



BATCH 2018-2022													
B.Tech in MECHANICAL ENGINEERING													
Choice Based Credit System													
SEMESTER IV													
S. No.	CATEGORY	CODE	COURSE TITLE	Periods			Evaluation Scheme				Subject Total	Credit	
				L	T	P	Assignment	TA	Total	ESE			
1	Professional Core Courses	7PCCME202	Applied Thermodynamics	3	1	0	20	10	30	70	100	4	
2	Professional Core Courses	7PCCME203	Fluid Mechanics & Fluid Machines	3	1	0	20	10	30	70	100	4	
3	Professional Core Courses	7PCCME204	Strength of Materials	3	1	0	20	10	30	70	100	4	
4	Professional Core Courses	7PCCME205	Materials Engineering	3	0	0	20	10	30	70	100	3	
5	Professional Core Courses	7PCCME206	Instrumentation & Control	3	1	0	20	10	30	70	100	4	
6	Humanities and Social Sciences including Management Courses	HSMC202	Professional Practice, Laws & Ethics	3	0	0	20	10	30	70	100	3	
7	Mandatory courses	MC201	**Disaster Management	3	0	0	20	10	30	70	100	0	
PRACTICAL /SESSIONAL													
NA													
										TOTAL	700	22	

** NOTE: Qualifying Non Credit Course)

Subject Code	Subject	L	T	P	C
7PCCME202	Applied Thermodynamics	3	1	0	4

Course Objectives:

- To have a working knowledge of basic performance of Gas power cycles.
- To calculate the forces exerted by a fluid at rest on submerged surfaces and understand the force of buoyancy.
- To understand and evaluate the performance of steam power cycles their various Engineering applications.
- To know how fuel burns and their thermodynamic properties.
- To Understand mechanism of power transfer through belt, rope, chain and gear drives in I C Engines.
- To determine performance parameters of refrigeration and air-conditioning systems.
- Evaluate the performance parameters of reciprocating air compressor as a function of receiver pressure.

Detail Contents:

Module I

Introduction to solid, liquid and gaseous fuels–(Stoichiometry), exhaust gas analysis- First law analysis of combustion reactions- Heat calculations using enthalpy tables- Adiabatic flame temperature- Chemical equilibrium and equilibrium composition calculations using free energy.

Module II

Vapor power cycles Rankine cycle with superheat, reheat and regeneration, energy analysis. Super-critical and ultra super-critical Rankine cycle- Gas power cycles, Air standard Otto, Diesel and Dual cycles-Air standard Brayton cycle, effect of reheat, regeneration and inter-cooling- Combined gas and vapor power cycles- Vapor compression refrigeration cycles, refrigerants and their properties.

Module III

Properties of dry and wet air, use of psychrometric chart, processes involving heating/cooling and humidification/dehumidification, dew point

Basics of compressible flow. Stagnation properties, Isentropic flow of a perfect gas through a nozzle, choked flow, subsonic and supersonic flows- normal shocks- use of ideal gas tables for isentropic flow and normal shock flow- Flow of steam and refrigerant through nozzle ,super saturation-compressible flow in diffusers, efficiency of nozzle and diffuser.

Module IV

Reciprocating compressors, staging of reciprocating compressors, optimal stage pressure ratio, effect of inter-cooling, minimum work for multistage reciprocating compressors. Analysis of steam turbines, velocity and pressure compounding of steam turbines.

Outcomes: On successful completion of the course, the student will be able to

- After completing this course, the students will get a good understanding of various practical power cycles and heat pump cycles.
- They will be able to analyze energy conversion in various thermal devices such as combustors,

air coolers, nozzles, diffusers, steam turbines and reciprocating compressors.

- They will be able to understand phenomena occurring in high speed compressible flows.
- Apply thermodynamic concepts to analyze turbo machines.
- Determine performance parameters of refrigeration and air-conditioning systems.
- Understand the principles and applications of refrigeration systems.
- Analyze air-conditioning processes using the principles of psychrometry and Evaluate cooling and heating loads in an air-conditioning system.
- Understand the working, applications, relevance of air and identify methods for performance improvement.

Text Books:

- Sonntag, R. E, Borgnakke, C. and Van Wylen, G. J., 2003, 6th Edition, Fundamentals of Thermodynamics, John Wiley and Sons.
- Jones, J. B. and Duggan, R. E., 1996, Engineering Thermodynamics, Prentice-Hall of India
- Moran, M. J. and Shapiro, H. N., 1999, Fundamentals of Engineering Thermodynamics, John Wiley and Sons.
- Nag, P.K, 1995, Engineering Thermodynamics, Tata McGraw-Hill Publishing Co.Ltd

Reference Books:

- Thermodynamics for engineers, Kenneth A. Kroos and Merle C. Potter, Cengage Learning, 2016
- Principles of Engineering Thermodynamics, Michael J, Moran, Howard N. Shapiro, Wiley, 8th Edition.
- An Introduction to Thermo Dynamics by Y.V.C. Rao, Wiley Eastern Ltd, 2003.
- Thermodynamics by Radhakrishnan.PHI, 2nd revised edition.
- I.C Engines by Ganeshan.V. Tata McGraw Hill, 4th Edi. 2012.
- I.C.Engines by M.L.Mathur& Sharma. Dhanpat Rai& sons- India

Subject Code	Subject	L	T	P	C
7PCCME203	Fluid Mechanics & Fluid Machines	3	1	0	4

Course Objectives:

- To have a working knowledge of the basic properties of fluids and understand the continuum approximation
- To calculate the forces exerted by a fluid at rest on submerged surfaces and understand the force of buoyancy.
- To understand the flow characteristic and dynamics of flow field for various Engineering applications.
- To know how velocity changes and energy transfers in fluid flows are related to forces and torques and to understand why designing for minimum loss of energy in fluid flows is so important.
- To discuss the main properties of laminar and turbulent pipe flow and appreciate their differences and the concept of boundary layer theory.
- Understand the concept of dynamic similarity and how to apply it to experimental modeling.
- To appreciate the consequences of compressibility in gas flow and understand the effects of friction and heat transfer on compressible flows.
- To learn about the application of mass and momentum conservation laws for fluid flows.
- To understand the importance of dimensional analysis.
- To analyze the flow in water pumps and turbines.

Detail Contents:

Module I

Definition of fluid, Newton's law of viscosity, Units and dimensions-Properties of fluids, mass density, specific volume, specific gravity, viscosity, compressibility and surface tension, Control volume- application of continuity equation and momentum equation, Incompressible flow, Bernoulli's equation and its applications.

Module II

Exact flow solutions in channels and ducts, Couette and Poiseuille flow, laminar flow through circular conduits and circular annuli- concept of boundary layer – measures of boundary layer thickness – Darcy Weisbach equation, friction factor, Moody's diagram.

Need for dimensional analysis–methods of dimension analysis–Similitude–types of similitude Dimensionless parameters–application of dimensionless parameters–Model analysis.

Module III

Euler's equation – theory of Rotodynamic machines – various efficiencies – velocity components at entry and exit of the rotor, velocity triangles – Centrifugal pumps, working principle, work done by the impeller, performance curves – Cavitations in pumps- Reciprocating

pump–working principle.

Module IV

Classification of water turbines, heads and efficiencies, velocity triangles- Axial, radial and mixed flow turbines- Pelton wheel, Francis turbine and Kaplan turbines, working principles – draft tube-Specific speed, unit quantities, performance curves for turbines – governing of turbines.

Course Outcomes: On successful completion of the course, the student will be able to

- Upon completion of this course, students will be able to mathematically analyze simple flow situations.
- They will be able to evaluate the performance of pumps and turbines.
- Identify and calculate the key fluid properties used in the analysis of fluid behavior.
- Understand and apply the principles of pressure, buoyancy and floatation.
- Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.
- Understand and apply the principles of fluid kinematics and dynamics.
- Understand the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.

Text Books:

- Fluid Mechanics (SI Units), Yunus A. Cengel John M.Cimbala, 3rd Ed., Tata a. McGraw Hill, 2014.
- Fluid Mechanics, F M White, McGraw Hill Publications Eighth edition. 2016.
- Mechanics of Fluids, Merle C. Potter, Devid C. Wiggerrt, Bassem H. Ramadan, Cengage learning, Fourth editions 2016.
- A Text book of Fluid Mechanics by Dr. R K Bansal.

Reference Books

- Fundamentals of Fluid Mechanics by Munson, Young, Okiishi&Huebsch, John Wiley Publications.7th edition.
- Fluid Mechanics, Pijush.K.Kundu, IRAM COCHEN, ELSEVIER, 3rd Ed. 2005.
- Fluid Mechanics, John F.Douglas, Janul and M.Gasiosek and john A.Swaffield, Pearson Education Asia, 5th ed., 2006.
- Introduction to Fluid Mechanics by Fox, McDonald, John Wiley Publications,8th edition

Subject Code	Subject	L	T	P	C
7PCCME204	Strength of Materials	3	1	0	4

Course Objectives:

- Classify the stresses into various categories and define elastic properties of materials and compute stress and strain intensities caused by applied loads in simple and compound sections and temperature changes.
- Derive the equations for principal stress and maximum in-plane shear stress and calculate their magnitude and direction.
- Draw Mohr circle for plane stress system and interpret this circle.
- Determine the shear force, bending moment and draw shear force and bending moment diagrams, describe behavior of beams under lateral loads.
- Explain the structural behavior of members subjected to torque, Calculate twist and stress induced in shafts subjected to bending and torsion.
- Understand the concept of stability and derive crippling loads for columns.

Detail Contents:

Module I

Deformation in solids- Hooke's law, stress and strain- tension, compression and shear stresses- elastic constants and their relations- volumetric, linear and shear strains- principal stresses and principal planes- Mohr's circle.

Module II

Beams and type's transverse loading on beams- shear force and bend moment diagrams- Types of beam supports, simply supported and over- hanging beams, cantilevers. Theory of bending of beams, bending stress distribution and neutral axis, shear stress distribution, point and distributed loads.

Module III

Moment of inertia about an axis and polar moment of inertia, deflection of a beam using double integration method, computation of slopes and deflection in beams, Maxwell's reciprocal theorems.

Module IV

Torsion, stresses and deformation in circular and hollow shafts, stepped shafts, deflection of shafts fixed at both ends, stresses and deflection of helical springs.

Axial and hoop stresses in cylinders subjected to internal pressure, deformation of thick and thin cylinders, deformation in spherical shells subjected to internal pressure

Course Outcomes: On successful completion of the course, the student will be able to

- Understand simple, compound, thermal stresses and strains their relations, Poisson's ratio, Hooke's law, mechanical properties including elastic constants and their relations.
- Determine stresses, strains and deformations in bars with varying circular and rectangular cross-sections subjected to normal and temperature loads.

- Determine plane stress, principal stress, maximum shear stress and their orientations using analytical method and Mohr's circle.
- Determine the dimensions of structural members including beams, bars and rods using Energy methods and also stress distribution in thick and thin cylinders.
- Draw SFD and BMD for different beams including cantilever beams, simply supported beams and overhanging beams subjected to UDL, UVL, Point loads and couples.
- Determine dimensions, bending stress, shear stress and its distribution in beams of circular, rectangular, symmetrical I and T sections subjected to point loads and UDL

Text Books:

- Egor P. Popov, Engineering Mechanics of Solids, Prentice Hall of India, NewDelhi, 2001.
- R. Subramanian, Strength of Materials, Oxford University Press,2007.
- Ferdinand P. Beer, Russel Johnson Jr and John J. Dewole, Mechanics of Materials, Tata McGraw Hill Publishing Co. Ltd., New Delhi 2005.

Reference Books:

- S S Rattan, Strength of Materials, Second Edition, McGraw Hill, 2011.
- Ferdinand Beer and Russell Johnston, Mechanics of materials, Tata McGraw Hill, 2003.

Subject Code	Subject	L	T	P	C
7PCCME205	Materials Engineering	3	0	0	3

Course Objectives:

- Understanding of the correlation between the internal structure of materials, their mechanical properties and various methods to quantify their mechanical integrity and failure criteria.
- To provide a detailed interpretation of equilibrium phase diagrams.
- Learning about different phases and heat treatment methods to tailor the properties of Fe-alloys.
- The foundation for understanding the structured various modes of failure in materials common in mechanical engineering.
- Topics are designed to explore the mechanical properties of metals and their alloys, polymers, ceramics, smart materials and composites.
- The means of modifying such properties, as well as the processing and failure of materials.

Detail Contents:

Module I

Crystal Structure: Unit cells, Metallic crystal structures, Ceramics. Imperfection in solids: Point, line, interfacial and volume defects; dislocation strengthening mechanisms and slip systems, critically resolved shear stress.

Mechanical Property measurement: Tensile, compression and torsion tests; Young's modulus, relations between true and engineering stress-strain curves, generalized Hooke's law, yielding and yield strength, ductility, resilience, toughness and elastic recovery; Hardness: Rockwell, Brinell and Vickers and their relation to strength.

Module II

Static failure theories: Ductile and brittle failure mechanisms, Tresca, Von-mises, Maximum normal Stress, Mohr-Coulomb and Modified Mohr-Coulomb; Fracture mechanics: Introduction to Stress- intensity factor approach and Griffith criterion. Fatigue failure: High cycle fatigue, Stress-life approach, SN curve, endurance and fatigue limits, effects of mean stress using the Modified Goodman diagram; Fracture with fatigue, Introduction to non-destructive testing (NDT).

Module III

Alloys, substitution and interstitial solid solutions- Phase diagrams: Interpretation of binary phase diagrams and microstructure development; eutectic, peritectic, peritectoid and monotectic reactions. Iron Iron- carbide phase diagram and micro-structural aspects of ledeburite, austenite, ferrite and cementite, cast iron.

Heat treatment of Steel: Annealing, tempering, normalizing and spheroidising, isothermal transformation diagrams for Fe-C alloys and microstructure development. Continuous cooling curves and interpretation of final microstructures and properties- austempering, mar tempering,

case hardening, carburizing, nitriding, cyaniding, carbo-nitriding, flame and induction hardening, vacuum and plasma hardening.

Module IV

Alloying of steel, properties of stainless steel and tool steels, maraging steels- cast irons; grey, white, malleable and spheroidal cast irons- copper and copper alloys; brass, bronze and cupro-nickel; Aluminium and Al-Cu – Mg alloys- Nickel based super alloys and Titanium alloys.

Course Outcomes: On successful completion of the course, the student will be able to

- Student will be able to identify crystal structures for various materials and understand the defects in such structures.
- Understand how to tailor material properties of ferrous and non-ferrous alloys How to quantify mechanical integrity and failure in materials.
- Describe the mechanical properties of metals, their alloys and various modes of failure.
- Understand the microstructures of ferrous and non-ferrous materials to mechanical properties.
- Explain the processes of heat treatment of various alloys.
- Understand the properties and potentialities of various materials available and material selection procedures.

Text Books:

- W. D. Callister, 2006, “Materials Science and Engineering-An Introduction”, 6th Edition, WileyIndia.
- Kenneth G. Budinski and Michael K. Budinski, “Engineering Materials”, Prentice Hall of India Private Limited, 4th Indian Reprint, 2002.
- V. Raghavan, “Material Science and Engineering”, Prentice Hall of India Private Limited, 1999.
- U. C. Jindal, “Engineering Materials and Metallurgy”, Pearson, 2011.

Reference Books:

- V. Raghavan, Materials Science and Engineering, PHI, 2002
- Donald R. Asklund and Pradeep.P. Phule, The Science and Engineering of Materials, Cengage Learning, 4th Ed., 2003.
- George Ellwood Dieter, Mechanical Metallurgy, McGraw-Hill.

Subject Code	Subject	L	T	P	C
7PCCME206	Instrumentation & Control	3	1	0	4

Objectives:

- To provide a basic knowledge about measurement systems and their components.
- To learn about various sensors used for measurement of mechanical quantities.
- To learn about system stability and control.
- To integrate the measurement systems with the process for process monitoring and control.

Detail Contents:

Module I

Measurement systems and performance—accuracy, range, resolution, error sources; Instrumentation system elements – sensors for common engineering measurements.

Module II

Signal processing and conditioning; correction elements- actuators: pneumatic, hydraulic, electric; Control systems – basic elements, open/closed loop, design of block diagram; control method – P, PI, PID, when to choose what, tuning of controllers.

Module III

System models, transfer function and system response, frequency response; Nyquist diagrams and their use.

Module IV

Practical group based project utilizing above concepts.

Course Outcomes: On successful completion of the course, the student will be able to

- Upon completion of this course, the students will be able to understand the measurement of various quantities using instruments, their accuracy & range, and the techniques for controlling devices automatically.
- After undergoing the course the student can select appropriate device for the measurement of parameters like temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.
- Upon completion of this course student will be able to understand the system model.

Text Books:

1. Instrumentation and control systems by W. Bolton, 2nd edition, Newnes, 200
2. Thomas G. Beckwith, Roy D. Marangoni, John H. Lienhard V, Mechanical Measurements (6th Edition) 6th Edition, Pearson Education India, 2007
3. Gregory K. McMillan, Process/Industrial Instruments and Controls Handbook, Fifth Edition, McGraw-Hill: New York, 1999.

Reference Books:

- Measurement systems: Application and design, Doebelin Earnest. O. Adaptation by Manik and Dhanesh/ TMH.
- Experimental Methods for Engineers / Holman.
- Mechanical and Industrial Measurements / R.K. Jain/ Khanna Publishers.

- Instrumentation, measurement & analysis by B.C.Nakra & K.K.Choudhary, TMH.

Subject Code	Subject	L	T	P	C
HSMC202	Professional Practice, Laws & Ethics	3	0	0	3

Course Objective-

- To impart basic skills of Professional Communication in English through basic elements of civil engineering professional practice are introduced in this course.
- Roles of all participants in the process-owners, developers, designers, consultants, architects, contractors, and suppliers - are described.
- Basic concepts in professional practice, business management, public policy, leadership, and professional licensure are introduced.
- The course covers professional relations, civic responsibilities, and ethical obligations for engineering practice.
- The course also describes contracts management, and various legal aspects related to engineering.
- Further, the course familiarizes students with elementary knowledge of laws that would be of utility in their profession, including several new areas of law such as IPR, ADR.

Proposed Syllabus

Professional practice covering the respective roles of the various stakeholders in the profession of civil engineering and the factors governing the same; Professional ethics relating to civil engineering; Various aspects of contracts relating to construction and management of contracts; types of contractual and other disputes in the profession methods of dispute resolution; legal aspects relating to employment and service conditions of labor; intellectual property rights and their legal framework

Modules:

Module 1 A- Professional Practice – Respective roles of various stakeholders: Government (constituting regulatory bodies and standardization organizations, prescribing norms to ensure safety of the citizens); Standardization Bodies (ex. BIS, IRC)(formulating standards of practice); professional bodies (ex. Institution of Engineers(India), Indian Roads Congress, IIA/ COA, ECI, Local Bodies/ Planning Authorities) (certifying professionals and offering platforms for interaction); Clients/ owners (role governed by contracts); Developers (role governed by regulations such as RERA); Consultants (role governed by bodies such as CEAI); Contractors (role governed by contracts and regulatory Acts and Standards); Manufacturers/ Vendors/ Service agencies (role governed by contracts and regulatory Acts and Standards)

Module 1 B- Professional Ethics – Definition of Ethics, Professional Ethics, Business Ethics, Corporate Ethics, Engineering Ethics, Personal Ethics; Code of Ethics as defined in the website of Institution of Engineers (India); Profession, Professionalism, Professional Responsibility, Professional Ethics; Conflict of Interest, Gift Vs Bribery, Environmental breaches, Negligence, Deficiencies in state-of-the-art; Vigil Mechanism, Whistle blowing, protected disclosures.

Module 2

General Principles of Contracts Management: Indian Contract Act, 1972 and amendments covering General principles of contracting; Contract Formation & Law; Privacy of contract; Various types of contract and their features; Valid & Voidable Contracts; Prime and sub-contracts; Joint Ventures & Consortium; Complex contract terminology; Tenders, Request For Proposals, Bids & Proposals; Bid Evaluation; Contract Conditions & Specifications ;Critical /“Red Flag” conditions; Contract award & Notice To Proceed; Variations & Changes in Contracts; Differing site conditions; Cost escalation; Delays, Suspensions & Terminations; Time extensions & Force Majeure; Delay Analysis; Liquidated damages & Penalties; Insurance & Taxation; Performance and Excusable Non-performance; Contract documentation; Contract Notices; Wrong practices in contracting (Bid shopping, Bid fixing, Cartels); Reverse auction; Case Studies; Build-Own-Operate & variations; Public-Private Partnerships; International Commercial Terms;

Module 3

Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system: Arbitration – meaning, scope and types – distinction between laws of 1940 and 1996; UNCITRAL model law – Arbitration and expert determination; Extent of judicial intervention; International commercial arbitration; Arbitration agreements – essential and kinds, validity, reference and interim measures by court; Arbitration tribunal – appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance; Award including Form and content, Grounds for setting aside an award, Enforcement, Appeal and Revision; Enforcement of foreign awards – New York and Geneva Convention Awards; Distinction between conciliation, negotiation, mediation and arbitration, confidentiality, resort to judicial proceedings, costs; Dispute Resolution Boards; LokAdalats

Module 4

Engagement of Labor and Labor& other construction-related Laws: Role of Labor in Civil Engineering; Methods of engaging labor- on rolls, labor sub-contract, piece rate work; Industrial Disputes Act, 1947; Collective bargaining; Industrial Employment (Standing Orders) Act, 1946; Workmen’s Compensation Act, 1923; Building & Other Construction Workers (regulation of employment and conditions of service) Act (1996) and Rules (1998); RERA Act 2017, NBC2017

Module 5

Law relating to Intellectual property: Introduction – meaning of intellectual property, main forms of IP, Copyright, Trademarks, Patents and Designs, Secrets; Law relating to Copyright in India including Historical evolution of Copy Rights Act, 1957, Meaning of copyright – computer programs, Ownership of copyrights and assignment, Criteria of infringement, Piracy in Internet – Remedies and procedures in India; Law relating to Patents under Patents Act, 1970 including Concept and historical perspective of patents law in India, Patentable inventions with special reference to biotechnology products, Patent protection for computer programs, Process of obtaining patent – application, examination, opposition and sealing of patents, Patent cooperation treaty and grounds for opposition, Rights and obligations of patentee, Duration of patents – law and policy considerations, Infringement and related remedies.

ORGANISATION OF COURSE (2-0-0)

S. No	Module	No of Lectures	Details
1A	Professional Practice	2	
1B	Professional Ethics	2	
2	Contracts Management	18	
3	Dispute Resolution Mechanisms	5	
4	Labour; Labour & other Laws	2	
5	Intellectual Property Management	1	
	TOTAL	30	

Course Outcomes: On successful completion of the course, the student will be able to

- To familiarize the students to what constitutes professional practice, introduction of various stakeholders and their respective roles; understanding the fundamental ethics governing the profession.
- To give a good insight into contracts and contracts management in civil engineering, dispute resolution mechanisms; laws governing engagement of labour.
- To give an understanding of Intellectual Property Rights, Patents.
- To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession.
- To develop good ideas of the legal and practical aspects of their profession.

Text/Reference Books:

- B.S. Patil, Legal Aspects of Building and Engineering Contracts, 1974.
- The National Building Code, BIS, 2017
- RERA Act, 2017
- Meena Rao (2006), Fundamental concepts in Law of Contract, 3rd Edn. Professional Offset
- Neelima Chandiramani (2000), The Law of Contract: An Outline, 2nd Edn. Avinash Publications Mumbai
- Avtar Singh (2002), Law of Contract, Eastern Book Co.
- Dutt (1994), Indian Contract Act, Eastern Law House
- Anson W.R. (1979), Law of Contract, Oxford University Press
- Kwatra G.K. (2005), The Arbitration & Conciliation of Law in India with case law on UNCITRAL Model Law on Arbitration, Indian Council of Arbitration
- Wadhwa (2004), Intellectual Property Rights, Universal Law Publishing Co.
- T. Ramappa (2010), Intellectual Property Rights Law in India, Asia Law House
- Bare text (2005), Right to Information Act
- O.P. Malhotra, Law of Industrial Disputes, N.M. Tripathi Publishers
- K.M. Desai (1946), The Industrial Employment (Standing Orders) Act
- Rustamji R.F., Introduction to the Law of Industrial Disputes, Asia Publishing House
- Vee, Charles & Skitmore, Martin (2003) Professional Ethics in the Construction Industry,

Engineering Construction and Architectural management, Vol.10, Iss2, pp 117-127, MCB UPLtd

- American Society of Civil Engineers (2011) ASCE Code of Ethics – Principles Study and Application
- Ethics in Engineering- M.W.Martin&R.Schinzinger, McGraw-Hill
- Engineering Ethics, National Institute for Engineering Ethics, USA
- www.ieindia.org
- Engineering ethics: concepts and cases – C. E. Harris, M.S. Pritchard, M.J. Rabins
- CONSTRUCTION CONTRACTS, <http://www.jnormanstark.com/contract.htm>
- Internet and Business Handbook, Chap 4, CONTRACTSLAW, <http://www.laderapress.com/laderapress/contractslaw1.html>
- Contract & Agreements
<http://www.tco.ac.ir/law/English/agreements/General/Contract%20Law/C.htm>
- Contracts, <http://206.127.69.152/jgretch/crj/211/ch7.ppt>
- Business & Personal Law. Chapter 7. “How Contracts Arise”,
<http://yucaipahigh.com/schristensen/lawweb/lawch7.ppt>
- Types of Contracts, <http://cmsu2.cmsu.edu/public/classes/rahm/meiners.con.ppt>
- IV. TYPES OF CONTRACTS AND IMPORTANT PROVISIONS,
<http://www.worldbank.org/html/opr/consult/guidetxt/types.html>
- Contract Types/Pricing Arrangements Guideline- 1.4.G(11/04/02),
<http://www.sandia.gov/policy/14g.pdf>

Subject Code	Subject	L	T	P	C
MC201	**Disaster Management	3	0	0	0

Course Objective:

- Develop an understanding of the key concepts, definitions key perspectives of All Hazards Emergency Management.
- Understand the Emergency/Disaster Management Cycle.
- Have a basic understanding for the history of Emergency Management.
- Develop a basic under understanding of Prevention, Mitigation, Preparedness, Response and Recovery.
- Develop a basic understanding for the role of public private partnerships.

Module I

Understanding Disasters:

Understanding the concepts and definitions of disaster, hazard, vulnerability, risk, importance, dimensions & scope of Disaster Management, Disaster Management cycle and disaster profile of India.

Module II

Types, Trends, Causes, Consequences and Control of Disaster: Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves); Biological Disasters (epidemics, pest attacks, forest fire); Technological Disasters (chemical, industrial, radiological, nuclear, bomb threat, explosion) and Man-made Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters; terrorist attack, , sudden shooting); Global Disaster Trends–Emerging Risks of Disasters–Climate Change and Urban Disasters; Financial emergency(risk of eviction, risk in arrears, sudden health emergency, family emergency, unexpected loss of income).

Module III

Prevention and Mitigation of Disaster: Disaster Mitigation: meaning and concept, Disaster Mitigation Strategies Emerging Trends in Disaster Mitigation, Mitigation management, Role of Team and Coordination. Disaster Preparedness: Concept & Nature, Disaster Preparedness Plan, Preventions. Roles & Responsibilities of Different Agencies and Government, Technologies for Disaster Management. Early Warning System; Preparedness, Capacity Development; Awareness during Disaster.

Module IV

Applications of Science and Technology for Disaster Management & Mitigation: Geo-informatics in Disaster Management (RS, GIS, GPS and RS) Disaster Communication System (Early Warning and Its Dissemination) Land Use Planning and Development, Regulations, Disaster Safe Designs and Constructions, Structural and Non Structural Mitigation of Disasters.

Course Outcomes: On successful completion of the course, the student will be able to

- Understanding foundations of hazards, disasters and associated natural/social phenomena
- Familiarity with disaster management theory (cycle, phases)
- Knowledge about existing global frameworks and existing agreements (e.g. Sendai)
- Methods of community involvement as an essential part of successful DRR
- Humanitarian Assistance before and after disaster
- Technological innovations in Disaster Risk Reduction: Advantages and problems
- Experience on conducting independent DM study including data search, analysis and presentation of disaster case study.
- Respond to disaster risk reduction initiatives and disasters in an effective, humane and sustainable manner.
- Upon completion of this course, the students will be able to understand application and use of GIS.

Text Book:

- Disaster Management- J. P. Singhal, Laxmi Publications.
- Disaster Management - Dr. Mrinalini Pandey, Wiley India Pvt.Ltd.
- Disaster Science and Management- Tushar Bhattacharya, McGraw Hill Education (India)Pvt.Ltd.
- Disaster Management: Future Challenges and Opportunities - Jagbir Singh, K W Publishers Pvt.Ltd.

Reference Books:

- Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012) 2.
- Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
- Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
- Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
- Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD.