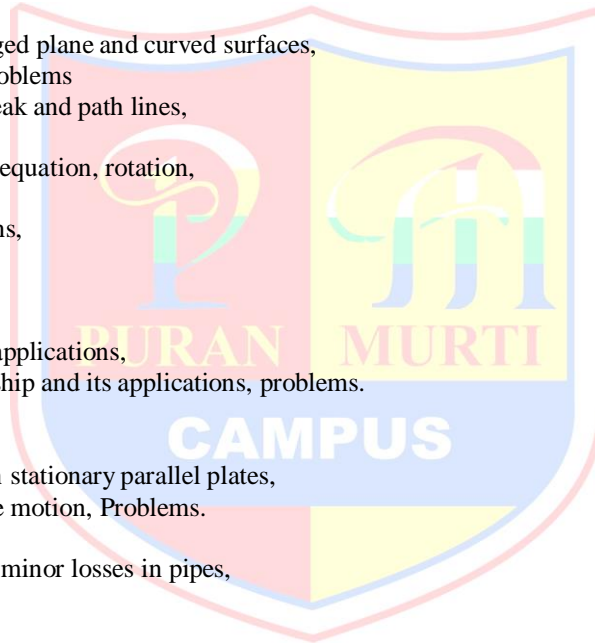
- Topic No1 Concept of fluid and flow,
- Topic No2 Ideal and real fluids,
- Topic No3 Properties of fluids,
- Topic No4 Newtonian and non-Newtonian fluids.
- Topic No5 Pascal's law,
- Topic No6 Hydrostatic equation,
- Topic No7 Hydrostatic forces on submerged plane and curved surfaces,
- Topic No8 Stability of floating bodies, problems
- Topic No9 Fluid Kinematics: Stream, streak and path lines,
- Topic No10 Types of flows,
- Topic No11 Differential (3-D) continuity equation, rotation,
- Topic No12 Vorticity and circulation,
- Topic No13 Stream and potential functions,
- Topic No14 Flow net, problems.
- Topic No15 Fluid Dynamics:
- Topic No16 Euler's equation,
- Topic No17 Bernoulli's equation and its applications,
- Topic No18 Impulse momentum relationship and its applications, problems.

UNIT II Viscous Flow:

- Topic No19 Uni-directional flow between stationary parallel plates,
- Topic No20 Parallel plates having relative motion, Problems.
- Topic No21 Flow Through Pipes:
- Topic No22 Major head loss in pipes and minor losses in pipes,
- Topic No23 Bends and fittings.
- Topic No24 Hagen-Poiseuille law,
- Topic No25 Series and parallel connection of pipes,
- Topic No26 Branched pipes, Equivalent pipe,
- Topic No27 Elementary turbulent flow, Problems.
- Topic No28 Boundary Layer Flow:
- Topic No29 Boundary layer concept,
- Topic No30 Displacement, Momentum and energy thickness,
- Topic No31 Laminar and turbulent boundary layer flows:
- Topic No32 Boundary layer thickness,
- Topic No33 Skin friction coefficient, Drag on a flat plate, Problem

UNIT III Impulse Turbines and Reaction Turbines:

- Topic No34 Classification – impulse and reaction turbines,
- Topic No35 Component parts, Construction,
- Topic No36 Operation and governing mechanism of Pelton wheel,
- Topic No37 Velocity diagrams,
- Topic No38 Work done and efficiency of a Pelton wheel, Problems



- Topic No39 Francis and Kaplan Turbines:
Topic No40 Component parts, Construction and operation,
Topic No41 Velocity diagrams, Work done and efficiency,
Topic No42 Draft tube - its function and different forms,
Topic No43 Introduction to new types of turbine, Deriaz (Diagonal), Bulb,
Topic No44 Tubular turbines, Problems.

UNIT IV Centrifugal Pumps and Reciprocating

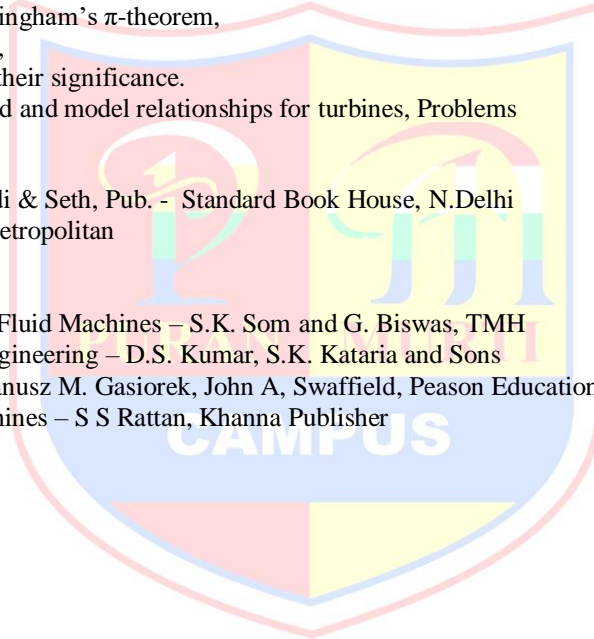
- Topic No45 Classification, Construction and operational details,
Topic No46 Velocity diagrams,
Topic No47 Work done, Manometric efficiency,
Topic No48 Pressure rise in impeller, Minimum starting speed,
Topic No49 Multi-stage pumps, specific speed,
Topic No50 Net positive suction head,
Topic No51 Cavitation and maximum suction lift, problems.
Topic No52 Reciprocating Pumps: Construction and operational details,
Topic No53 Slip, work and power input,
Topic No54 Effect of acceleration and friction on indicator diagram, Separation, Problems.
Topic No55 Dimensional Analysis And Model Similitude:
Topic No56 Rayleigh's method and Buckingham's π -theorem,
Topic No57 Model studies and similitude,
Topic No58 Dimensionless numbers and their significance.
Topic No59 Unit quantities, Specific speed and model relationships for turbines, Problems

TEXT BOOKS:

1. Hydraulics & Fluid Mechanics – Modi & Seth, Pub. - Standard Book House, N.Delhi
2. Hydraulic Machines – Jagdish Lal, Metropolitan

REFERENCES BOOKS:

1. Introduction to Fluid Mechanics and Fluid Machines – S.K. Som and G. Biswas, TMH
2. Fluid Mechanics and Fluid Power Engineering – D.S. Kumar, S.K. Kataria and Sons
3. Fluid Mechanics– John F Douglas, Janusz M. Gasiorek, John A, Swaffield, Peason Education
4. Fluid Mechanics and Hydraulic Machines – S S Rattan, Khanna Publisher



Subject: STRENGTH OF MATERIAL
Subject Code: ME 206C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

UNIT I Stresses & Strains:

- Topic No1 Concept & types of Stresses and strains,
- Topic No2 Poisson's ratio,
- Topic No3 Stresses and strain in simple and compound bars under axial loading,
- Topic No4 Stress strain diagrams,
- Topic No5 Hooks law,
- Topic No6 Elastic constants & their relationships,
- Topic No7 Temperature stress & strain in simple & compound bars under axial loading, Numerical.
- Topic No8 Compound Stresses & Strains: Concept of surface and volumetric strains,
- Topic No9 Two dimensional stress system,
- Topic No10 Conjugate shear stress at a point on a plane,
- Topic No11 Principal stresses & strains and principal- planes,
- Topic No12 Mohr's circle of stresses, Numerical

UNIT II Shear Force & Bending Moments:

- Topic No13 Definitions,
- Topic No14 SF & BM diagrams for cantilevers,
- Topic No15 Simply supported beams with or without over-hang and calculation of maximum BM & SF and the point of contra-flexure
- Topic No16 Concentrated loads,
- Topic No17 Uniformly distributed loads over whole span or a part of it,
- Topic No18 Combination of concentrated loads and uniformly distributed loads,
- Topic No19 Uniformly varying loads
- Topic No20 A of moments,
- Topic No21 Relation between the rate of loading,
- Topic No22 The shear force and the bending moments, Problems.
- Topic No23 Bending stresses in beams with derivation & application to beams of circular,
- Topic No24 Rectangular, I, T and channel sections,
- Topic No25 Composite beams,
- Topic No26 Shear stresses in beams with combined bending,
- Topic No27 Torsion & axial loading of beams. Numericals.
- Topic No28 Slope & Deflection: Relationship between bending moment, slope & deflection,
- Topic No29 Mohr's theorem, moment area method, method of integration,
- Topic No30 Macaulay's method,
- Topic No31 Calculations for slope and deflection of cantilevers and simply supported beams overhang under concentrated load,
- Topic No32 Uniformly distributed loads or combination of concentrated and uniformly distributed loads, Numericals

UNIT III Torsion of Circular Members and Columns & Struts

- Topic No33 Torsion of thin circular tube,
- Topic No34 Solid and hollow circular shafts, tapered shaft, stepped shaft & composite circular shafts,
- Topic No35 Combined bending and torsion,
- Topic No36 Equivalent torque, effect of end thrust. Numericals.
- Topic No37 Column under axial load,
- Topic No38 Concept of instability and buckling, slenderness ratio,
- Topic No39 Derivation of Euler's formulae for the elastic buckling load,

Topic No40 Eulers, Rankine,

Topic No41 Gordon's formulae Johnson's empirical formula for axial loading columns and their applications,

Topic No42 Eccentric compression of a short strut of rectangular & circular sections, Numericals

UNIT IV Theories Of Elastic Failure and Thin and thick walled Pressure Vessels

Topic No43 Various theories of elastic failures with derivations and graphical representations,

Topic No44 Applications to problems of 2-dimensional stress system with combined direct loading and bending,

Topic No45 Combined torsional and direct loading, Numericals.

Topic No46 Stresses in cylindrical and spherical vessels subjected to internal fluid pressure only.

TEXT BOOKS:

1. Strength of Materials – G. H. Ryder - Macmillan, India
2. Strength of Materials– Andrew Pytel and Fredinand L. Singer, Addison – Wesley

REFERENCE BOOKS:

1. Strength of Materials – Popov, PHI, New Delhi.
2. Strength of Materials - A Rudimentary Approach – M.A. Jayaram, Sapna Book House, Bangalore
3. Mechanics of Materials - Timoshenko, S.P., and Gere, J.M., 2nd Ed., CBS Publishers 2002

An Introduction to the Mechanics of Solids - Crandall, S.H., Dahl, N.C., and Lardner, T.J., Tata McGraw-Hill 199



Subject: MATERIALS ENGINEERING
Subject Code: ME 208C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	-	-	3	25	75	3 hours	100

UNIT I Crystal Structure and Mechanical Property measurement :

- Topic No1 Unit cells,
- Topic No2 Metallic crystal structures, Ceramics.
- Topic No3 Imperfection in solids: Point, line, interfacial and volume defects;
- Topic No4 Dislocation strengthening mechanisms and slip systems,
- Topic No5 Critically resolved shear stress.
- Topic No6 Tensile, compression and torsion tests;
- Topic No7 Young's modulus,
- Topic No8 Relations between true and engineering stress-strain curves,
- Topic No9 Generalized Hooke's law,
- Topic No10 Yielding and yield strength,
- Topic No11 Ductility, resilience, toughness and elastic recovery;
- Topic No12 Hardness: Rockwell, Brinell and Vickers and their relation to strength.

UNIT II Fracture mechanics and Fatigue failure: Ductile and brittle failure mechanisms,

- Topic No13 Introduction to Stress-intensity factor approach
- Topic No14 Griffith criterion.
- Topic No15 Fatigue failure: High cycle fatigue,
- Topic No16 Stress-life approach,
- Topic No17 SN curve,
- Topic No18 Endurance and fatigue limits,
- Topic No19 Effects of mean stress using the Modified Goodman diagram;
- Topic No20 Fracture with fatigue,
- Topic No21 Introduction to nondestructive testing (NDT),
- Topic No22 Introduction to corrosion and its prevention

UNIT III Alloys and Phase diagrams and Heat treatment of Steel

- Topic No23 Substitutional and interstitial solid solutions,
- Topic No24 Introduction to diffusion process
- Topic No25 Interpretation of binary phase diagrams and microstructure development;
- Topic No26 Eutectic, peritectic, peritectoid and monotectic reactions.
- Topic No27 Iron Iron-carbide phase diagram and microstructural aspects of ledeburite, austenite, ferrite and cementite, cast iron.
- Topic No28 Annealing, tempering, normalizing and spheroidising,
- Topic No29 Isothermal Transformation diagrams for Fe-C alloys and microstructure development.
- Topic No30 Continuous cooling curves and interpretation of final microstructures and properties-
- Topic No31 Aus tempering, mar tempering, case hardening, carburizing, nitriding, cyaniding, carbo-nitriding,
- Topic No32 Flame and induction hardening,
- Topic No33 Vacuum and plasma hardening

UNIT IV Steels and Cast irons

Topic No34 Alloying of steel,
Topic No35 Properties of stainless steel and tool steels,
Topic No36 Maraging steels
Topic No37 Grey, white, malleable and spheroidal cast irons-
Topic No38 Copper and copper alloys;
Topic No39 Brass, bronze and cupro-nickel Aluminium and Al-Cu – Mg alloys-
Topic No40 Nickel based super alloys and Titanium alloys

.TEXT BOOKS:

1. W. D. Callister, “Materials Science and Engineering-An Introduction”, 6th Edition, Wiley India.
2. Kenneth G. Budinski and Michael K. Budinski, “Engineering Materials”, Prentice Hall of India Private Limited,

REFERENCE BOOKS:

1. V. Raghavan, “Material Science and Engineering’, Prentice Hall of India Private Limited,
2. William F. Smith ,Javad Hashemi ,Ravi Prakash “Material Science and Engineering” ,TMH publications
3. Gupta .K.M, “Material Science, Metallurgy and Engineering Materials ”Umesh Publication, New Delhi



Subject: INSTRUMENTATION AND CONTROL
Subject Code: ME 210C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

UNIT- I Introduction and Static And Dynamic Characteristics Of Instruments :

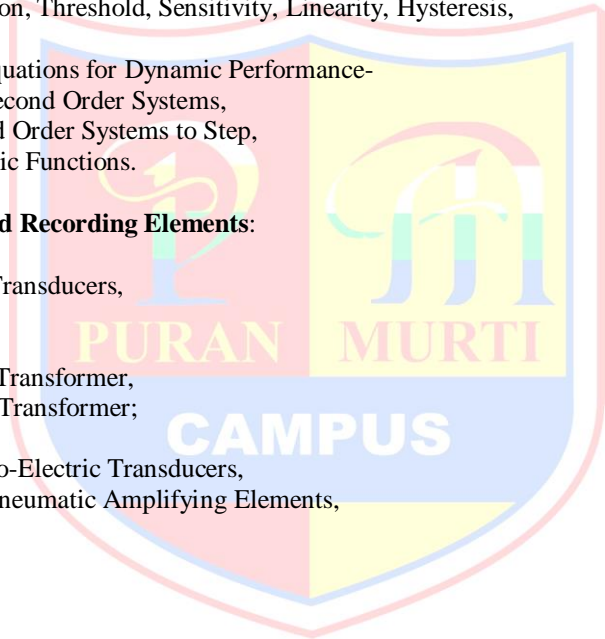
Topic No1 Measurement Systems and Instruments,
 Topic No2 Typical Applications of Instrument Systems,
 Topic No3 Functional Elements of a Measurement System,
 Topic No4 Classification of Instruments.
 Topic No5 Static And Dynamic Characteristics Of Instruments: Introduction,
 Topic No6 Accuracy, Precision, Resolution, Threshold, Sensitivity, Linearity, Hysteresis,
 Topic No7 Dead Band, Backlash, Drift,
 Topic No8 Formulation of Differential Equations for Dynamic Performance-
 Topic No9 Zero Order, First Order and Second Order Systems,
 Topic No10 Response of First and Second Order Systems to Step,
 Topic No11 Ramp, Impulse And Harmonic Functions.

UNIT-II Transducer, Intermediate And Recording Elements:

Topic No12 Introduction,
 Topic No13 Types and Classification of Transducers,
 Topic No14 Selection of Transducers,
 Topic No15 Strain Gauges and Rosettes,
 Topic No16 Linear Variable Differential Transformer,
 Topic No17 Rotary Variable Differential Transformer;
 Topic No18 Piezo-Electric Transducers,
 Topic No19 Optical Transducers and Opto-Electric Transducers,
 Topic No20 Mechanical, Hydraulic and Pneumatic Amplifying Elements,
 Topic No21 Compensators,
 Topic No22 Data Transmission Elements,
 Topic No23 Data Acquisition Systems,
 Topic No24 Data Display and Storage,
 Topic No25 Signal Processing and Conditioning.

UNIT-III Control System and Types of Controllers:

Topic No26 Types of control systems ;
 Topic No27 Typical Block Diagram : Performance Analysis;
 Topic No28 Representation of Processes & Control Elements – Mathematical Modeling.
 Topic No29 Block Diagram Representation,
 Topic No30 Representation of Systems or Processes,
 Topic No31 Comparison Elements;
 Topic No32 Representation of Feedback Control systems – Block Diagram & Transfer Function Representation.
 Topic No33 Types of Control Action;
 Topic No34 Proportional Controller,
 Topic No35 Integral Controller,
 Topic No36 Derivative Controller,
 Topic No37 On-off controller, PD,
 Topic No38 PID Controller,
 Topic No39 Hydraulic Controllers;
 Topic No40 Electronic Controllers;



Topic No41 Pneumatic Controllers; Problems

UNIT-IV Frequency Response Analysis and Stability Of Control Systems:

Topic No42 Introduction;

Topic No43 Closed and Open Loop Transfer Function;

Topic No44 Bode Diagram;

Topic No45 Polar Plots;

Topic No46 Rectangular Plots;

Topic No47 Nichols Plots.

Topic No48 Characteristic Equation;

Topic No49 Routh's Criterion;

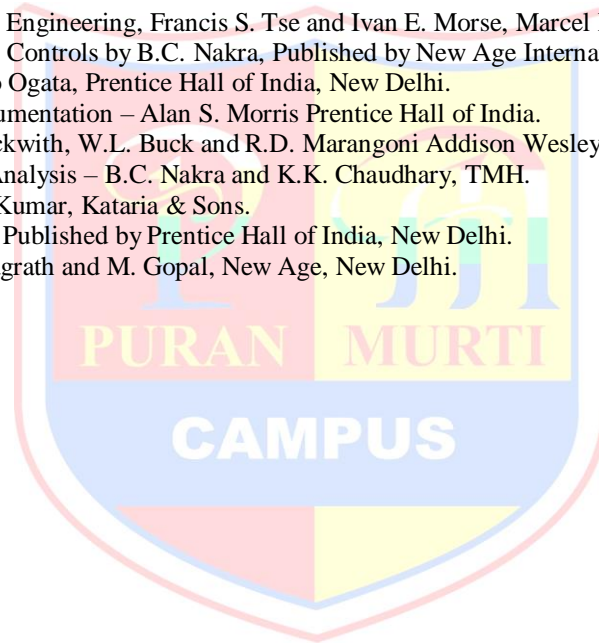
Topic No50 Nyquists Criterion, Problems.

TEXT BOOKS:

1. Instrumentation and control systems by W. Bolton, 2nd edition, Newnes, 200
2. Measurement systems Application and Design. Ernest O. Doebelin, Tata McGraw Hill Edition (Fourth Edition) 2002.

REFERENCE BOOKS:

1. Measurement and Instrumentation in Engineering, Francis S. Tse and Ivan E. Morse, Marcel Dekker.
2. Theory & Applications of Automatic Controls by B.C. Nakra, Published by New Age International Pvt. Ltd., New Delhi.
3. Modern Control Engg. By Katsuhiko Ogata, Prentice Hall of India, New Delhi.
4. Principles of Measurement and Instrumentation – Alan S. Morris Prentice Hall of India.
5. Mechanical Measurements: T.G. Beckwith, W.L. Buck and R.D. Marangoni Addison Wesley.
6. Instrumentation, Measurement and Analysis – B.C. Nakra and K.K. Chaudhary, TMH.
7. Mechanical Measurements by D. S. Kumar, Kataria & Sons.
8. Automatic Control Systems by Kuo' Published by Prentice Hall of India, New Delhi.
9. Control System Engineering, I. J. Nagrath and M. Gopal, New Age, New Delhi.

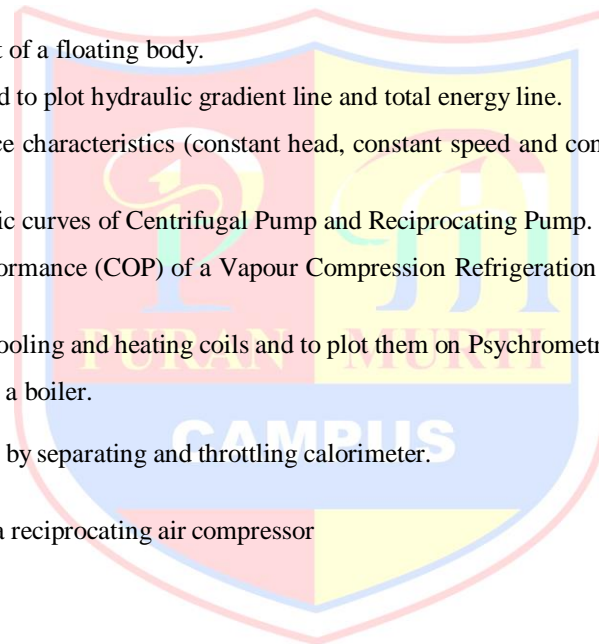


Subject: LABORATORY-I THERMAL
Subject Code: ME212C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	2	1	25	75	3 hours	100

List of Experiments:

1. To compare and determine the coefficient of discharge of an orifice meter, venturimeter and V/rectangular notch.
 2. To determine the coefficient of discharge, contraction and velocity of an orifice.
 3. To determine the loss coefficient for minor losses (sudden enlargement, sudden contraction, valves and bends, etc.) and coefficient of friction for pipes.
 4. To determine the Meta-centric height of a floating body.
 5. To verify the Bernoulli's Theorem and to plot hydraulic gradient line and total energy line.
 6. To draw and analyze the performance characteristics (constant head, constant speed and constant efficiency) of Pelton, Francis and Kaplan turbines.
 7. To draw and analyze the characteristic curves of Centrifugal Pump and Reciprocating Pump.
 8. To determine the Coefficient of Performance (COP) of a Vapour Compression Refrigeration (VCR) System and to draw its cycle on PH and TS diagrams.
 9. To determine the By-pass factor of cooling and heating coils and to plot them on Psychrometric charts for different inlet conditions.
 10. To prepare the heat balance sheet for a boiler.
 11. To find the dryness fraction of steam by separating and throttling calorimeter.
 12. To find the condenser efficiencies.
- To determine the volumetric efficiency of a reciprocating air compressor



Subject: Constitution of India
Subject Code: MC203C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	-	-	3	25	75	3 hours	100

Unit 1 Philosophy of Indian Constitution:

Topic No1 Ideological Basis and Salient Features of Indian Constitution,
Topic No2 Fundamental Rights & Duties of the Citizens,
Topic No3 Directive Principles of State Policy

Unit 2 Nature and Dynamics of Indian Federalism:

Topic No4 Federalism: Theory and Practice in India,
Topic No5 Federal Features of the Indian Constitution, Legislative,
Topic No6 Administrative and Financial Relations between the Union and the States.

Unit 3 Union and State Legislature :

Topic No7 Parliament: Composition, Functions and Working of the Parliamentary system
Topic No8 State Legislature:
Topic No9 Composition and Functions of Vidhan Sabha/ Vidhan Parishad

Unit 4 Centre and State: Executive and Judiciary:

Topic No10 President,
Topic No11 Prime Minister and Council of Ministers ,
Topic No12 Governor,
Topic No13 Chief Minister and Council of Ministers, Judiciary:
Topic No14 Supreme Court;
Topic No15 High Court

Text Books:

1. Austin G., *The Indian Constitution: Corner Stone of a Nation*, New Delhi: Oxford University Press, 196
2. Basu D.D., *An Introduction to the Constitution of India*, New Delhi: Prentice Hall, 1994
3. Kothari R., *Politics in India*, New Delhi: Orient Language, 1970
4. Siwach J.R., *Dynamics of Indian Government and Politics*, New Delhi: Sterling Publishers, 1985
5. Bhambhri C.P., *The Indian State--Fifty Years*, New Delhi: Shipra, 1997
6. Ghai U.R., *Indian Political System*, Jalandhar: New Academic Publishing Company, 2010

Course Outcomes: Upon successful completion of this course, students will be able:

1. To understand basic features of the constitution and rights and duties of Indian citizens
2. To understand the basic structure of Centre and State Government
3. To get acquainted with the nature of parliamentary form of Government
4. To have knowledge of the executive and judiciary powers in Indian democratic set-up

Scheme of End Semester Examinations (Major Test):

1. The duration of examinations will be three hours.
2. Nine questions of 15 marks each will be set out of which the students will have to attempt five questions in all.
3. First question of 15 marks will be compulsory. It will cover all the four units of the syllabus. The nature

of the questions in each unit will depend upon the nature of content therein. The questions may have sub-parts with marks assigned against each.

4. Question No 02 to 09 of 15 marks each will be set from the four units of the syllabus --- two from each unit.
5. In addition to first compulsory question the students will have to attempt four more questions, selecting one from each unit.

Subject: Environmental Studies

Subject Code: MC201C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	-	-	3	25	75	3 hours	100

UNIT – I Environmental Studies and Environmental Pollution

- Topic No1 The Multidisciplinary Nature of Environmental Studies,
- Topic No2 Introduction to Environment:
- Topic No3 Definition, Scope, and importance of environmental studies;
- Topic No4 Need for public awareness.
- Topic No5 Environmental Pollution: Definition, Cause and effects
- Topic No6 Air pollution,
- Topic No7 Water pollution,
- Topic No8 Soil pollution,
- Topic No9 Marine pollution,
- Topic No10 Noise pollution,
- Topic No11 Role of an individual in prevention of pollution,
- Topic No12 Pollution case studies

UNIT – II Natural Resources:

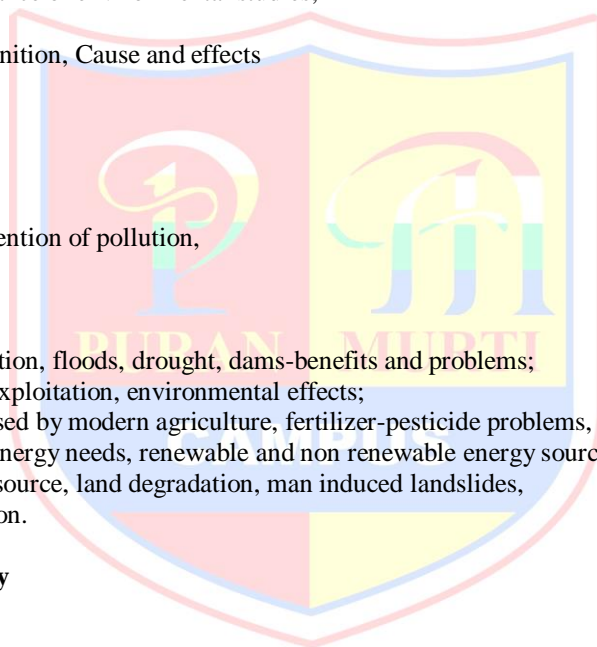
- Topic No13 Water resources: over-utilization, floods, drought, dams-benefits and problems;
- Topic No14 Mineral resources: Use and exploitation, environmental effects;
- Topic No15 Food resources: changes caused by modern agriculture, fertilizer-pesticide problems, water logging,
- Topic No16 Energy resources: Growing energy needs, renewable and non renewable energy sources;
- Topic No17 Land resources: Land as a resource, land degradation, man induced landslides,
- Topic No18 Soil erosion and desertification.

UNIT – III Ecosystems and Biodiversity

- Topic No19 Concept of an ecosystem,
- Topic No20 Structure and function,
- Topic No21 Energy flow,
- Topic No22 Ecological succession,
- Topic No23 Ecological pyramids.
- Topic No24 Concept of Biodiversity, definition and types,
- Topic No25 Hot-spots of biodiversity; threats to biodiversity,
- Topic No26 Endangered and endemic species of India, Conservation of biodiversity.

UNIT - IV Social Issues and Environment

- Topic No27 Water conservation,
- Topic No28 Rain water harvesting,
- Topic No29 Environmental ethics: Issues and possible solutions.
- Topic No30 Climate change, global warming,
- Topic No31 Acid rain,
- Topic No32 Ozone layer depletion,
- Topic No33 Public awareness.
- Topic No34 Population growth, variation among nations,
- Topic No35 Family Welfare Programme.



Topic No36 Human Population and the Environment

Topic No37 Population growth,

Topic No38 Population explosion,

Topic No39 Women and Child Welfare.

Field Work –

1. Visit to a local area to document environmental assets—river/forest/grassland/hill/ mountain.
2. Visit to a local polluted site—Urban/Rural/Industrial/Agricultural.
3. Study of common plants, insects, birds.
4. Study of simple ecosystems—pond, river, hill slopes, etc

REFERNCE BOOKS:

1. A Textbook of Environmental Studies by Asthana D.K. and Asthana Meera
2. Fundamental Concepts in Environmental Studies by Mishra D.D.
3. Environmental Studies by S.C Sharma M.P Poonia
4. Textbook of Environmental Studies for Undergraduate by Erach Bharucha
5. Environmental Studies: Third Edition by R. Rajagopalan



