Minutes of the meeting of the Senate of MNNIT, Allahabad held on 04.01.2008 (Friday) at 3.30 p.m. in the in the Conference Room of the Institute.

Following members were present:

1. Prof. A B Samaddar	Chairman
2. Prof. Satish Chand	Member
3. Prof. S.K. Agrawal	"
4. Prof. Satya Sheel	"
5. Prof. T.N. Sharma	"
6. Prof. V.K. Neema	"
7. Prof. P.R. Agrawal	"
8. Prof. Raghuvir Kumar	"
9. Prof. S.C. Prasad	"
10. Prof. R.C. Mehta	"
11. Prof. P.K. Mishra	"
12. Prof. Sudarshan Tiwari	"
13. Prof. Nirjhar Roy	"
14. Prof. Triloki Nath	"
15. Prof. S.K. Duggal	"
16. Prof. K.M. Gupta	"
17. Prof. Dinesh Chandra	"
18. Prof. Vineeta Agarwal	"
19. Prof. R.K. Srivastava, MED	"
20. Prof. Peetam Singh	"
21. Prof. Rajeev Tripathi	"
22. Prof. M.M. Gore	"
23. Prof. K.K. Shukla	"
24. Prof. Rakesh Narain	"
25. Prof. Anuj Jain	"
26. Prof. N.D. Pandey	"
27. Prof. Suneeta Agrawal	"
28. Prof. R.P. Tewari	"
29. Prof. R.K. Singh	"
30. Prof. H.N. Kar	"
31. Prof. Vinod Yadava	"
32. Dr. Sanjay Chaubey	"
33. Dr. S S Narvi	"
34. Dr. Ambalika Sinha	"
35. Dr. Binayak Rath	"
36. Sri Sarvesh K Tiwari	Registrar/ Secretary

Special Invitee

1. Dr. R. D. Gupta	Co-ordinator, GIS Cell

The Chairman extended welcome to the members of the Senate and thanked them for taking their time out to attend the meeting.

The Chairman extended special welcome to the new members namely, Prof. Suneeta Agrawal, Prof. N.D. Pandey, Prof. R.P. Tewari, Prof. R.K. Singh, Prof. Vinod Yadava and Prof. H.N. Kar in the Senate.

Following resolution were passed in the Senate:

1. The Senate confirmed the minutes of its meeting held on 14.11.2007 and the adjourned meeting held on 15.11.2007.
2. The Senate noted the action taken on the decisions of the meeting of Senate held on 17.08.2008 and suggested following modifications in presentation.

   (i) In case of reporting matters, the action taken be written as "The Senate noted the approval accorded by the Chairman, Senate or as appropriate" instead of "No action required".

   (ii) At. Sl. No.6: In the last line under Action Taken for both the points (a) and (b) it should be read as "for deliberation and making recommendations" instead of "for deliberation and taking decision".

3. (i) The Senate considered the proposal of the DPGC of the Mechanical Engineering Department for starting the new programme, M.Tech. in Mechanical Engineering (Thermal Engineering) and approved the same with following suggestions.

   (a) In ME-986: Some topics should be included such as 'Sustainable Development' and also 'National/International Policy on Sustainable Development'.

   (b) In ME-988: Some lectures should be on Non conventional Energy Resources.

   Detailed Course structure is appended as ANNEXURE – I.

   (ii) The Senate considered the proposal of the DPGC of Mechanical Engineering Department for the following points (a) and (b) applicable for all M.Tech. programmes of the department and approved the same:

   (a) The State of Art Seminar may be dropped from III semester and credits for State of Art Seminar and Thesis may be 4 and 8 respectively in the present course of structure.

   (b) Credits of all courses may be assigned as 4. This change will be implemented from the session 2008-2009.

(iii) The Senate considered the proposal of DPGC of the Department of Humanities and Social Sciences for new courses for Post Graduate and Ph.D. programmes of the Department and approved the same.

(iv) The Senate considered the proposal of DPGC of GIS Cell for addition of new courses for M.Tech. (GIS & Remote Sensing), change of credits, modification in eligibility criteria and modification in curriculum and approved the same. Detailed proposal is appended as ANNEXURE-II.

(v) The Senate considered the proposal of DPGC of Department of Applied Mechanics for modification in course structure of M.Tech. (Fluids Engineering) and B.Tech. (Biotechnology) and approved the same. (ANNEXURE-III)

4. The Senate discussed and resolved on the following matter with the permission of the Chairman:

(i) The Senate considered and approved the proposal of the Department of Civil Engineering for modification in names and structure of courses of B.Tech. & M.Tech. programmes of the Department as in ANNEXURE-IV.

(ii) The Senate after discussion authorised the Chairman, Senate to consider and accord necessary approval, if deemed fit, on the proposal of the Department of Computer Science and Engineering for addition of new courses for UG & PG Programmes of the department as the detailed proposal could not be placed before the Senate, but a decision now to be taken early.

(iii) The Senate accepted the report of the Committee constituted in its meeting held on 17.08.2007 for "Relaxation of percentage of marks from 75% to 60% in M.Sc. for admission to Ph.D. programme". The Senate also acknowledged and appreciated the work done by the Committee. Recommendations of the Committee as accepted by the Senate is placed as ANNEXURE-IV

(iv) The Senate considered the request of Mr. Navin Kumar Chaudhary, an off campus Ph.D. scholar of Civil Engineering Department for waiving off the course work and resolved that the same to be referred to the following committee for deliberation and making recommendations to the Senate for further consideration:

(i) Chairman, SPGC – Chairman

(ii) Prof. S.C. Prasad, CED

(iii) Prof. P.R. Agrawal, SMS

(iv) Prof. M.M. Gore, CSED

(v) Prof. Dinesh Chandra, EED

(v) The Senate considered the matter of "Nominee of Senate (one Professor and one Assistant Professor or Lecturer) as Member of Board of Governors" as per Clause 11(f) of the National Institutes of Technology Act, 2007 and deferred the decision on it till the next meeting of Senate.

The meeting concluded with a vote of thanks to the Chair.

Approved

01/02/08

(A B Samaddar)
Director/ Chairman, Senate

31/01/08

(Sarvesh K Tiwari)
Registrar/Secretary

Confirmed

01/05/08

(Chairman, Senate)

ANNEXURE-I

Course Structure

of

M.Tech. in Mechanical Engineering (Thermal Engineering)

M. Tech. in Mechanical Engineering
(Thermal Engineering)

FIRST SEMESTER

Sl. No.	Code	Subject	L	T	P	Credit
1.	ME 930	Materials for Thermal Systems	3	1	0	4
2.	ME 931	Advanced Thermodynamics	3	1	0	4
3.	ME 932	Advanced Heat Transfer.	3	1	0	4
4.	ME933	Computational Methods in Thermal Engineering	3	1	2	4
5.	ME 934	Air-Conditioning Technology	3	1	0	4
		Total				**20**

SECOND SEMESTER

Sl. No.	Code	Subject	L	T	P	Credit
1.	*ME 914	Design of Thermal Systems	3	1	0	4
2.	*ME915	Advanced Instrumentation & Process Control	3	1	0	4
3.	ME 935	~~Thermal~~ Turbo Machines	3	1	0	4
4.	ME 936	I. C. Engine & Pollution	3	1	2/2	4
5.		Elective-I	3	1	0	4
		Total				**20**

THIRD SEMESTER

Sl. No.	Code	Subject	L	T	P	Credit
1.	ME 937	Modern Power Plants	3	1	0	4
2.		Elective-II	3	1	0	4
3.	ME 997	Seminar & State of Art Seminar	0	0	0	4
4.	ME 999	Thesis	0	0	0	8
		Total				**20**

FOURTH SEMESTER

Sl. No.	Code	Subject	L	T	P	Credit
1.	ME 999	Thesis	0	0	0	16

Subjects to be added to the already Existing List of Post-Graduate Electives-

1. ME 985- Solar Energy Engineering
2. ME 986- Energy & Sustainable Development
3. ME 987- Design of I.C. Engine
4. ME 988- Non -Conventional and Renewable Energy Technologies
5. ME 989- Combustion Engineering
6. ME 990- Heat Transfer in two-phase flows

*** Note: Courses ME914 & ME915 already exist in the M.Tech in Mechanical Engineering (Design) Programme.**

ME 930: Materials for Thermal Systems (3-1-0)4

Scope and classification of Engineering Materials for Thermal Systems, Selection of Materials for Thermal Systems, Properties and applications of Metals, Alloys, Superalloys, Glass, Ceramics, Plastics and Composites for Thermal Systems.

Introduction to Thermodynamics of Materials: Free energy- Temperature relationships.

Thermal degradation of materials and Protective techniques, Property enhancing and surface processing operations: Cleaning, surface treatments and protective coatings. Application of advanced coating materials towards creating new engineered surface, controlled high quality surface modification by CVD, PVD, Thermal, Laser, etc.

REFERENCES

1. Budinski, K. G., "*Engineering Materials, Properties and Selection,*" Pub. Prentice-Hall of India, New Delhi, India, 1998.
2. Callister W. D., Jr., "*Material Science and Engineering An Introduction,*" John Wiley & Sons, Inc., 6th Ed., 2003.
3. Groover, M.P., "*Fundamentals of Modern Manufacturing: Materials, Processes, and Systems,*" Wiley Student Edition, John Wiley and Sons, 2005.
4. Sims, C. T., Stoloff, N. S., and Hagel, W.C., "*Superalloys II,*" John Wiley and Sons, 1987.
5. Batchelor, A.W., Lam, L.N. and Chandrasekaran, M, "*Materials Degradation and its Control by Surface Engineering,*" 2nd Edition, Imperial College Press, 2003.
6. Davis, J.R., "*Surface Engineering for Corrosion and Wear Resistance,*" ASM International, USA, 2001.
7. Bunshah, R. F., "*Handbook of Hard Coatings: Deposition Technologies, Properties and Applications,*" Noyes Pub. Park Ridge, New Jersey, U. S. A./William Andrew Publishing, LLC, Norwich, New York, U.S.A., 2001.
8. Tupkary, R.H., "*Metallurgical Thermodynamics,*" Tu Publishers, 1995.

ME 931: ADVANCED THERMODYNAMICS (3-1-0)4

Review of Thermodynamics: Reactive & Non-reactive gas mixtures Liquefaction of Gases, conditions of Thermal stability and Mechanical stability.

Statistical Thermodynamics: Quantum Hypothesis , de Broglie equation, Schrodinger's wave equation, Phase space, Microstate and Macrostate, Maxwell-Boltzman statistics, Fermi - Dirac and Bose-Einstein statistics. Partition Function, Principle of equipartition of energy, Thermodynamic properties.

Kinetic Theory of Gases and Distribution of Molecular Velocities:

Molecular Model, Molecular collisions with a stationary wall, Pressure and absolute temperature of a gas, collisions with moving wall, Clausius equation of state, van der waals equations of state, Maxwell- Boltzmann Velocity Distribution, Energy distribution function, Specific heat of a gas, Specific heat of a solid.

Transport Processes in Gases: Mean free path, Coefficient of Viscosity, Thermal Conductivity, Coefficient of Diffusion, Electrical conductivity.

References:

1. Rao, Y. V. C., Theory and Problems of Thermodynamics, New Age International (P) Ltd. Publishers, 1994.
2. Sontag & Gordon; Wylen, J. Van, Fundamentals of Statistical Thermodynamics, John Wiley & sons, Inc, 1966
3. Nag P.K., Basic & Applied Thermodynamics, Tata McGraw-Hill Publishing Co. Ltd, New Delhi, 2002.

ME 932: ADVANCED HEAT TRANSFER (3-1-0)4

Conduction: Steady and unsteady problems and their solutions in cartesion, cylindrical and spherical coordinates. Separation of variables. Duhamel's theorem. Laplace transform, complex combinations, Problems involving change of phase.

Radiation: Radiative interchange among black and grey surfaces, Shape factors. Applications to cavities and enclosures Radiation from gases, vapours and flames.

Convection: Conservation equations, boundary layers, free Convection, forced convection. Heat transfer in laminar and turbulent, internal as well as external flows, mixed convection, Convection in porous media, combined convection and radiation.

Condensation: Laminar and turbulent film on a vertical surface, Film condensation in other configurations, Drop condensation.

Boiling: Pool boiling regimes, nucleate boiling and peak heat flux, film boiling and minimum heat flux, flow boiling, contact melting and lubrication.

References:

1. Bejan Adraian, *Convection heat transfer*, John Wiley and Sons, Inc., 2004.
2. Myers, G.E., *Analytical Methods in Conduction Heat Transfer,* McGraw Hill Book Co., New York, 1971.
3. Frank P. Incropera and David P. DeWitt, *Fundamentals of Heat and mass Transfer,* John Wiley & Sons, Inc., 1996.
4. Hottel, H.C., and A.F. Sarofim, *Radiative Transfer*, McGraw Hill Book Co., New York, 1967.
5. Siegel, R., and J.R. Howell, *Thermal Radiation Heat Transfer*, McGraw Hill Book Co., New York, 1972.
6. Sparrow, E.M. and R.D. Cess, *Radiation Heat Transfer*, Wadsworth Publishing Co. Inc., Englewood Cliffs, N.J. 1966.

ME933: COMPUTATIONAL METHODS IN THERMAL ENGINEERING(3-1-2)4

Review of numerical techniques: Solution of transcendental equations, solution of simultaneous algebraic- equations.

Problems related to heat transfer:

(a) Explicit and implicit methods of solving the heat conduction equation under various types of boundary conditions, methods of solving partial differential equations of elliptic, parabolic and hyperbolic types

(b) Series solution to Ordinary Differential equations, Separation of variable method, Complex Combination method, Normalization method
Combined convection and radiation. Applications of Monte-Carlo method. Special topics.

References:

1. Minkowycz, W.J., et al., *Handbook of Numerical Heat Transfer.* John Wiley. 2000.
2. Myers, G.E., *Analytical Methods in Conduction Heat Transfer,* Mc-Graw Hill Book Co., New York, 1971.

ME 934: AIR-CONDITIONING TECHNOLOGY (3-1-0) 4

Brief review of refrigeration techniques, Non- conventional Refrigeration systems , namely Vapour Refrigeration and Steam jet Refrigeration systems, psychrometric properties and processes,

Thermal comfort, inside and outside design conditions, Ventilation requirements, Cooling / Heating load calculations

Room sensible heat factor & Effective sensible heat factor, Apparatus dew point and coil by pass factor, Calculation of supply air state and rate

Summer and winter air-conditioning apparatus: selection and thermal design of evaporators, condensers, capillary / expansion valves and other refrigerant control devices. Air-washers and cooling towers, Transmission and distribution of air

Solar air conditioning – passive and active techniques.

REFERENCES

1. C P Arora , *Refrigeration and air-conditioning*, Tata McGraw-Hill, 2nd edition, 2000.
2. G N Tiwari , *Solar Energy*, Narosa Publishing House, 2002
3. *ASHRAE (American Society of Heating, Refrigeration and Air-conditioning Engineers) Handbook*
4. Jan F Kreider., *HVAC (Heating, Ventilation and Air-Conditioning) Handbook*

ME 935: THERMAL TURBO MACHINES (3-1-0)4

Fundamentals theory of turbomachines of incompressible fluids, Euler's theorem, Velocity diagrams, types of turbomachines, two and three-dimensional flow of compressible fluids, thermodynamics of turbomachine processes, flow of fluids in turbo-machines, boundary layer considerations, free vertex, solid rotation and other types of radial equilibrium. Axial, radial and mixed flow machines, transonic and supersonic compressors, characteristic curves, loading limits and design corrections off design conditions and regulation.

References:

1. Rama, S. R. Gorla, Aijar A. Khan, *Turbo machinery – Design and Theory*, , Marcel Dekker, Inc., NY, 2003.
2. Earl Logan, JR, *Turbomachinery – Basic Theory and Applications*, II edition, Marcel Dekker Inc., NY, 1993.
3. Dixon S L, *Fluid Mechanics and Thermodynamics of Turbomachinery*, V edition, Butterworth Heinemann, UK, 2005.
4. Schobeiri M., Turbomachinery, *Flow Physics and Dynamic Performance*, NY, 2003.
5. Balje O E , *Turbomachines – A guide to Design, Selection and Theory*, John Willy and Sons, NY, 1981.
6. Round G. F., *Incompressible Flow Turbomachines*, Design, Selection Applications and Theory,– Heinemann, UK, 2004.
7. Yahya, S.M., Turbines , *Compressors and Fans*,, Tata McGraw Hill Co., 1983

ME 936: IC Engine and Pollution (3-1-2/2)4

Basics of Engine Operation, Engine Geometry, Performance Parameters, Ideal Cycle Analysis, Combustion Stoichiometry, Fuel-air Cycle Model

Gas Exchange in 4-Stroke and 2-Stroke engines, Mixture Preparation

Spark-ignition (SI) Engine Combustion, Flame Propagation and Structure, Knock, SI Engine Emissions, Engine Heat Transfer, 2-Stroke & 4-Stroke SI Engine Performance, Variable Valve Control, Gasoline Direct Ignition Engines

Diesel Combustion, Diesel Emissions, Turbo charging, Diesel engine performance

Emission Control Technology of SI and Diesel Engines

Alternative fuels, Modeling and simulation of various engine processes.

List of Practicals

1. Comparison of Specific Fuel Consumption (SFC) of CI & SI engines under constant speed.
2. Comparison of SFC of CI & SI engines under variable speed operation.
3. Determination of Friction power of CI engine by (i) Motoring test (ii) Retardation test
4. Effect of spark advance on the performance of SI engine.
5. Study of fuel injector pump testing m/c and testing effectiveness.
6. Study of fuel injector.
7. Smoke testing.

References:

1. Heywood, J. B. *Internal Combustion Engine Fundamentals.* London: McGraw-Hill, 1988.
2. Taylor, C. F. *The Internal Combustion Engine in Theory and Practice.* Vol. 1, and 2. Cambridge, MA: M.I.T. Press
3. Ferguson, C. R. *Internal Combustion Engines--Applied Thermosciences.* New York: John Wiley & Sons, 1986.
4. Blair, G. P. *Design and Simulation of Four-Stroke Engines.* Warrendale, PA: SAE, 1999.
5. Blair, G. *The Basic Design of Two-Stroke Engines.* Warrendale, PA: Society of Automotive Engineers, 1990.
6. Zhao, F., D. L. Harrington, and M-C. Lai. *Automotive Gasoline Direct-Injection Engine.* Warrendale, PA: SAE, 2002.
7. Bosch. *Automotive Handbook.* 5th ed. Published by Robert Bosch GmbH. Warrendale, PA: Distributed by SAE, 2000.

ME 937: MODERN POWER PLANTS (3-1-0)4

Introduction to Modern Power Plants: Principle types of power plants special features, application and future trend of development.

Steam power plant: Major subsystems, fuels, storage, preparation, handling, feeding and burning, Ash handling and duct collection, furnace wall design, cooling towers and feed water treatment plants, piping, Environmental aspects.

Nuclear power plant: fission and fusion, fuels, Fertile materials and breeding. Nuclear reactors, materials used for various components, radiation and health hazards and waste disposal.

Diesel and Gas Turbine power plant: Various subsystems, combined cycle Power plants.

Hydroelectric power plant: Rainfall and run-off measurements and plotting of various curves for estimating power available with or without storage, different types of hydroelectric power plants, design, construction and operation of different components of hydro-electric power plants.

Non-conventional power generation: Design aspects of wind and solar power plants.

Site and Equipment selection: Comparison of site selection and plant layout criteria for different types of power plants instrumentation and controls used in different types of power plants. Power plant economics

References:

1. Morse F. T., *Power Plant Engineering*, Affiliated East West Press, Pvt. Ltd, New Delhi, 1978
2. Kehlhofer, R., *Combined Gas and steam turbine Power Plant*, Fairmont Press Inc., 1991.
3. Gretz, J.B., et al., *Thermomechanical Solar power Plants*, D Reidel publishing Co., Boston, 1985.
4. Goncharov, A. N., *Hydropower Stations*, Israel program for Scientific Transactions, 1975.

ME 985: SOLAR ENERGY ENGINEERING (3-1-0) 4

The energy crisis- causes and options, solar energy option – availability and land area requirements.

Solar radiation outside the earth's atmosphere and at the earth's surface, instruments for measuring solar radiation, solar radiation geometry, basic earth-sun angles, flux on tilted surfaces.

Liquid flat-plate collectors – design and performance parameters, solar air heaters, concentrating collectors, solar ponds and energy storage.

Solar thermal power generation: low, medium and high temperature cycles, solar cooling, Goswami cycle for combined cooling and power, drying and desalination, solar air and water heating

Solar photovoltaic power generation: monocrystalline, polycrystalline and amorphous cells, Fabrication and performance of SPV modules.

REFERENCES:

1. 'Solar Energy – principles of thermal collection and storage' by Sukhatme, Tata McGraw-Hill, 1996

2. 'Solar Energy – fundamentals and applications' by Garg and Prakash, Tata McGraw-Hill, 1997

3. 'Principles of Solar Engineering' 2nd edition by Goswami, Kreith and Kreider, Taylor & Francis, 2000.

ME 986: ENERGY AND SUSTAINABLE DEVELOPMENT (3-1-0)4

The energy crisis: causes and options; global energy demand and supply, characteristics of renewable and non-renewable energy resources

Energy-economy link; electricity – economy link for developing countries

Energy-environment link, Global warming and climate change, Acid rain and thermal pollution

Environmental cost of economic growth, Energy strategies for sustainable development.

REFERENCES:

1. 'Energy for a sustainable world', Jose Goldemberg et al, Wiley Eastern Limited, 1993
2. ERG (Energy Research Group) series; editor: Ashok V. Desai, Wiley Eastern Limited, International Development Research Centre, Ottawa and United Nations University, Tokyo, 1990
3. "EXERGY: Energy, Environment and Sustainable Development by Ibrahim Dincer and Marc A Rosen, Elsevier Publication, 2007

ME 987: DESIGN OF I.C. ENGINES (3-1-0)4

REVIEW OF I.C. ENGINE COMBUSTION: Thermodynamics properties of fuel-air mixture before combustion, equilibrium composition of combustion products, construction and use of charts for unburned and burned mixture,

CYCLE ANALYSIS: inlet and exhaust processes, output, mean effective pressure and efficiency of fuel-air cycle, deviation of actual cycle from ideal fuel-air cycle.

AIR CAPACITY OF FOUR-STROKE ENGINES AND SUPERCHARGING: Ideal air capacity, volumetric efficiency, effect of engine variables on volumetric efficiency, supercharging for S.I. and C.I. engines, types of superchargers and their characteristics, exhaust supercharging, performance of supercharged engines.

TWO STROKE CYCLE ENGINES: Engine types, charging and scavenging processes. Charging efficiency, scavenging efficiency, scavenge ratio, trapping efficiency, delivery ratio, perfect scavenging and perfect missing scavenging arrangements cross, loop and uniflow scavenging, elementary porting calculations, Free piston engine.

ENGINE DESIGN: General design: types of cycle, number of cylinder and arrangements, compression ratio, speed, stroke-bore ratio, displacement combustion chamber shape.

DESIGN OF PRINCIPLE PARTS: cylinder, cylinder head, Crank case, pistons connecting rod, crank shaft, valves inlet and exhaust manifolds. Design of cooling system, engine cooling arrangements, basic heat transfer equation, estimation of heat loss, radiator and fin design.

Reference:

1. Lichty, Lester. C, *Internal Combustion Engines*, Mc-Graw Hill Book Co., Inc. 1951.
2. Heywood, J. B. *Internal Combustion Engine Fundamentals.* London: Mc-Graw Hill, 1988.
3. Taylor, C. F. *The Internal Combustion Engine in Theory and Practice.* Vol. 1, and Cambridge, MA: M.I.T. Press
4. Blair, G. P. *Design and Simulation of Four-Stroke Engines.* Warrendale, PA: SAE, 1999.
5. Blair, G. *The Basic Design of Two-Stroke Engines.* Warrendale, PA: Society of Automotive Engineers, 1990.
6. Bosch. *Automotive Handbook.* 5th ed. Published by Robert Bosch GmbH. Warrendale, PA: Distributed by SAE, 2000.
7. Maleev, V.L., *Internal combustion Engines, Theory & Design,* Mc-Graw Hill Book Co. London 1945.

ME 988: Non-Conventional and Renewable Energy Technologies (3-1-0)4

Introduction to the subject, Energy Scene, MNES and State Nodal Agencies.

Solar Energy:

Solar Energy: Thermal and Photo Voltaic routes. Structure of Sun, Solar radiation, Flat plate collectors, Solar cookers and solar ponds, Solar drying and solar still, Solar chimney and solar greenhouses, Solar refrigeration, passive solar house heating and cooling, SPV Physics of semi-conductors & uses of SPV, Solar cells

Wind Energy:

Wind Energy: Introduction, principles of wind power. Wind turbine operation, site Characteristics, Horizontal shaft machines, Vertical shaft machines, Wind farms, Indian scene

Energy from Oceans:

Energy from Oceans: Introduction to OTEC, Wave and Tidal energy. OTEC systems, Mechanism and Wave Motion-Theory, Conversion devices, Theory of Tidal Waves, Conversion devices

Bio Energy:

Introduction to solid, liquid and gaseous Biomass, photosynthesis, Biomass Energy Resources Conversion processes-Incineration, Thermo chemical conversion and Biochemical conversion processes,. Gasification, Paralysis, Anaerobic Digestion (Bio-gas plants), Fermentation, Ethanol & Methanol, Environmental considerations, Indian scene

Geothermal Energy:

Geothermal Energy: Introduction and study of Geology, Types of Geothermal systems, Environmental Issues, Non-Electrical uses of Geothermal Energy

Direct Energy Conversion:

Introduction, MHD power generation, plasma physics, and Energy conversion system: Open & closed cycles, Indian scene.

Fuel cells, Theory, principle of operation, classification, advantages and uses, Fuel cell systems,. Thermo-Electric power generation,Thermo ionic power generation

Energy Storage:

Introduction to Energy storage: Thermal energy storage including sensible and latent heat forms, Flywheel and pumped Hydro systems, Compressed air. Electrochemical (Battery) system.

References:

1. El.Wakil MM: "*Power Plant Technology*", Mc-Graw Hill Book Company, 1984
2. Tiwari G.N., "*Solar Energy (Fundamental, Design, Modelling and Applications)*" Narosa Publishing House (2002)
3. Rao, S. and Parulekar B.B. "*Non-conventional Energy Sources: Renewable and Conventional*", Khanna Publishers (1995).
4. Nikolai, V. Khartchenko "*Green Power, Eco-Friendly Energy Engineering*" Tech. Books International, New Delhi (2004).
5. Bansal, N K. Kleemann M. And Meliss, M.: "*Renewable Energy Sources and Conversion Technology*", Tata Mc-Graw Hill Publishing Co. Limited, New Delhi (1990)

ME 989 : COMBUSTION ENGINEERING (3-1-0)4

Conventional Solid, liquid and gaseous fuels, Manufacture and uses of Producer gas and water gas. Substitute fuels and miscellaneous synthetic fuels. Chemical equation of combustion and conservation of mass, Enthalpy of formation, Enthalpy and Internal Energy of Combustion, Adiabatic Flame Temperature. Equilibrium and dissociation, reversible chemical reaction and equilibrium constant.

Chemical Kinetics: rate and order of reaction, First and Second order reactions.

Molecular Kinetics: Molecularity and order, Theories of Collision.

Flames and Combustion, flame propagation, Quenching and Ignition, Flammability-Theories of flame propagation.

Diffusion Flame: Combustion of solid, liquid particles packed.

Flame stabilization: Unstable flames, Solid carbon in flames, Atomization, vaporization and mixing.

Engineering implications of combustion studies: Design methods.

References:

1. Williams, F. A., "*Combustion Theory/Fundamental Theory of Chemically Reacting Flow Systems*", Addison Wesley Publishing Co., Inc, 1965.
2. Shaha A.K.,"*Combustion engineering and fuel technology: optimum utilization of fuels*", Oxford & IBH publishing co., New Delhi, 1974
3. Turns S R, "*Introduction to combustion;concepts and applications*", McGraw-Hill, New York, 2000

ME 990: HEAT TRANSFER IN TWO-PHASE FLOWS (3-1-0)4

1. Introduction to two-phase flow: 2-phase flow patterns, Basic equations, for 2-φ flow modeling, Frictional pressure drops, Singular pressure drops.

2. Introduction to two-phase heat transfer: Vapour-liquid equilibrium, Mechanism of nucleation, Aspects of heat transfer in two-phase flows.

3. Pool Boiling: The boiling curve, Natural convection, Nucleation, Film boiling.

4. Forced Convection Boiling: Regions of heat transfer in a vertical heated tube Sub-cooled boiling, Saturated boiling.

5. Heat transfer in condensation: Drop wise condensation, Film wise condensation, Film condensation on a planer surface, The influence of interfacial shear.

6. Augmentation of Two-phase heat transfer.

7. Scaling and modeling laws in Two-phase flow and boiling heat transfer.

Book(s)

1. Bejan, A, "*Convection Heat Transfer*", John Wiley & Sons, Inc., 2004
2. Kakac, S.; T.N. Veziroglu , "*Two-Phase Flows and Heat Transfer*", Vol-I & II, Hemisphere Publishing Corporation, Washington, 1977
3. Bergles , A.E., J.G. Collier, J.M. Delhaye, G.F. Hewitt, F. Mayinger , "Two-Phase Flow & Heat Transfer in the Power & Process Industries", Hemisphere Publishing Corporation, Washington, 1981

ANNEXURE-II

GIS Cell, MNNIT, Allahabad

Dated: 2.01.2008

Dean (Academic Affairs)

SUBJECT: Modification in the Course Curriculum of M. Tech. (GIS & Remote Sensing)

A meeting of DPGC of GIS Cell was held on 13.12.2007. The course curriculum of M. Tech. (GIS & Remote Sensing) was discussed in detail and the following decisions were taken:

1. It was decided to add Course on "Decision Support Systems & Methods" (IS 192) run by Department of Compute Science & Engineering for M. Tech. students as an Elective for M. Tech. (GIS & Remote Sensing).

2. It was decided to increase the credits for the Thesis work of M. Tech. III Semester to 12 from 8. Now the total credits for M. Tech. III semester will be 16 in place of 12. The total credits for M. Tech. programme will be 72.

3. At present, candidates having Master of Sciences in Geology/ Geophysics/ Geography/ Archaeology/ Environmental Science/ Computer Science having a valid GATE score are eligible for the admission to M. Tech. (GIS & Remote Sensing). It was discussed and decided by DPGC of GIS Cell that candidates having Master of Science in GIS & Remote Sensing with valid GATE score will also be eligible for admission to M. Tech. (GIS & Remote Sensing) programme. After this, the eligibility for the M. Tech. programme shall be as given below:

   ELIGIBILITY

   The candidates having Bachelor's degree in Engineering in the branches of Civil Engineering/ Computer Science & Engineering/ Information Technology/ Electronics Engineering/ Architecture/ Agriculture Engineering/ Marine Engineering/ Military Engineering/ Naval Science & Engineering/ Aeronautical Engineering/ Mining Engineering or its equivalent are eligible for the admission to M. Tech. (Remote Sensing and GIS). Further, candidates having Master of Sciences in GIS & Remote Sensing/ Geology/ Geophysics/ Geography/ Archaeology/ Environmental Science/ Computer Science or Master of Computer Application are also eligible for the admission.

   The candidates should have minimum 60% marks for the admission. The candidates should have a valid GATE score for getting the fellowship in M. Tech. programme.

4. The members felt that there should be more elective courses in M. Tech. II semester (GIS & Remote Sensing) so that the students have increased flexibility and options to select the subjects of their choices. It was decided to increase the number of elective courses to 3 from 2 in M. Tech. II semester. Thus, it was decided to transfer the course of "Fundamentals of GPS" from compulsory course to elective course.

5. The modified curriculum of M. Tech. (GIS & Remote Sensing) and the list of electives have been attached with this.

Submitted for the approval of Senate.

Krishna Kant.

(Krishna Kant)
Professor & Chairperson, GIS Cell

COURSE PROFILE: M. Tech. (GIS and Remote Sensing)

The duration for M. Tech. degree programme would be 4 semesters.

SEMESTER – I

S. No.	Course No.	Subject	Credits
1.	CE-351	GIS Technology	4
2.	CE-352	Principles of Remote Sensing	4
3.	CS-383/ CS-188	Database Management Systems/ Advanced Data Modelling *	4
4.	-	Elective-I	4
5.	-	Elective-II	4
Total Credits			20

** If majority of students belongs to Civil Engineering, then Database Management Systems will be taught. If majority of students belongs to Computer Science/ IT, then Advance Data Modelling will be taught.*

SEMESTER – II

S. No.	Course No.	Subject	Credits
1.	CE-353	Satellite Image Processing	4
2.	CS-281	Object Oriented Analysis & Design	4
3.	-	Elective-III	4
4.	-	Elective-IV	4
5.	-	Elective-V	4
Total Credits			20

SEMESTER – III

S. No.	Course No.	Subject	Credits
1.	GI -391	Seminar/ Special Problem/ Project	4
2.	GI -392	Thesis	12
Total Credits			16

SEMESTER – IV

S. No.	Course No.	Subject	Credits
1.	GI -393	Thesis	16
Total Credits			16

Total Credits for all semesters = 72

List of Electives

S. No.	Course No.	Name of Course
A. Civil Engineering Stream		
1.	CE-360	Fundamentals of GPS
2.	CE-361	Web GIS
3.	CE-362	Analytical & Digital Photogrammetry
4.	CE-363	Surveying Measurements & Adjustment Computations
5.	CE-364	Physical & Satellite Geodesy
6.	CE-365	Precision Remote Sensing
7.	CE-366	Cartography and Digital Terrain Modelling
8.	CE-367	Microwave Remote Sensing
9.	CE-368	Land Use Planning and Natural Resources Management
10.	CE-369	Urban Planning and Infrastructure Development
11.	CE-370	Water Resources Planning and Development
12.	CE-851	Transportation Systems Planning and Engineering
13.	CE-868	Urban Mass Transit Planning, Operations and Modelling
14.	CE-163	Disaster Management and Hazard Mitigation
15.	CE-251	Earth Resources and Sustainable Development
16.	CE-254	Integrated Solid Waste Management
17.	CE-666	Environmental Impact Assessment
18.	CE-687	Soft Computing Methods in Engineering Problem Solving
B. Computer Science & Engineering Stream		
1.	CS-183	Software Engineering
2.	CS-391	Mobile Computing
3.	CS-187	Advanced Computational Algorithms
4.	CS-288	Data Mining & Warehousing
5.	CS-290	Parallel Computing
6.	CS-291	Neural Networks and Fuzzy Logic
7.	CS-283	Web Technology
8.	CS-385	Computer Networking
9.	CS-294	Network Security & Cryptography
10.	CS-387	Real Time & Embedded Systems
11.	CS-388	Computer Architecture
12.	CS-389	Data Compression Techniques
13.	CS-390	Distributed Systems
14.	IS-192	Decision Support Systems & Methods
C. Mathematics Stream		
1.	MA-377	Mathematical Modelling & Information Theory
2.	MA-378	Computer Based Numerical Analysis & Statistical Techniques
3.	MA-379	Simulation and Modelling

ANNEXURE-III

Course Structure

of

M.Tech. in (Fluids Engineering) and

B.Tech. (Biotechnology)

Annexure-I

M.Tech. (Fluids Engineering)

Modifications Proposed:

There were 7 subjects in 2nd semester in M.Tech. (Fluids Engineering) programme. To maintain a uniformity among all the M.Tech. programmes being run in the department, an elective subject (Elective-V) is proposed for deletion to make total subjects in 2nd semester as 6. The subjects in all other semesters remain unchanged.

Modified Programme Structure:

M.Tech. (Fluids Engineering)

SEMESTER-I

Code	Course		L-T-P	Credits
AM905	Advanced Fluid Mechanics		4-0-0	4
AM921	Experimental Methods & Analysis		3-0-2	4
M	Advanced Engineering Mathematics		3-1-0	4
AM922	Applied Numerical Methods		3-0-2	4
	Elective-I		4-0-0	4
	Elective-II		4-0-0	4
		Total	21-1-4	24

SEMESTER-II

AM923	Turbulent Flow		4-0-0	4
AM924	Theory & Design of Impeller Pumps		4-0-0	4
AM925	Advanced Solid Mechanics		3-1-0	4
AM926	Computational Fluid Dynamics		3-0-2	4
	Elective-III		4-0-0	4
	Elective-IV		4-0-0	4
		Total	22-1-8	24

SEMESTER-III

AM9	Mini Project		0-0-4	4
AM9	Thesis		0-0-20	4
		Total	0-0-24	8

SEMESTER-IV

AM9	Thesis		0-0-25	16
		Total Credit	0-0-25	72

List of Electives

Elective-I & II			
Code	Course	Code	Course
AM927	Hydropower & Hydraulic Turbines	ME981	Thermo-Fluid Dynamics
AM928	Fluid Power Control	ME982	Advanced Gas Dynamics
Elective-III & IV			
AM965	Non-Newtonian Fluid Flow and Applications	ME983	Fans, Blowers and Compressors
AM963	Boundary Layer Theory	ME984	Gas Turbine & Jet Propulsion
AM964	Multiphase Flow	EE908	Instrumentation & Control
AM967	Environmental Fluid Mechanics		

Annexure-II

B.Tech. (Biotechnology)

Modifications Proposed:

The teaching loads and credits of the following subjects to be taught in 4th semester of B.Tech. (Biotechnology) are proposed for modification:

B.Tech. (Biotechnology)

	SEMESTER-IV	OLD		PROPOSED	
Code	Course	L-T-P	Credits	L-T-P	Credits
AM406	Transport Process	3-1-0	4	3-1-2	5
BT 404	Biochemical Engineering	3-1-2	5	3-1-0	4

Transport Process Laboratory (AM406): List of Practical Proposed:

1. To verify the momentum equation using the experimental set-up on diffusion of submerged air jet.
2. To determine the coefficient of discharge of an orifice of a given shape. Also to determine the coefficient of velocity and the coefficient of contraction of the orifice mouth piece.
3. To calibrate an orifice meter, venturimeter and bend meter and study the variation of the coefficient of discharge with the Reynolds number.
4. To study the transition from laminar to turbulent flow and to determine the lower critical Reynolds number.
5. To study the velocity distribution in a pipe and also to compute the discharge by integrating the velocity profile.
6. To study the variation of friction factor, '*f*' for turbulent flow in commercial pipes.
7. To study the boundary layer velocity profile over a flat plate and to determine the boundary layer thickness.
8. Separation of Blood into its constituents.

ANNEXURE-IV

DEPARTMENT OF CIVIL ENGINEERING
MOTILAL NEHRU NATIONAL INSTITUTE OF TECHNOLOGY
ALLAHABAD

CED/Letter No. 04 /2008 Dated : Jan. 3, 2008

An urgent Departmental meeting was held on Jan. 3, 2008 at 3.00 P.M. in the Civil Engineering Department. The following members were present.

1. Prof. S.C. Prasad
2. Prof. S.K. Duggal
3. Prof. R.P. Tiwari
4. Er. Y.K. Gupta
5. Er. L.K. Misra
6. Dr. R.D. Gupta
7. Dr. R.C. Vaishya
8. Dr. Rakesh Kumar
9. Dr. R.M. Singh
10. Er. Kumar Venketesh
11. Er. Nek Ram Rawal
12. Dr. Goutam Ghosh
13. Dr. P. Balaramudu
14. Er. Puspendu Bhunia

Following are the minutes of the meeting :

1. It was proposed and passed in the meeting that the names of the B. Tech. Courses of

   (i) CE 302 Building Construction & Materials is changed to Building Materials and Services. There are some changes in the course content also.
   (ii) CE 402 Concrete Technology – there are some changes in course content
   (iii) CE 501 Construction, Planning and Management there are some changes in course content.
   (iv) CE 504 Concrete Structures – I there are some changes in course content.
   (v) CE 505 the name of the Course in Changed from Estimation. Construction, Estimation and Valuation.
   (vi) CE 803 Earth quake Resistant Design. There are some changes in the course content.

2. Course No. 522 : Experimental and Computational Methods of M. Tech. Structure will have 2 – 0 – 4 (LTP) instead of 3 1 (LT). The credit will be the same.

The meeting was terminated with thanks to the chair.

(S.C. PRASAD)
PROFESSOR & HEAD

Copy to : All faculty members.

CE 302 Building Materials & Services

L3 T1

1.1 Introduction: Classification of materials, materials and their performance, economics of the building materials.

1.2 Stones, Bricks and other Building Blocks:

(i) Stones, Requirement of good building stone, characteristics of stones and their testing. Common building stones. Preservation of stones.
(ii) Bricks : Manufacture of clay bricks, and their classification. Properties of clay bricks and their testing. Problems of efflorescence & lime bursting in bricks & tiles.

1.3 Gypsum, Lime and Pozzolona :

(i) Gypsum: Forms of gypsum and gypsum plaster, properties of gypsum plaster, building products of gypsum and their uses.
(ii) Lime: Manufacture of lime, classifications of limes, and properties of lime.
(iii) Pozzolona : Natural and Artificial fly ash, Surkhi (burnt clay pozzolona), rice husk and ash pozzolona, properties and specifications for use in construction.

1.4 Organic Building Materials:

(i) Timber: Classification and identification of timber, Fundamental Engineering properties. Defects in timber, Factors affecting strength of timber, seasoning and preservation of timber. Wood based products.
(ii) Asphalt, Bitumen and Tar:
Terminology, specifications and uses, Bituminous materials.

1.5 Polymers, Plastic, Paints and Varnishes:

Chemistry of Plastics manufacturing process, classification, advantages of plastics, Mechanical properties and their use in construction.
Paints varnishes and distempers, Common constituents, types and desirable properties, Cement paints.

1.6 Metals:

Ferrous metals, Desirable characteristics of reinforcing steel. Principles of cold working. Detailed Discussion on reinforcing steel mechanical and physical properties chemical composition. Brief discussion on properties and uses of Aluminum and lead.

1.7 Glass and Insulating Materials:

(i) Glass: Ingredients, properties types and use in construction.
(ii) Insulating Materials: Thermal and sound insulating material desirable properties and type.

2. Building Services:
Planning of

(a) Natural Ventilation a day lighting.
(b) Water Supply and Sanitary fittings (Plumbing)
(c) Heating Ventilation & Air conditioning.
(d) Mechanical Lifts and Escalators.
(e) Fire Fighting.
(f) Acoustics.

3. Building Finishes: Plastering, pointing.

4. Building Maintenance: Principles & Methods.

References

1. S.K. Duggal : " Building Materials", New age International Pvt Ltd, Publishers.
2. S.K. Sharma: "A Text Book of Building Construction", S. Chand & Company Ltd.
3. B.C. Punmia : "A Text Book of Building Construction, Laxmi Publications, Delhi.
4. O.H. Koenisberger : "Manual of tropical housing and building" Orient Longman Ltd., Madras.
5. S.P. Arora et *al.*, "A Text Book of Building Construction (Planning Techniques and Methods of construction)" - Dhanpat Rai & Sons, Delhi.

CE 402 Concrete Technology

L 3 T 1

2.1 Concrete as a Building Material and its Ingredients:

(i) Cement: Manufacture of Portland Cement, its composition, Hydration of cement, physical and chemical properties, concept of strength development. Gel. space Ratio, Powers Law. Gel. structure.

(ii) Testing of Cement for general physical and chemical properties as per BIS specifications.
(iii) Different types of cement such as Slab Cement, Portland Pozzolona Cement and high Alumina cement, their characteristics, composition, use and properties.
(iv) Aggregates and Testing of Aggregates:
Classification, source, physical and mechanical properties. Testing of Aggregates for physical and mechanical properties.

2.2 Production of Fresh Concrete:

(i) Proportioning of concrete, operations involved in concrete production, Workability, Factors Affecting workability, Measurement of workability. Problem of Segregation and bleeding and Laitance.

(ii) Properties of Hardened Concrete.
Strength and durability, Factors affecting strength and durability of concrete.

2.3 Concrete Mix Design: principle and Methods, Statistical Quality control. Concrete Rheology, Maturity concept.

2.4 Introduction to special concretes:

(a) Admixtures in concrete.
(b) Special concrete as lightweight concrete. High Density Concrete, Sulpher Implemented concrete Polymer concrete, Lime concrete constituents and uses.
(c) High strength concrete.
(d) Fibre Reinforced Concrete.
(e) Ready Mixed Concrete.
(f) High Performance Concrete.
(g) Self Compacted Concrete.
(h) Roller Compacted Concrete
(I) Bacterial Concrete

2.5 Material testing and instrumentation:

Conventional vs. Non-Destructive Testing. Methods & Principles of NDT.

References

1. Rai Mohan and Jai Singh M.P. "Advances in Building Materials and Construction"-CBRI Roorkee.
2. "Civil Engineering Materials "Technical Teachers" Training Institute Chandigarh, Tata McGraw Hill Publishing Company Ltd., New Delhi.
3. Spence RJS and Cook DJ-"Building Materials in Developing Countries", John Wiley and Sons.
4. Shetty M.S. "Concrete Technology, Theory and Practices." S. Chand & Company Ltd., New Delhi.
5. Neville A.M., "Properties of Concrete", Pitman Publishing Company.
6. Gambhir M.L. "Concrete Technology" - Tata McGraw Hill Publishing Company Ltd., New Delhi.
7. Gambhir M.L. "Concrete Manual" - Dhanpat Rai & Sons, Delhi.

CE 501 CONSTRUCTION PLANNING & MANAGEMENT

L3 T1

1. Elements of Management

Project cycle, Organisation, planning, scheduling monitoring updating and management system in construction.

2. Network Techniques

Bar charts, milestone charts, work break down structure and preparation of networks. Application of network Techniques like PERT, GERT, CPM AON and AOA in construction management. Project monitoring, cost planning, resource allocation through network techniques. Line of balance technique.

3. Engineering Economics

Time value of money, Present economy studies, Equivalence concept, financing of projects, economic comparison present worth method Equivalent annual cost method, discounted cash flow method, analytical criteria for postponing of investment retirement and replacement of asset.

Depreciation and break even cost analysis.

4. Contract Management

Legal aspects of contraction, laws related to contracts, land acquisition, labour safety and welfare. Different types of contracts, their relative advantages and disadvantages. Elements of tender preparation, process of tendering pre-qualification of contracts, Evaluation of tenders, contract negotiation and award of work, monitoring of contract extra items, settlements of disputes, arbitration and commissioning of project.

5. Equipments and Their Management

Introduction about the equipments used in construction industry. Productivity, operational cost, owning and hiring cost and the work motion study. Simulation techniques for resource scheduling.

References

1. "Construction Planning", Equipment and Methods. : R.L. Peurify. T.M.H., International Book Company.
2. "PERT & CPM Principles and Applications" L.S. Srinath, E.W.P. Ltd., New Delhi.
3. "Network Analysis Techniques" S.K. Bhatnagar, Willey Eastern Ltd.

CE 504 CONCRETE STRUCTURES – I (L3:T1:P0)

Methods of Design

Working Stress Design Method

Assumption, Distribution of Stresses on the cross section in bending transformed area, Analysis and Design of a rectangular singly and doubly reinforced section, T and L sections.

Limit State Design Method

Assumptions, Distribution of stresses on the cross section in bending Analysis and Design of a rectangular singly and doubly reinforced section, T and L sections.

Design of Beam in Shear

Behaviour of RC beam in shear, shear strength of beam with and without shear reinforcement, Minimum and Maximum shear reinforcement, Design of beam in shear using working stress and Limit state methods.

Bond and Development Length

Nature of bond between steel and concrete. Development of bond stress in reinforcement, Concept of development length and anchorage, Design of RC section in bond and calculation of development length using Working stress method and Limit state methods.

Design of Beams in Torsion

Failure of beam under torsion, interaction between shear and torsion and between moment and torsion, Concept of equivalent sheer and moments. Analysis and design of beam curved in plan

Rectangular Slabs

One way solid slabs, simple supported and continuous two way slabs simply supported and continuous.

Compression Members

Classification of Compression members into pedestal, long and short column, Effective length, Slenderness ratio and slenderness limit, Axially loaded short columns design using Working Stress and Limit State methods, Increase in permissible load in helically reinforced columns.

Eccentrically loaded columns, Minimum eccentricity, Uniaxially loaded columns, Working stress and Limit State method of design

Reference Books

1. Jain A.K: "Reinforced Concrete Design", Limit State Method.
2. Syal I.C. & Goel A.K: "Reinforced Concrete Structures".
3. Malik S.L. and Gupta: "Reinforced Concrete".
4. Jaikrishna and Jain: "Plain and Reinforced Concrete Vol. I & II".
5. Dayaratnam P: "Reinforced Concrete Design".
6. Park R & Pauley T: "Reinforced concrete structures".
7. IS 456-1978 code of practice for plain & Reinforced concrete.
8. SP-16 Design Aids of Reinforced Concrete to IS: 456-1978.

CE 505 Building Construction, Estimation & Valuation

L3 T1

1. Building Construction: Components of building area considerations, Construction Principle and Methods for layout, Damp proofing ant termite treatment, staircases Different types of floors, and flooring materials. Bricks and stone masonary construction. Cavity wall, hallow wall and Waffle slab construction. Doors, Windows, Roofs, Lintels and Chhajja, Functional efficiency of Buildings.
2. Importance of estimation, different types of estimates specifications general and detailed.
3. Methods of Estimation: General items of work for estimates units and measurement, method of accounting for the deduction of openings etc.
4. Estimates of Buildings: Detailed estimates of a single roomed and a two roomed residential building. Analysis of rates: Definition of analysis of rates, Prime cost, Work charged establishment, Quantity of materials per unit of work for major civil engineering items Resource planning through analysis of rates, market rates, PW.D. Scheduled and cost indices for building material and labour.
5. Public works Organization, M.E.S. Organization, India Railway Organization and concept of organizational set up for Public Work Execution. Duties and responsibilities of the officers.
6. System of P.W. accounts, Cash and cash boom Temporary advance, Stores, Issue of stores, Material at site account, Measurement and standard measurement book.
7. Valuation: Purpose of valuation: Terminology, Factors affecting the values of property, valuation and it different aspects. Methods of variation such as Rental method, Direct compensation method, Profit based method and Development method Concept of years purchase, Capitalized value and depreciation. Standard rent- free hold and lease hold propriety, Mortgage and easement.

Reference:

1. Chakraborty M: "Estimating costing and valuation in Civil Engg., Principle and application (Authors Publication, Calcutta)".
2. NB.N. Dutta, "Estimating and Costing".
3. S.K. Sharma: "A Text Book of Building Construction", S. Chand & Company Ltd.
4. B.C. Punmia: "A Text Book of Building Construction", Laxmi Publications, Delhi.
5. O.H. Koenisberger: "Manual of tropical housing and building" Orient Longman Ltd., Madras.
6. S.P. Arora et al., "A Text Book of Building Construction (Planning Techniques and Methods of construction)" - Dhanpat Rai & Sons, Delhi.

CE 803 EARTHQUAKE RESISTANCE DESIGN

L3 T1

Wind and Earthquake loading on structure. Structural idealization for dynamic analysis. Free and Forced vibrations of single degree, two degree and multi-degree-freedom systems, Vibration of continuous Beams.

Lagrange's equation and its application. Seismic Coefficient method and average Response spectrum techniques in Structural Design.

Introduction to Planning of structures for earthquake resistance
Design and detailing of Masonary and RCC structures
Introduction to performance based design
Introduction to design of non-structures

Design criteria for satisfactory Action of a machine foundation. Determination of Soil spring constants. Degrees of freedom of a block foundation. I.S. code for design & construction of m/c dns.

References:

1. "Introduction to Structural Dynamics" - J.M. Biggs
2. "Elements of Earthquake Engineering" - Jai Krishna and A.R. Chandrasekaran
3. IS: 1893 - 2002 Criteria for Earthquake Resistant Design of Structiures.
4. "Fundamental of Earthquake Engineering" -N.M. Neumarks and E. Rosenblueth.
5. "Engineering Vibrations" - L.S. Jacobsen & R.s.Arye
6. "Structural Dynamics - Theory & computation" - Mario Paz.
7. "Dynamics of Structures Theory and Applicaions to Earhquake Engineering" - Anil K. Chopra.
8. "Structural dynamics" - R. Roy Craig Jr.
9. "Dynamics of structures" - R. W. Clough and J Penjien.
10. " Earthquake Resistant Design of Structures" – S.K. Duggal
11. "Earthquake Resistant Design of Structures" – Pankaj Agarwal and Manish Shrikahande.

Motilal Nehru National Institute of Technology
Allahabad

Meeting of the subcommittee formed by the Senate to consider the proposed relaxation of marks from 75% to 60% was held on 02/01/08 at 11.00AM in the office of the Chairman SPGC. Following members were present:

1. Prof. R.K.Srivastava CED
2. Prof. P.R.Agarwal SMS
3. Prof. Rakesh Narain MED
4. Dr. Sanjay Chaubey Physics Dept.
5. Prof. Rajeev Tripathi Chairman SPGC

Prof. Rakesh Mathur could not attend the meeting.

1. Committee considered the proposal and it was decided to recommend the following modification in the clause number 2.3.4:

"Applicant with Bachelors degree in Engineering with 75% marks/7.5 CPI shall only consider for admission. Applicant with Masters Degree in Applied Sciences or any appropriate discipline with First class with NET/UGC/CSIR/Gate or any other qualifying. However in case of exceptionally suitable candidate the requirement of NET/UGC/CSIR/GATE may be waived off but such candidates will not be entitled for fellowship till they qualify any of these examinations."

2. The committee decided to recommend that the minimum course work credit requirement of the candidates with M.Sc. qualification shall be 12.

(R.K.Srivastava) (P.R.Agarwal) (Rakesh Narain) (Sanjay Chaubey) (Rajeev Tripathi)