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COURSE MAP OF B.TECH FOR OTHER IN (OR) SEMESTER		SEMESTER I	
Course Code	Course Name	L	T
CE1001	PROBABILITY AND STATISTICS	2	1
CE1002	COMPUTER GRAPHICS	2	1
CE1003	BASIC MECHANICAL ENGINEERING	2	1
CE1004	ENGINEERING DRAWING	4	1
TOTAL			
SEMESTER II		L	T
Course Code	Course Name	L	T
CE2001	NUMERICAL METHODS	2	1
CE2002	FLUID MECHANICS	2	1
CE2003	HEAT TRANSFER	2	1
CE2004	STRENGTH OF MATERIALS	2	1
CE2005	MANUFACTURING TECHNOLOGY	2	1
CE2006	INDUSTRIAL AND APPLIED MATHEMATICS	2	1
CE2007	PROJECT	1	1
TOTAL			
SEMESTER III		L	T
Course Code	Course Name	L	T
CE3001	DESIGN OF MACHINE ELEMENTS	2	1
CE3002	INTERNAL COMBUSTION ENGINES	2	1
CE3003	REFRIGERATION AND AIR CONDITIONING	2	1
CE3004	HYDRAULIC AND PNEUMATIC	2	1
CE3005	ELECTRICAL MACHINES	2	1
CE3006	ELECTRICAL AND ELECTRONIC MEASUREMENTS	2	1
CE3007	ELECTRICAL AND ELECTRONIC CIRCUITS	2	1
CE3008	INDUSTRIAL ROBOTICS	2	1
CE3009	PLASMA TECHNOLOGY	2	1
CE3010	ANALOG AND DIGITAL CIRCUITS	2	1
CE3011	PROJECT	1	1
TOTAL			
SEMESTER IV		L	T
Course Code	Course Name	L	T
CE4001	ADVANCED DESIGN OF MACHINE ELEMENTS	2	1
CE4002	INTERNAL COMBUSTION ENGINES	2	1
CE4003	REFRIGERATION AND AIR CONDITIONING	2	1
CE4004	HYDRAULIC AND PNEUMATIC	2	1
CE4005	ELECTRICAL MACHINES	2	1
CE4006	ELECTRICAL AND ELECTRONIC MEASUREMENTS	2	1
CE4007	ELECTRICAL AND ELECTRONIC CIRCUITS	2	1
CE4008	INDUSTRIAL ROBOTICS	2	1
CE4009	PLASMA TECHNOLOGY	2	1
CE4010	ANALOG AND DIGITAL CIRCUITS	2	1
CE4011	PROJECT	1	1
TOTAL			
TOTAL CREDITS		24	12

R. K. and Jain R. K. (2003), Numerical Methods (Problems and Solution), New Delhi: New Age. International 16 Syllabus for B.Tech (Marine Engineering) Second Year Revised Syllabus of B.Tech in MRE (To be followed from the academic session, July 2011, i.e. for the students who were admitted in Academic Session 2010-2011) 3. Scarborough, J. B. (1966), Numerical Mathematical Analysis, Oxford Book Co. 4. Tolstov, Georgi P. (1976), Fourier Series, Dover. 5. Sastry, S. S. (2006), Introductory Methods of Numerical Analysis, PHI. References: 1. Gockenbach, Mark S. (2002), Partial Differential Equations Analytical and Numerical Methods, Philadelphia : Society for Industrial and Applied Mathematics (SIAM). 2. Hildebrand, F. B. (1974), Introduction to Numerical Analysis (2nd edition ed.), McGraw-Hill. 3. Larsson, S. and Thomee, V. (2003), Partial Differential Equations with Numerical Methods, New York: Springer-Verlag. ## MATERIALS SCIENCE (MMS - 403): DETAILED SYLLABUS Metals and alloys; Different types of iron and steel; their manufacture, properties and uses in industry. Alloys of iron and steel. Non-ferrous metals and alloys. Properties and uses; Miscellaneous engineering materials; their properties and uses. Solid Solution: Properties of solid solutions and alloys.



[6] Numerical solution of a system of linear equations: Gauss elimination method, Matrix inversion, LU Factorization method, Gauss-Jacobi and Gauss-Seidel iterative methods. [6] Module-4 Application to Ordinary Differential Equations: Numerical solution of first order ordinary differential equation with initial condition by Picard's, Euler's & Taylor series methods; Runge-Kutta Method, Predictor-Corrector methods (Milne & Adams-Bashforth). Introduction to the numerical methods of solutions of BVP's. [6] Module-5 Application to Partial Differential Equations: Finite difference approximations to partial derivatives, Solution of Laplace & Poisson's equations using standard five point formula & diagonal five point formula. Solution of one dimensional heat conduction equation by Schmidt method and Crank Nicolson method. [6] Text Books: 1. Amaranath, T. (1997), An Elementary Course In Partial Differential Equations, Narosa Publishing House. 2. Jain M. K., Iyengar S. R. K. and Jain R. K. (2003), Numerical Methods (Problems and Solution), New Delhi: New Age. International 16 Syllabus for B.Tech (Marine Engineering) Second Year Revised Syllabus of B.Tech in MRE (To be followed from the academic session, July 2011, i.e. for the students who were admitted in Academic Session 2010-2011) 3. Scarborough, J. B. (1966), Numerical Mathematical Analysis, Oxford Book Co. 4. Tolstov, Georgi P. (1976), Fourier Series, Dover. 5. Sastry, S. S. (2006), Introductory Methods of Numerical Analysis, PHI. References: 1. Gockenbach, Mark S. (2002), Partial Differential Equations Analytical and Numerical Methods, Philadelphia : Society for Industrial and Applied Mathematics (SIAM). 2. Hildebrand, F. B. (1974), Introduction to Numerical Analysis (2nd edition ed.), McGraw-Hill. 3. Larsson, S. and Thomee, V. (2003), Partial Differential Equations with Numerical Methods, New York: Springer-Verlag. ## MATERIALS SCIENCE (MMS - 403): DETAILED SYLLABUS Metals and alloys; Different types of iron and steel; their manufacture, properties and uses in industry. Alloys of iron and steel. Non-ferrous metals and alloys. Properties and uses; Miscellaneous engineering materials; their properties and uses. Solid Solution: Properties of solid solutions and alloys. Types of Binary alloys, thermal Equilibrium Diagrams, Cooling curves, Eutectic and peritectic alloys. Intermetallic compounds. Iron carbon equilibrium diagram: Phases in the Fe-C system, Invariant reactions, critical temperatures. Microstructures of slowly cooled steels. Effect of alloying elements on the Fe-C diagram, ferrite and austenite stabilizers. The TTT diagram, drawing of TTT diagram, TTT diagram for hypo & hyper eutectoid steels, effect of alloying elements on CCT diagram. Heat Treatment: Heat treatment principles and processes (Annealing, normalizing, hardening, tempering, martempering, austempering, hardenability. Surface hardening like carburizing, cyaniding, nitriding, and induction hardening) Effect on structure and properties. Fatigue & Creep: S-N curves. Factors affecting fatigue life and protection methods. The creep curves, mechanism of creep, creep resistant materials. Corrosion and its prevention; Mechanism of corrosion, chemical Corrosion, Electrochemical corrosion, Anodic and Cathodic protection. Forms of metallic coatings. Anodising, Phosphating. Selection of Materials in Shipbuilding & Marine Engineering: Boilers, Steam and Gas turbine and diesel engine components. Pumping Machinery, Piping, Engine seating. Propellers and rudders. Composition, strength value and other requirements for materials used. Miscellaneous Engg. Materials: Refractories, Insulating materials; Plastics and Rubber; PVC, Resins, Paints etc. Properties and selection of various materials for various engineering applications. Testing of Materials: Destructive tests; Tensile; Compression Test; Hardness Test; Bend test; Torsion Test & Impact Test. Non-destructive Tests; Magnetic Dust; Fluorescent Test; Ultrasonic Test; Radiography Test etc. Text Books: 1. Materials Science and Engineering - An introduction; William D Callister Jr; Wiley India Pvt. Ltd., 6th Edition, 2006, New Delhi 17