CIRCULAR

Sub: Syllabus/pattern, Written Test and Interview Schedule for admission to Ph.D./M.S. (By Research) programmes in July 2015 session – Reg.

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• Ph.D./M.S. (By Research) application status including details about any discrepancies/missing documents are available in the link https://cfr.annauniv.edu/jul15/status/ w.e.f. 08.03.2015. Candidates are instructed to strictly adhere to the deadline specified, in order to avoid delay in the processing of applications.

• Selection of the candidates will be based on Written Test, Interview and CGPA or % of marks obtained in the qualifying degree.

• Written test to the eligible candidates for admission to Ph.D./M.S. programmes is scheduled to be held on 11.04.2015 (Saturday) between 10 am and 11 am in the Knowledge Park (Adjacent to Department of Information Science and Technology), College of Engineering, Anna University, Chennai - 600 025.

• Written test will be conducted for 50 marks covering the Syllabus given below based on the specialization of the qualifying degree of the candidates.

• The question paper shall consist of multiple choice type. Total No. of Questions is 50 and the duration of the test is 1 Hour. Mark for every correct answer is one. There is no negative mark. For candidates with M.A. (English), 50% of the questions will be multiple choice type and the rest will be descriptive type.

• Interview will be held from 11.30 am onwards on the same day (or may be extended to the next day, if the number of candidates is more) in the Knowledge Park, College of Engineering, Anna University, Chennai - 600 025.

• Announcement about the list of eligible candidates and issue of Hall tickets will be posted in the website shortly.

• No TA/DA will be paid for attending the Written Test.

**SELECTION LIST WILL BE POSTED IN THE WEBSITE DURING MAY 2015.**

Sd/-
DIRECTOR (RESEARCH)

Syllabus for the admission to Ph.D./M.S. programmes
Ph.D.

PCE1011  Urban Engineering
PCE1012  Transportation Engineering


PCE1021  Structural Engineering
PCE1022  Computer Aided Structural Engineering
PCE1023  Computer Methods and Applications in Structural Engineering

PCE1031  Construction Engineering
PCE1032  Construction Engineering and Management
PCE1033  Infrastructure Engineering
PCE1034  Advanced Construction Technology
PCE1035  Architectural Construction


PCE1041  Soil Mechanics and Foundation Engineering
PCE1042  Geotechnical Engineering

Environmental engineering-aquatic chemistry, atmospheric chemistry, soil chemistry-environmental chemicals; Environmental Microbiology - classification and characteristics of Microorganisms-microbes and nutrient cycles- metabolism of microorganisms- pathogens in wastewater- toxicology Fluid flow-continuity principle, energy principle and momentum principle; frictional head loss in free and pressure flow, minor heads losses- Planning of water system - selection of pipe materials, water transmission main design. Design of sanitary sewer; economics of sewer design-sewer appurtenances; material, construction, inspection and maintenance of sewers. Pollution in wastewaters - physical and chemical treatment of waste water- Biological treatment of wastewater - sludge treatment and disposal. Design of water and wastewater treatment systems-Principles of treatment-Design of water treatment plants-Design of wastewater
PCE1061 Environmental Management

**PCE1071  Ecology and Environment**


**PSH7011  Environment Science**


PCE1081 Water Resources Engineering

PCE1082 Irrigation Water Management


PSH7021 Agriculture
History and Principles of Plant Pathology, Laboratory and Analytical Techniques, Physiological and Molecular Plant Pathology, Mycology, Plant Bacteriology, Plant Virology, Plant Disease Epidemiology, Phanerogamic parasites and Non-parasitic Diseases, Fungal Diseases of Crop Plants, Bacterial and Viral Diseases of Crop Plants, Management of Plant diseases

PCE1091 Coastal Management
PCE1092 Coastal Engineering
PCE1093 Ocean Engineering

**PSH7031  Marine Science**

**PSH7032  Ocean Science and Technology**


**PCE1101  Geoinformatics**

**PCE1102  Geomatics**
PCE1103 Remote Sensing
PSH7201 Spatial Information Technology


PME2011 Mechanical Engineering
PME2012 CAD
PME2013 CAM
PME2014 Product Design and Development
PME2015 Machine Design
PME2016 Engineering Design
PME2017 Mechanical Systems

Design concepts: Design fundamentals, methods and material selection; Design for Quality; Failure mode effect analysis and design for six sigma; Design of experiments; Statistical consideration and reliability; Introduction to computer graphics fundamentals; Curves and surfaces modeling; Concepts of Solid modeling; Visual realism; Assembly of parts and product data Exchange. Basic concepts of material behavior: Elasticity and plastic behavior of metallic and non-metallic materials. Metallurgical aspects of Materials. Effect of temperature, strain and strain rate on plastic behavior - Super plasticity - Ductile, brittle

PME2021 Energy Engineering
PME2022 Thermal Engineering
PME2023 Refrigeration and Air Conditioning
PME2024 Internal Combustion Engineering


PME2031 Manufacturing Systems Management
PME2032 Lean Manufacturing
PME2033 Project Management


PME2041 Welding Engineering

PME2051 Materials Engineering
PME2052 Metallurgy Engineering


**PME2061 Industrial Engineering**


**PME2071 Quality Engineering & Management**


**PME2081 Computer Integrated Manufacturing**

**PME2082 Advanced Manufacturing Engineering**


**PME2091 Printing and Packaging Technology**


**PME2101 Mechatronics**


**PME2111 Production Engineering**

**PME2112 Manufacturing Engineering**


**PME2121 Aeronautical Engineering**

**PME2122 Aircraft Maintenance Engineering**


PME2131  Aerospace Technology

PME2141  Avionics

PME2151  Automobile Engineering
PME2152  Automotive Engineering
**PME2153  Automotive Materials And Manufacturing**


**PME2161  Mining Engineering**

stoping, VCR, sub-level caving, block caving. Recent trends in mechanization of development and stoping methods. Cyclic and continuous mining systems. Excavation and Loading - Workings, applications and limitations of: Shovels, Draglines, Front-end loaders, Scrapers, BWEs, Surface Miners, etc. Transportation - Working, applications and limitations of: Dumpers, conveyors, in-pit crushers, high angle conveyors, etc. Waste Dumps and type of formations. Basic rock mechanics: UCS, tensile and shear strength and their time dependent characteristics; failure theories. Stress distributions around single and multiple openings in rocks. Rock reinforcement and rock bursts. Instrumentation. Mine gases; Natural and Mechanical ventilation; Ventilation network analysis; Mine fires and explosions; Mine dust and illumination. Meridian - True and Magnetic; Theodolite traverse; Triangulation EDM traversing; Correlation; Modern surveying equipment-Total station and GPS. Pollution control and remedial measures. Preparation and appraisal of EMP, EIA. Environment laws and legislation. Carbon capturing, Green house effect and global warming. Mine reclamation and mine closure planning.

**PEE3011**  **Power Systems Engineering**  
**PEE3012**  **Electrical and Electronics Engineering**  
**PEE3013**  **Electrical Energy System**  

**PEE3021**  **High Voltage Engineering**  

**PEE3031**  **Power Electronics and Drives**  
**PEE3032**  **Electrical Machines**  

**PEE3041**  **Embedded Systems Technology**

**PEE3051**  Control System

**PEE3052**  Electronics and Control

**PEE3053**  Instrumentation Engineering

**PEE3054**  Sensor System Technology


**PEE3061 Power Engineering and Management**


**PIC4011 VLSI Design**

**PIC4012 Applied Electronics Engineering**

**PIC4013 Electronics and Communication Engineering**


**PIC4021 Medical Electronics**

**PIC4022 Biomedical Engineering**

Electronic Circuits, Semiconductor Devices, Integrated Circuits, Communication Theory Biomedical Instrumentation, Biomedical Equipment, Digital Image Processing, Radiological Equipment, Human Assist Devices

**PIC4031 Advanced Communication System**
PIC4032  Digital Communication and Network Engineering
PIC4033  Optical Communication
PIC4034  Wireless Communication
PIC4035  Communication Systems
PIC4036  Networking Technology
PIC4037  Electronics Engineering
PIC4038  Computer and Communication


PIC4041  Computer Science and Engineering
PIC4042  Software Engineering
PIC4043  Information Technology
PIC4044  Distributed Computing System
PIC4045  Advanced Computing
PIC4046  Pervasive Computing
PIC4047  Main Frame Technology
PIC4048  System Engineering and Operations Research


PIC4051  Multimedia Technology


**PSH7041 Master of Computer Applications (MCA)**


**PTE5011 Chemical Engineering**

**PTE5012 Petroleum Refining and Petrochemicals Engineering**


**PTE5021 Process Design**

**PTE5031  Environmental Science and Technology**

**PSH7051  Agro Chemistry**
Manufacture of Agrochemicals, Resource Management, Pesticide Biochemistry, Pesticides Formulations, Crop Pathology & Pest Management, Weed management, Modern Techniques in agriculture, Food processing, Dairy Technology, Advanced Agrochemicals, Biopesticides and Fertilizers

**PTE5041  Industrial Safety Engineering**

**PTE5042  Fire Engineering and Safety Management**
Probability and Reliability - random variable, special distributions, sampling, curve fitting, time series analysis, reliability, computer programming and software, safety in chemical industry - concept of safety and safety auditing, hazardous chemicals - precautions in handling, tolerance limits of industrial emissions, carcinogens-health hazards of insecticides, drinking water standards - computer aided hazards analysis, hazard, risk issues and hazard assessment, instrumentation, testing, risk analysis - environmental pollution control and industrial hygiene, EIA, impact assessment and documentation - industrial safety and hazards management - fire and explosion, relief systems, toxicology, leaks and leakages - process simulators - safety in engineering industry - metals and wood working machines, guarding, welding and gas cutting, cold forming and hot working, finishing, inspection and testing - regulations for health, safety and environment - safety management - construction - safety in material handling - noise and vibration controls - electrical safety - air pollution control - fire and explosive control and transport phenomena.

**PTE5051  Textile Technology**

**PTE5052  Textile Chemistry**
and Estimations - Analysis of Variance - Process Control and Capability Analysis - Design and Analysis of Experiments

**PTE5061**  **Apparel Technology**

**PTE5062**  **Fashion Technology**


**PTE5071**  **Ceramic Technology**


**PTE5081  Leather Technology**


**PTE5091  Footwear Science and Engineering**


PTE5101 Biotechnology/ Industrial Biotechnology
PTE5102 Microbial Technology
PTE5103 Pharmaceutical Technology
PTE5104 Biopharmaceutical Technology
PTE5105 Bioinformatics
PSH7061 Biotechnology
PSH7062 Bio Engineering
PSH7063 Molecular Biology
PSH7064 Human Genetic
PSH7065 Genomics
PSH7066 Biomedical Science
PSH7067 Biomedical Instrumentation Science
PSH7068 Biochemistry

Anatomy of a cell, Cell components-organelles, Membrane, Membrane transport and protein sorting, signal transduction, Structure and function of cytoskeleton, Tissue and their cellular interactions, Cell cycle and cancer.


Prokaryotic and eukaryotic cell structure; Microbial nutrition, growth and control; Microbial metabolism (aerobic and anaerobic respiration, photosynthesis); Nitrogen fixation; Chemical basis of mutations and mutagens; Microbial genetics (plasmids, transformation, transduction, conjugation); Microbial diversity and characteristic features; Viruses.

Molecular analysis of UV/visible, florescence, circular dichroism, NMR and ESR spectroscopy, Electron microscopy - transmission and scanning electron microscopy - scanning tunnelling and atomic force microscopy, Molecular structure determination using X-ray diffraction and NMR; mass spectrometry, Analytical Ultracentrifugation: Sedimentation velocity and equilibrium, determination of molecular weights, Theory and principles of Chromatography.

Media Design and requirements for fermentation processes, medium optimization methods, Stoichiometry of cell growth and product formation, Kinetics of microbial growth, substrate utilization and product formation, Simple structured models, Sterilization of air and media, Thermal death kinetics of microorganisms, batch and continuous heat sterilization of liquid media, filter sterilization of liquid media, air sterilization and design of sterilization equipment, Batch, fed-batch and continuous processes, Bioreactor Scale-up, Various types of microbial and enzyme reactors, STR, packed bed reactor, airlift reactor, fluidized bed reactor and bubble column reactors, Online monitoring of bioprocess parameters such pH, redox potential, DO, DCO2, temperature, cell density and vent gas analysis.
Biological sequences analysis, Algorithms for local and global alignment of sequences, Multiple sequences alignment and applications, Phylogenetics; Character and Distance based methods, Protein secondary structure and tertiary structure prediction, Biological databases and tools, Microarray analysis, Basics of Systems Biology, Basics of PERL programming language and Linux Operation System.

**PSH7071 Microbiology**

**PSH7072 Botany**

**PSH7073 Applied Plant Science**

**PSH7074 Plant Biology and Plant Biotechnology**

**PSH7075 Zoology**

Photosynthesis - Emphasis on mechanisms of electron transport; photoprotective mechanisms; CO2 fixation-C3, C4 and CAM pathways. Respiration and photorespiration - Citric acid cycle; plant mitochondrial electron transport and ATP synthesis; alternative oxidase; photorespiratory pathway. Nitrogen metabolism - Nitrate and ammonium assimilation; amino acid biosynthesis. Plant hormones - Biosynthesis, storage, breakdown and transport; physiological effects and mechanisms of action. Sensory photobiology - Structure, function and mechanisms of action of phytochromes, cryptochromes and phototropins; stomatal movement; photoperiodism and biological clocks. Solute transport and photoassimilate translocation - uptake, transport and translocation of water, ions, solutes and macromolecules from soil, through cells, across membranes, through xylem and phloem; transpiration; mechanisms of loading and unloading of photoassimilates.

Developmental biology, Basic concepts of development: Potency, commitment, specification, induction, competence, determination and differentiation; morphogenetic gradients; cell fate and cell lineages; stem cells; genomic equivalence and the cytoplasmic determinants; imprinting; mutants and transgenics in analysis of development. Gametogenesis, fertilization and early development: Production of gametes, cell surface molecules in sperm-egg recognition in animals; zygote formation, cleavage, blastula formation, embryonic fields, gastrulation and formation of germ layers in animals; embryogenesis. Ecology and Evolution. Population Ecology: Characteristics of a population; population growth curves; population regulation; life history strategies (r and K selection); concept of metapopulation - demes and dispersal, interdemic extinctions, age structured populations. Lamarck; Darwin-concepts of variation, adaptation, struggle, fitness and natural selection; Mendelism; Spontaneity of mutations; The evolutionary synthesis. Characterisation, classification and Identification. Morphology, cultivation and reproduction of microbes. Microbial genetics and overview of metabolism. Microbes in relation to disease and health.
PTE5111 Food Technology
PTE5112 Food Processing
PTE5113 Food And Nutritional Biotechnology
PTE5114 Agricultural Processing and Food Engineering
PSH7191 Food Chemistry and Food Processing

Food Chemistry - Composition of foods Nutrient and non-nutrient components of foods, water activity, lipid, carbohydrates, proteins, bioactive components, functional foods, analytical methods in food analyses; food additives, their functions and applications - Food microbiology - microbial spoilage of foods, food pathogens, food poisoning, food borne infections, microbes in food fermentation. Bioreactor and upstream processing, fermentation processes - batch, continuous, fedbatch, enzymes in food technology, microbial productions of aminoacids, proteins, lipids, flavor components, colouring agents. Types of processing - aseptic processing, drying and ultrafiltration, canning, radiation processing, CAP, MAP, Hurdle technology, newer methods- ohmic heating PEF, High pressure processing, food packaging technology. Cereal, Pulse and oilseed technology, meat, fish and poultry technology, dairy product technology, fruit and vegetable technology, flavours, spices, coffee, tea, cocoa. Heat Transfer, mass transfer, fluid mechanics, mass and energy balance, mechanical operations Engineering materials, pumps, principles of refrigeration, Equipment used for milling, extrusion, mixing, blending, filling, heat processing and cooling. Sensory evaluation of foods, consumer testing, food product development, Assessment of food safety, GHP, GMP, HACCP, sanitation and hygiene in food industry, food safety management systems, ISO. GM foods, use of biotechnology in enhancing food production and safety assessment. Food Laws and regulations - National and international, Codex, JECFA, USFDA, EFSA, FFSAI, BIS. Food economics and Trade, public distribution, food security.

PTE5121 Nano Science and Nano Technology


PTE5131 Plastic Technology
PTE5132 Rubber and Plastics Technology
PTE5133 Polymer Technology
Polymers - Classification of polymers - Functionality - Polymerization mechanism - Industrial polymerization techniques - Molecular weight of polymers and their significance - States of aggregation in polymers - $T_g$ - Factors affecting $T_g$ - Crystal nucleation and growth - Spherulite formation - Factors affecting crystallinity. Preparation, Structure - Property relationship and applications of General Purpose Rubbers, Special Purpose Rubbers, Polyurethanes and Thermoplastic Elastomers. Preparation, Structure - Property relationship and applications of Commodity Plastics, Engineering Plastics and Specialty polymers. Test for Processability - Viscosity - Flow characteristics - Vulcanization Tests for rubber. MFI - Gelation and Gel time, Test for Mechanical, Electrical and Optical Properties, Test for durability; Thermal analysis, Molecular weight studies, Spectroscopic and Morphological studies. Flow behavior of Polymers - Compounding and Mixing process, Forming Operations - Extrusion, Injection molding, Blow molding, Compression and Transfer molding, Rotational molding, Thermoforming, Calendering, Reaction Injection Molding; Latex processing and applications; Composite materials and Fabrication; Polymer recycling. Simple geometries - Spring rates - Creep - Stress relaxation - Design to Specific Spring rates, Rubber under complex loading, Rubber products under dynamic conditions, Property considerations in designing of Plastics Parts, Design of moulds and dies for Rubber and Plastics products.

PAP6011 Digital Architecture

PAP6012 Landscape Architecture

PAP6013 General Architecture

Evolution and principles of city planning; types of cities & new towns; planning regulations and building byelaws; eco-city concept; Concept of housing and neighborhood ; housing standards ,policies and typology, housing infrastructure; housing programs in India; selfhelp housing, settlement system planning; growth of cities & metropolises; rural-urban migration; urban conservation; urban renewal; Traffic and Transportation Planning. Indian architecture from Indus civilization to Modern contemporary period. European architecture from Egyptian modern architectural styles to contemporary period. Vernacular and traditional architecture. Principles of landscape design and site planning; history of landscape styles, elements and materials, plant characteristics, environmental considerations in landscape planning. Application of computers in architecture and planning; understanding elements of hardware and software; computer graphics; programming languages and usage of software packages. Components of Ecosystem and environment, climate responsive and energy efficient building design. Principles of Building Science - lighting, architectural acoustics etc. Building Services on Water supply, sewerage and drainage systems, electrification of buildings, air-conditioning intelligent buildings; fire fighting systems, building safety and security systems -principles, types, standards and uses; Infrastructure, Services and Amenities in city level
planning. Behavioral characteristics of all types of building materials; principles of strength of materials; design of structural and principles of disaster resistant structures. Building Construction and Management: Building construction techniques, methods and details; professional practice; project management techniques. Development Administration and Management: Planning laws; development control and zoning regulations.

PAP6021  

Town and Country Planning

Process of evolution of human settlement planning - Planning systems in India - Type of planning surveys - Sociological and Economic concepts and frameworks - Social and economic Impacts of urban growth and expansion - City-region, urban sprawl, and urban fringe - Current trends in the traffic and transportation development sector in India. - Pedestrian planning- Parking and Public Transport Surveys - Inventory of Transport facilities - Different modes - Private transport - Scope and function of statistics in planning analysis - Distribution and structure of population - Population projection methods - Research processes and planning processes - Access to Information: nature, types and sources - Hypothesis - Housing character and its information with reference to culture and technological changes and development - Impact of industrialization and urbanization on housing and built environment - Green house and eco friendly housing - Housing market and housing finance - Gated community-emergence and management system - Contemporary theories and concepts in city planning - Concept and need for regional planning and regional development - Multi-level planning, block and District planning. Environmental concerns at local, regional and global levels - environmental impact assessment practice in India - Sustainability and environmental - Legislative requirements, public awareness and community participation - Evolution, scope and significance of planning legislation - Review of Town and Country Planning Act of Tamil Nadu - Professional role responsibility and planning consultancy service - project cycle - Planning process and project planning - Funding options for urban development projects - Planning Norms and standards - Basic concepts of government and governance - Governance and urban governance - Urban and rural administration in developed, and developing countries - e-Governance-concepts, theories and practices - e-Readiness indices - Approaches to understanding organizations - Human resource planning and management - Participatory governance - Public relations- Introduction to real property ownership - Real estate investment analysis and portfolio management - Classification of spatial and non-spatial data application of spatial data in urban and regional plans - Ecotourism - Leisure, recreation and society - Tourist and local community - Tourist site planning- processes and sustainability - Urban development through Five Year Plans - Budgetary allocation from central and state governments for urban development - Asset management - Disaster cycle - Disaster-types, causes and consequences - Disaster preparedness
and rehabilitation - Spatial planning and technology interface - Socio-economic and environmental Impact of techno cities - communities and people in building smart cities and smart communities - Information need and the role of web in planning - Web sites and information sources in urban and regional planning.

PSH7081  Electronic Media
PSH7082  Visual Communication
PSH7083  Communication
PSH7084  Mass Communication
PSH7085  Journalism
PSH7086  Media Arts


PSH7091  Mathematics
PSH7092  Applied Mathematics

PSH7101  Computer Science
PSH7102  Information Technology


PSH7111  Physics
PSH7112  Astrophysics


**PIC4061 Laser and Electro Optical Engineering**


PSH7121 Materials Science


**PSH7131 Medical Physics**

Basic Radiation Physics: Atomic Structure, radioisotopes, radioactivity, radioactive equilibrium, artificial radioactivity, production of radioisotopes. Interaction of charged particles with matter, Interaction of X- and gamma rays with matter attenuation, modes of interactions, attenuation and mass energy absorption coefficients, buildup correction, shielding materials. Interaction of neutrons with matter, scattering, absorption, neutron induced nuclear reactions, radioactive capture reactions (n, p), (n, γ), moderation, shielding materials. Basic X-ray Physics characteristics and continuous spectra, basic requirements of medical diagnostic and therapeutic tubes, safety devices in X-ray tubes, technology of modern X-ray tubes, insulation and cooling of X-ray tubes, filtration and beam quality, mobile and dental units, malfunctions of X-ray tubes, limitations on loading, control panels, image intensifiers; technology of electron accelerators. Radiation Quantities and Units w-value, exposure (rate), Kerma (rate), Terma, absorbed dose (rate), activity, energy, rate constants, charged particle equilibrium (CPE), radiation weighting factors, tissue weighting factors, equivalent dose, effective dose, collective effective dose. Radiation Dosimetry Absorbed dose, Kerma, exposure, activity, rate constants, Charged Particle. Equilibrium (CPE), relationship between Kerma, absorbed dose and exposure under CPE; determination of exposure and air kerma, ionization chambers for low, medium and high energy, X-rays and gamma rays, electrometers, determination of absorbed dose. Basic principles of radiation detection, Gas Filled detectors: Ionisation chambers - Theory and design; Construction of condenser type chambers Radiochromic films; Thermoluminescent Dosimeters (TLD), Optically stimulated Luminescence dosimeters (OSLD), radiophotoluminescent dosimeters, neutron detectors, nuclear track emulsions for fast neutrons, solid state nuclear track (SSNTD) detectors, calorimeters. Radiation Measuring & Monitoring Instruments Dosimeters based on condenser chambers, pocket chambers, dosimeters based on current measurement, different types of electrometers - MOSFET, farmer dosimeters, multipurpose dosimeter, water phantom dosimetry systems, brachytherapy dosimeters, Thermoluminescent dosimeter readers for medical applications, calibration and maintenance of dosimeters. Radiation Biology mutations, potentially lethal and sub-lethal damages, modification of radiation damage, LET, RBE, dose rate, dose fractionation, stochastic and deterministic effects of radiation, acute radiation sickness, LD50/60, effects of radiation on skin, blood forming organs, digestive tract and reproductive system; effects of chronic and acute exposure to radiation, induction of leukemia and radiation carcinogenesis. Nuclear Medicine Clinical radioisotope laboratory and its organization, use
of open isotopes including 99Tc in functional studies, measurement of radioactivity, design aspects of collimators, use of whole body counters, physical principles of isotope dilution analysis, circulation time, radioisotope scanners and cameras, cyclotron produced radionuclides, SPECT, PET, radio-Immunoassay (RIA), therapy. Radiation Hazard Evaluation and Control. Radiation monitoring instruments, calibration check of monitoring instruments, radiation monitoring procedures for radiation generating equipment and installations, protective measures to reduce radiation exposures to patients and occupational workers, radiation hazards in radioisotope laboratories, protective equipment.

PSH7141 Biophysics

PSH7151 Chemistry
PSH7152 Applied Chemistry Organic Chemistry
PSH7153 Industrial Chemistry
PSH7154 Polymer Chemistry

PSH7161 Corrosion Science & Technology


PSH7171 Geology

PSH7172 Applied Geology


**PSH7181**  English

**PSH7182**  Linguistics


PMS8011 Master of Business Administration with any specialisation

M.S. (By Research)

MCE111  Civil Engineering

MCE121  Geoinformatics

MME111  Mechanical Engineering
Stress, strain and deformation of solids Transverse loading on beams and stresses in beams-Torsion-Deflection of beams- Thin cylinders, spheres and thick cylinders. Basics of mechanisms-Kinematics of linkage and cam mechanisms- Gears and gear trains-Friction. Steady stresses and variable stresses in machine members-Design of shafts and couplings- Design of energy storing elements-Design of bearings and miscellaneous elements. Force Analysis- Balancing- free and forced vibration, mechanism for control.
Jigs and Fixtures. Design of transmission systems for flexible elements- spur gears and parallel axis helical gears- bevel, worm and cross helical gears


**MME121 Aeronautical Engineering**


**MEE111 Electrical Engineering**

MEE121 Control Systems Engineering
MEE122 Instrumentation Engineering


MIC111 Electronics and Communication Engineering

Electronic Circuits, Semiconductor Devices, Integrated Circuits, Communication Theory
**MIC121  Computer Science and Engineering**

**MIC122  Information Technology**


**MTE111  Chemical Engineering**


**MTE121  Leather Technology**


**MTE131 Biotechnology**


Anatomy of a cell, Cell components, Membrane, Membrane transport and protein sorting, signal transduction, Structure and function of cytoskeleton, Tissue and their cellular interactions, Cell cycle and cancer.

Immunity, Cells, tissues and organs of the immune system. Antigens, epitopes and antibody reactivity

Structural organization and multiplication of bacteria, viruses, algae and fungi, methods to quantify bacterial growth; Nutritional requirements of bacteria, host-microbe interactions; anti-bacterial , antifungal and anti- viral agents; mode of action and resistance to antibiotics; biofertilizers and biopesticides; microorganism and pollution control; biosensors.

Medium requirements for fermentation processes, medium optimization methods, Stoichiometry of cell growth and product formation, Kinetics of microbial growth, substrate utilization and product formation, Simple structured models, Batch, fed - batch and continuous processes, Mass transfer in bioreactor and Aeration and agitation, Rheology of fermentation fluid, Scale - up concepts.

Polarized light - optical rotation - circular dichroism, UV-VIS Spectroscopy - Applications, nuclear Magnetic Resonance - X -ray diffraction- application in Biology FT-IR, Raman spectroscopy, Theory of chromatography- normal phase & reverse phase chromatography - gel permeation- ion exchange & affinity chromatography

Biological Sequence Analysis, Local and Global Alignment Multiple sequence alignment and Application, Protein structure prediction, Phylogenetics, Biological databases.
MTE141  Rubber and Plastics Technology

MTE142  Polymer Technology


MTE551  Ceramic Technology

Quarrying of ceramic materials, size reduction, mechanical separation, mixing and conveying, powder characterization, Classification of whiteware products, heavy clayware, tests and quality control. Formation and structure of glass, preparation of glass batch, glass melting process, Special glasses, annealing, different types of refractories, different types of cement, concrete, properties of cement and concrete.

MAP111  Architecture

City planning: Evolution and principles of city planning; types of cities & new towns; planning regulations and building byelaws; eco-city concept; Housing: Concept of housing and neighborhood; housing standards, policies and typology, housing infrastructure; housing programs in India; self help housing. Regional planning; settlement system planning; growth of cities & metropolises; rural-urban migration; urban conservation; urban renewal; Traffic and Transportation Planning. History of Architecture: Indian
architecture from Indus civilization to Modern contemporary period. European architecture from Egyptian modern architectural styles to contemporary period. Vernacular and traditional architecture. Landscape Design: Principles of landscape design and site planning; history of landscape styles, elements and materials, plant characteristics. Environmental considerations in landscape planning. Computer Aided Design: Application of computers in architecture and planning; understanding elements of hardware and software; computer graphics; programming languages and usage of software packages. Environmental Studies in Building Science - Components of Ecosystem and environment, climate responsive and energy efficient building design. Principles of Building Science - lighting, architectural acoustics etc. Building Services on Water supply, sewerage and drainage systems, electrification of buildings, air-conditioning intelligent buildings; fire fighting systems, building safety and security systems - principles, types, standards and uses; Infrastructure, Services and Amenities in city level planning. Materials and Structural Systems: Behavioral characteristics of all types of building materials; principles of strength of materials; design of structural and principles of disaster resistant structures. Building Construction and Management: Building construction techniques, methods and details; professional practice; project management techniques Development Administration and Management: Planning laws; development control and zoning regulations.