VINAYAKA MISSIONS UNIVERSITY

Deemed to be University
(Vinayaka Mission's Research Foundation)
(Declared Under Section 3 of the UGC Act, 1956)

Accredited by NAAC

SALEM

ALL INDIA COMMON ENTRANCE EXAMINATIONS 2017
(ENGINEERING, MANAGEMENT & COMPUTER APPLICATIONS)

HANDBOOK OF INFORMATION & GUIDELINES

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(For B Tech / M Tech / MBA / MCA Programmes)

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1. INTRODUCTION

In recognition of the Trust's excellence in Education, Vinayaka Missions was accorded the Deemed University Status in the year 2001 by the Ministry of Human Resource and Development, Government of India. The University is the 48th Deemed University in India. Vinayaka Mission's Research Foundation (VMRF) offers diploma, degree and career oriented UG and PG programmes in the fields of Medicine, Dentistry, Paramedical Sciences, Alternative Medicines, Homoeopathy, Engineering, Management, Computer Application, Architecture and Basic Sciences. The University is in the process of continuously developing and offering job oriented and innovative educational programmes.

Vinayaka Mission's Research Foundation is conducting its All India Common Entrance Examinations (AICEE) every year on an all India basis for admission to 4 year B Tech, 2 year MTech, 2 year MBA & 3 year MCA Degree programmes, offered in two campuses, namely, Vinayaka Missions Kirupananda Variyar Engineering College (VMKVEC), Salem and Aarupadai Veedu Institute of Technology (AVIT), Chennai. Candidates who satisfy the eligibility criteria will be admitted to the concerned programmes and institutions through counselling, based on their ranks in the Entrance Examination.

This handbook contains the general information and rules relating to VINAYAKA MISSION'S RESEARCH FOUNDATION ENTRANCE EXAMINATIONS 2017 and relevant details of the programmes offered, examination centres, syllabus, counseling etc. Candidates are required to go through the handbook thoroughly and acquaint themselves with the details relating to entrance examination and subsequent admission. The contents of the handbook are subject to modification as may be deemed necessary by the University.

2. PROGRAMMES AND BRANCHES / SPECIALIZATIONS OFFERED

The various programmes offered in the two Engineering Colleges are listed below :

S.No.	Name of College	Programmes and Branches /Specializations
1.	Vinayaka Mission's Kirupananda Variyar Engineering College, Salem	**B.Tech.** Aeronautical Engineering Automobile Engineering Biomedical Engineering Biotechnology Civil Engineering Computer Science and Engineering Electrical and Electronics Engineering Electronics and Communication Engineering Mechanical Engineering Mechatronics Solar & Alternate Energy
		M.Tech. Applied Electronics Biomedical Engineering Biotechnology CAD Computer Science and Engineering Computer Forensic & IT Security Construction Engineering and Management Embedded SystemTechnology Environmental Engineering Information Technology Irrigation, Water Management and Resources Engg. Manufacturing Engineering Power Electronics and Drives Power Systems Engineering Real Estate Valuation Structural Engineering Thermal Engineering VLSI Design
		M.B.A. [HRM / Marketing / Finance / Operations / Systems] Airport & Airline Management Banking Insurance & Financial Market Services Entrepreneurship Environment Hospital Administration Knowledge Management Real Estate Management
		M.C.A.

S.No.	Name of College	Programmes and Branches /Specializations
2.	Aarupadai Veedu Institute of Technology, Paiyanoor, Chennai	**B.Tech.** Automobile Engineering Biomedical Engineering Biotechnology Civil Engineering Cloud Computing Computer Science and Engineering Electrical and Electronics Engineering Electronics and Communication Engineering Information Technology Mechanical Engineering Mechatronics Solar & Alternate Energy
		M.Tech. Applied Electronics Biotechnology CAD Computer Forensic & IT Security Computer Science and Engineering Construction Engineering & Management Disaster Mitigation & Management Embedded System Technology Environmental Engineering Information Technology Manufacturing Engineering Metallurgy & Material Science Power Electronics and Drives Power Systems Engineering Structural Engineering Thermal Engineering VLSI Design
		MBA [HRM / Marketing / Finance / Operations / Systems / Logistics / International Business / Entrepreneurship]
		MCA

3. ELIGIBILITY :

B.Tech. : A pass in 10+2 or its equivalent with Physics, Chemistry and atleast one of Mathematics / Biology. Candidates who have not studied Mathematics as a subject are eligible for the Biology-based branches only, namely Biomedical and Biotechnology. Others are eligible for all the branches, including the Biology-based branches. Candidates appearing for 10+2 Examination in March / April 2017 can also apply.

M.Tech. : A pass in Bachelor's Degree programme or its equivalent in a branch approved as relevant to the area of specialization. Candidates appearing for Final Examination in March / April 2017 can also apply.

MBA : A pass in any recognized Bachelor's Degree programme. Candidates appearing for Final Examination in March / April 2017 can also apply.

MCA : A pass in any recognized Bachelor's Degree programme. Must have studied Mathematics / Statistics at degree level or Mathematics at +2 level. Candidates appearing for Final Examination in March / April 2017 can also apply.

4. APPLICATION FORM

Application form can be obtained from addresses given below, either in person (by paying cash of Rs. 500/-), or by post (on payment of Rs. 600/- by Demand Draft favouring "VINAYAKA MISSIONS UNIVERSITY", payble at Salem or Chennai, according to the address chosen).

Corporate Office:	**University Office :**
Vinayaka Missions University 160, New No.213, Behind Doshi Towers, Poonamallee High Road, Kilpauk, Chennai - 600 010, Tamil Nadu.	The Registrar Vinayaka Missions University, Sankari Main Road (NH-47), Ariyanoor, Salem - 636 308, Tamil Nadu.

Alternatively, Application form can also be downloaded from www.vinayakamission.com in which case the filled in application must be submitted along with a Demand Draft for Rs. 500/-. The filled-in application form (along with Demand Draft if the downloaded form is used), must reach the following address within the last date notified.

The Registrar
Vinayaka Missions University,
Sankari Main Road (NH-47), Ariyanoor,
Salem - 636 308, Tamil Nadu. Ph : 0427 - 3987000

5. GENERAL INSTRUCTIONS

- Fill in each coloumn in your own handwriting.
- Place a tick mark (✓) wherever necessary. Strike off the portion(s) not applicable when alternatives are stated.
- Incomplete applications will be summarily rejected.
- Do not enclose any original certificates.
- Ensure all information furnished in the application are clear and correct, failing which the application / admission may be cancelled.

- MERE ADMISSION TO THE ENTRANCE EXAMINATION DOES NOT CONFER ON THE CANDIDATE ANY RIGHT OF ADMISSION TO THE COURSE OF STUDY APPLIED FOR.
- Candidates should report at the examination hall, at least 30 minutes before the scheduled time of starting of the examination with Hall Ticket, pen, pencil and eraser.
- Hall Ticket should be produced at the time of entrance examination without fail. No candidate shall be allowed to write the entrance examination without the Hall Ticket. Those issued with *provisional* Hall Tickets must get them regularized as directed, before the examination.
- Candidates shall not carry any bits of paper or other incriminating materials, including calculators and mobile phones, inside the examination hall.
- No candidate will be allowed to go outside the examination hall till completion of the first one hour duration.
- Candidates found misbehaving or using unfair means or resorting to impersonation, will have their candidature cancelled and will be liable to be debarred from taking Entrance Examinations of this University any further.
- The OMR answer sheet of the candidate should be handed over to the Hall Superintendent along with the question booklet. If any candidate fails to do so, his/her candidature shall be cancelled.
- University will not be responsible for any postal delay or loss in postal transit.

6. CHECK LIST FOR ENCLOSURES

Before sending the application, check whether the attested copies of the following are attached.

1. Certificates of qualifying examination (including all mark sheets).
2. Conduct and Transfer certificates from the Head of the institution last studied.
3. Birth certificate
4. Community certificate*
5. Certificate of sports, games and other extra-curricular activities in which the candidate has taken part / won a prize / claims special merit*

* if claiming consideration under that quota, if available.

The All India Common Entrance Examination will be held at SALEM, CHENNAI, ERNAKULAM, KOLKATA, MADURAI, PATNA, PUDUCHERRY and RANCHI. In the box against each centre in the application form write your preference number for that centre. Exhaust all the preferences 1-7. If sufficient number of candidates are not available for a particular Examination Centre, the University may divert those candidates to the other nearest examination centre.

7. IMPORTANT DATES

Details	B Tech
Last date for receipt of filled - in application forms	19.05.2017
Date of All India Common Entrance Examination	27.05.2017
Examination Time	10.00 am To 01.00 pm

Details	M Tech / MBA / MCA
Last date for receipt of filled - in application forms	19.05.2017
Date of All India Common Entrance Examination	27.05.2017
Examination Time	02.00 pm To 04.00 pm

8. ENTRANCE EXAMINATION

8.1 General

The Questions for the AICEE will be of Objective type which may include Matching, Assertion-Reason and Comprehension types also. Multiple answers will be given from which the correct answer is to be chosen.

Evaluation and Negative Marks

For All P.G. Degree programmes, except M.B.A: Three marks will be awarded for every correct answer. For every incorrect answer, one mark will be deducted.

For M.B.A. programme: Every correct answer carries four marks. For every incorrect answer one mark will be deducted.

There is no negative mark for wrong answers for U.G. programmes. Details of distribution marks are given in para 8.2.

Method of Answering

Select the correct answer and shade the corresponding bubble using pencil / pen / ball pen.

Answer sheet and Process of Evaluation

Specially designed OMR answer sheets, suitable for computer evaluation, are used. If the number of candidates is small, manual evaluation will be done.

Language of the Question Papers

The language of the question papers is English.

Syllabus

Every question paper follows a syllabus created from the common minimum content of the prescribed qualifying programme(s) in major Universities / Boards of Education in the country and approved by competent expert bodies.

8.2. Engineering : UG - B Tech

Duration of the Examination	3 Hours
Maximum Marks of the paper	360
Distribution of number of questions and marks	
Part 1: Physical Sciences	Physics (P) : 30 questions Chemistry (C) : 30 questions Three Marks for each questions Total marks : 180
Part 2: Biology	Biology (B) : 60 questions Three Marks for each question Total marks : 180
Part 3: Mathematics	Mathematics (M): 45 questions Four Marks for each question Total marks : 180
Whether negative marks for wrong answer	No

Part 1 is common for all the candidates. Additionally, either part 2 or part 3 shall be answered, subject to the condition that the candidate had studied the subject of the chosen part in the qualifying course. Those who answer part 2 are eligible only for the Biology-based branches whereas those who answer part 3 are eligible for all branches including Biology-based branches.

Nature of Questions:

The question type for AICEE is an Objective one, with four multiple answers, having one correct answer for each question.

Syllabus for the Examination

A minimum common syllabus expected to be covered reasonably well in CBSE and State boards, at the level of Standard XII. The details are given in Appendix-I.

Ranking procedure:

The candidates of AICEE are ranked based on their AICEE marks. Though all candidates may not have distinct CEE marks, all the ranks must be distinct. Ties that may arise between candidates because of equal total marks in the AICEE are resolved in one or more steps using the following criteria.

Tie-Breaking Criteria

Among the candidates who are 'tied-up' with the same total marks in All India Common Entrance Examination,

Higher priority (smaller rank) is given to the one(s) with higher mark in the subject M/B in the AICEE. If the tie still persists, similar higher priorities are given to the following, in order, until the tie breaks totally :

Higher mark in P in AICEE;

Higher total mark in (M/B+P+C) in the Qualifying Examination (QE), (with the weightages: 200+100+100);

Higher mark in M/B in QE;

Higher mark in P in QE;

Earlier Date of Birth.

Counseling and Admission

All candidates obtaining not less than a prescribed cut-off mark in the AICEE are called for counseling for selecting the course and college for admission, in the order of their rank, subject to availability and verification of eligibility claims. Successful candidates are issued with *provisional* letters of admission. The *provisional* admissions are confirmed after payment of fees within the prescribed dates.

8.3 ENGINEERING: P G - M Tech

Duration of the Examination	2 Hours
Maximum mark of the paper	300
Distribution of number of question and marks	
Section 1: Engineering Mathematics	25 questions : Three marks for each correct answer and one negative mark (-1) for every wrong answer
Section2: Basic Engineering	25 questions : Three marks for each correct answer and one negative mark (-1) for every wrong answer
Section 3: Qualifying Branch(es) (Grouped)	50 questions : Three marks for each correct answer and one negative mark (-1) for every wrong answer

Sections 1 and 2 are common for candidates for all PG Engineering specialisations

Nature of questions

Objective type, with four multiple answers, with only one correct answer for each question, from B.E. / B.Tech or equivalent programme of Indian Universities and Institutions.

Syllabus for the Examination.

A minimum common syllabus expected to be covered reasonably well in all Indian Universities and Institutions in the qualifying UG programme(s). The details are given in Appendix-II.

Ranking Procedure

According to the AICEE marks.

Tie-Breaking Criteria

Ties are resolved by giving higher priorities (smaller ranks) in the following sequence:

Higher total marks for correct answer in AICEE;

Higher marks in Section 3 of AICEE;

Higher mark in Section 2 of AICEE;

Higher percentage of mark in the qualifying exam;

Earlier Date of Birth.

8.4 MANAGEMENT: PG - MBA

Duration of the Examination	2 Hours
Maximum Marks of the paper	400
Distribution of Number of Questions and marks	
Analysis of Business situation	20 questions : Four marks for each correct answer and one negative mark (-1) for every wrong answer
Reading Comprehension	20 questions : Four marks for each correct answer and one negative mark (-1) for every wrong answer
Data Sufficiency	20 questions : Four marks for each correct answer and one negative mark (-1) for every wrong answer
English Grammar and Usage	20 questions : Four marks for each correct answer and one negative mark (-1) for every wrong answer
Quantitative Aptitude	20 questions : Four marks for each correct answer and one negative mark (-1) for every wrong answer

Nature of Questions

Objective type, with five multiple answers, with only one correct answer for each question.

Examining Level

The general graduate level of most of Indian Universities with aptitude will be adequate for all sections except the one on 'Quantitative Aptitude' for which the higher secondary level with practical mathematical knowledge will suffice.

Syllabus for the Examination

Conforming to the Examination level described above.

Ranking for Counseling

According to the AICEE marks.

Tie-breaking Criteria

Ties are resolved by giving higher priorities (smaller ranks) in the following order

Higher total marks for correct answers in AICEE;

Higher percentage of marks in the qualifying exam;

Earlier date of birth.

Counselling and admission

Eligible candidates obtaining not less than a prescribed cut-off mark in the AICEE are counselled in the order of their rank and enabled to choose the College of their choice for *provisional* admission. The *provisional* admissions are *regularized* after payment of prescribed fees.

8.5 COMPUTER APPLICATIONS: P G - MCA

Duration of the Examination	2 Hours
Maximum Marks of the paper	300
Distribution of number of question and marks	
Analytical Reasoning and Logical Ability	40 questions : Three marks for each correct answer and one negative mark (-1) for every wrong answer
Computer Awareness	20 questions : Three marks for each correct answer and one negative mark (-1) for every wrong answer
Proficiency in English	20 questions : Three marks for each correct answer and one negative mark (-1) for every wrong answer
Quantitative Aptitude	20 questions : Three marks for each correct answer and one negative mark (-1) for every wrong answer

Nature of Questions

Objective type, with four multiple answers, with only one correct answer for each question.

Examining Level

The general graduate level of most of Indian Universities with aptitude will be adequate for all sections. For 'Quantitative Aptitude' knowledge of mathematics at higher secondary level with applications will suffice.

Syllabus for Examination

Conforming to the 'Examination level' described above.

Ranking, counseling and admission are done as in the case of M.B.A. programme.

9. COUNSELING FOR ADMISSIONS - 2017

Counseling for admission will be done during May/June 2017. Counseling call letter will be sent to the eligible candidates after the publication of the rank list.

Candidate must be physically present for counseling. Parent/Guardian should accompany the candidate.

At the time of Counseling the candidates shall produce the following in original.

If the originals are not produced, the candidate will not be permitted to attend the counseling.

Original Documents to be brought

1. Qualifying Examination mark sheets.
2. Transfer certificate
3. Conduct / Character certificate
4. Community certificate (if claiming consideration under reservation, if any)
5. Migration and Provisional certificates (PG course only)
6. Physical fitness certificate
7. Recent passport size photos - 8 Nos.

When a candidate accepts the seat allotment, his/her original certificates will be retained by the university, for a period decided by the competent authority.

Each candidate has to pay Rs.20000/- by Demand Draft as part of tuition fees during counseling for selection. Candidates are required to pay balance fees and complete all other formalities within the time limit prescribed in the provisional admission order. If a candidate fails to remit the fees on or before the stipulated date, his/her admission will get automatically cancelled without any notice.

Counseling call to a candidate does not guarantee admission to the programme.

10. WITHDRAWAL FROM THE PROGRAMME AND REFUND OF FEES

Any fees once paid will not be refunded under normal circumstances. However if a student admitted to the programme withdraws from the programme before the starting of classes, the fees collected from the student will be refunded after deducting a processing fee of Rs. 5000/-. A request for cancellation of admission should be given with allotment letter and the fee receipt in such a case.

No refund will be given to student withdrawing on or after the date of commencement of classes.

11. IMPORTANT NOTE :

The course details are as per university regulations in force and are subject to modification from time to time.

All disputes are subject to the jurisdiction of the courts at Salem only.

APPENDIX - I

SYLLABUS

Under Graduate Programme in Engineering and Technology - B Tech

PHYSICS

Mensuration, units, dimensions and dimensional homogeneity

Kinematics: Motion in straight lines, speed, velocity, acceleration, relative velocity, motion in plane, projectile, circular motion.

Laws of Motion: Inertia, force and momentum, Newton's laws, impulse, law of conservation of linear momentum, equilibrium under concurrent forces, static and kinetic friction, laws of friction, rolling friction, dynamics of uniform circular motion.

Work, energy and power: Kinetic and potential energies, power, energy of a spring, conservative forces, collision of elastic bodies.

Rotational motion and Gravitation: Moment of a force, angular momentum, its conservation, moment of inertia, rigid body rotation, universal law of gravitation, acceleration due to gravity, Keplar's Laws, escape velocity.

Properties of solids and liquids: Stress-strain relation, Hooke's law, Young's modulus, bulk modulus, rigidity modulus, fluid pressure, viscosity, surface tension, angle of contract, heat, temperature, thermal expansion, specific heat, conduction, convection and radiation, Newton's law of cooling.

Thermodynamics and Kinetic theory of gases: Laws of thermodynamics, reversible/irreversible processes, Carnot engine, equation of state of perfect gas, kinetic energy and temperature, law of equipartition of energy, means free path, Avagadro number.

Periodic motion and waves, period, frequency, periodicity, SHM, oscillations of a spring, force constant, simple pendulum, free, forced and damped oscillations, resonance, longitudinal and transverse waves, superposition of waves, standing waves, harmonics, beats, Doppler effect in sound.

Electrostatics: Charge, Coulomb law, forces between charges, superposition principle : electric filed lines, dipole in uniform electric field. Electric flux, Gauss law, field due to charged infinitely long straight wire, plane sheet and spherical shell, electric potential dipole, equipotential surfaces, conductors and insulators, dielectrics, electric polarization, capacitors, parallel plate capacitor with/ without dielectric medium between the plates, energy in a capacitor.

Current electricity: Electric current, drift velocity, Ohm's law, resistance, energy power, resistivity, series / parallel combinations of resistors, temperature and resistance, electric cell, internal resistance

pd and emf of a cell, series/parallel combination of cell, Kirchhoff's laws, Wheatstone bridge, Meter bridge and potentiometer.

Magnetic effects of current and magnetism: Current in circular loop, Biot-Savart law, Ampere law, infinitely long straight current carrying wire and solenoid, charge moving in uniform magnetic and electric fields. Forces on current carrying conductor in uniform magnetic field, between two parallel conductors, torque on a current loop in uniform magnetic field, moving coil galvanometer, conversion to ammeter and voltmeter, current loop as a magnetic diopole, Earth's magnetic field and magnetic elements, para-dia and ferro-magnetic materials, magnetic susceptibility and permeability, hysteresis, electromagnets and permanent magnet.

Electromagnetic induction, alternating current and electromagnetic waves; Faraday's law, inducted emf and current Lenz law, eddy current, self and mutual inductance, alternating current, rms value of alternating current/voltage, reactance, alternating currents rms values of alternating current/ voltage, reactance and impedance, LCR series circuit, resonance, power in AC circuit, AC generator and transformer, electromagnetic waves and their characteristics, electromagnetic spectra, applications of electromagnetic waves.

Optics: Reflection and refraction of light at plane and spherical surface, total internal reflection, dispersion by prism, Lens formula, magnification and power, microscope, telescope.

Wave optics: Wave front, Huygens principle, reflection, refraction and interference, Young's double slit experiment, microscopes, telescopes, polarization, Brewster's law, plane polarized light and Polaroid's.

Dual nature of matter and radiation: photoelectric effect, observations of Hertz and Lenard, particle, de Brogile relation.

Atomic physics: Scattering of alpha particle, Rutherford's and Bhor's models of atom, hydrogen spectrum, nucleous atomic masses, isotopes, isobars isotones, radioactivity: alpha, beta, gamma particles, radioactive decay, mass-energy relation, mass defect , binding energy, nuclear fission and fusion.

Electronic and Communication devices: Semiconductors, semiconductor diode, I-V characteristics in forward and reverse bias , diode as rectified, LED, photodiode, solar cell, Zener diode. Junction transistor, transistor as an amplifier.

Oscillator and switch, logic gates. Propagation of electromagnetic waves, need for modulation, amplitude and frequency modulation, bandwidth of signals and of transmission medium.

CHEMISTRY

PHYSICAL, INORGANIC AND ORGANIC CHEMISTRY

Physical Chemistry

Basic concepts: Laws of chemical combination, atomic and molecular masses, mole, molar mass, percentage composition, empirical and molecular formulae, chemical equations.

Matter and states: Solid, liquid and gaseous states of matter.

Gas: Boyle's Law, Charle's law, Graham's law of diffusion, Avagadro's law, Dalton's law of partial pressure, Ideal gas equation, kinetic theory of gases, average, rms and most probable velocities real gases, Vander waals equation, liquefaction of gases, critical constants

Liquid: Vapour pressure, viscosity and surface tension effect of temperature

Solid: Molecular, ionic, covalent and metallic solids, amorphous and crystalline solids, Bragg's Law, Lattices, packing are solids, voids, electric magnetic and dielectric properties.

Atom: Electron, proton and neutron, models of Thomson and Rutherford, electromagnetic radiation, photoelectric effects, hydrogen atom, Bhor model, dual nature of matter, Hessenberg uncertainty, principle, elementary ideas of quantum mechanics, atomic orbitals as one electron wave functions, quantam numbers, s,p and d orbitals, spin quantum number, Pauli's exclusion principal, Hunde's rule, electronic configuration of elements.

Chemical bonding and moleculer structure : Kossel-Lewis approach to chemical bond formation. Lognic Bonding, lattice enthalpy. Covalent bonding, electro-negativity, Fajan's rule, dipole moment, VSEPR, valence Bond theory, hybridization involving s,p and d orbitals, resonance, molecular orbital theory, LCAO, types of orbitals, sigma and pi -bonds, homonuclear diatomic molecules, bond order, bond length and bond energy.

Chemical Thermodynamics: Fundamentals, extensive and intensive properties, state functions, process types, first law of thermodynamics: work heat enthalpy, heat capacity, Hess law: Second Law of thermodynamics

Solutions: Molality, molality, mole fraction, vapour pressure and Rault's law, ideal and non ideal solutions, colligative properties of dilute solutions,determination of molecular mass ,ven Hoff factor

Equilibria: Physical process equilibria, Henry's law, Chemical process equilibiria, laws, kp and kc, DG and DGO, equilibrium concentration, pressure, temperature, effect of catalyst, LE Chatelier principle. Lonic equilibrium weak and strong electrolytes ionization ,concepts of acids and bases, ionization of water, PH scale, common ion effect, hydrolysis of salts, solubility products, buffer solutions.

Electrochemistry: Electrolytic and metallic conduction, conductance in electrolytic solutions, specific and molar conductivities, Kohlrausch law, Electrochemical cells, Galvanic cells, Nerst equation, cell potential and Gibbs energy changes

Chemical kinetics: Reaction rate, elementary and complex reactions, order and molecularity, rate constant, zero and first order reaction ,Arrhenius theory, activation energy

Surface Chemistry: Adsorption of gases on solids, Freundlic and Langmuir adsorption solid catalyst, enzyme catalysts, Colloidal State - colloids and suspensions, classifications of colloids, Tyndall effect, brownian movement, electrophoresis, diyalysis, coagulation and flocculation, emulsions

Inorganic chemistry

Classification of elements and periodicity, modern periodic law, periodic table, s p d and f block elements, periodic trends in properties of elements.

Isolation of metals: Occurrence of elements in nature, extraction of metals, concentration reduction and refining of Al, Cu, Zn and Fe.

Hydrogen: Position in periodic table, isotopes, preparation properties and uses, water and heavy water, hydrogen peroxide, ionic, covalent and interstitial classification of hydrides.

s- Block elements: Group 1 and 2 elements, electronic configuration, general trends in physical and chemical properties of sodium carbonate, sodium chloride, sodium hydroxide and sodium hydrogen carbonate.

p- Block elements: Group 13 to 18 elements, group wise study, d- and f-Block elements: transition elements, inner transition, lanthanoids and actinoids

Coordination Compounts: Werner theory , ligands, coordination number ,dent city chelation, isomerism, crystal field theory, color and magnetic properties.

Environmental chemistry: Environmental and atmospheric pollution, troposphere, particulate and soil pollution, control strategies.

ORGANIC CHEMISTRY

Organic component: Purification, qualitative analysis detection of nitrogen, sulphur, phosphorus and halogens, qualitative analysis - carbon, hydrogen, nitrogen, halogens, sulphur, phosphorous.

Fundamental of organic chemistry: Tetravalency of carbon, simple molecules, hybridization, classification of organic compounds homologous series isomerism. Covalent bond fission, electronic displacement in covalent bond, common types of organi reactions.

Hydrocarbons: Classification, isomerism, IUPAC nomenclature, preparation, properties and reaction. Alkanes, alkynes, aromatic hydrocarbons.

Organic compounds with halogens: Preparation, Properties, reactions and uses, amines diazonium salts.

Organic compounds with oxygen: Preparation, Properties,reactions and uses, alcohols, phenols, ether, aldehyde and ketones, carboxylic acids.

Polymers : Classifications, methods of polymerization, rubber, vulcanization, polythene nylon, bakelite and polyster.

Bimolecular : Carbohydrates - classification, monosacchorides, oligosaccharides, polysaccharides, Proteins - aminoacids, peptide bond, polypeptides primary, secondary, tertiary and quartermary structure of proteins, denaturation, enzymes Vitamins- classification and functions.

Nucleic acids - DNA and RNA biological function

Everyday Chemistry : Chemicals in Foods, cleansing agents and medicines.

BIOLOGY

Living World and Diversity of Life : Biology and its meaning, what is living Taxonomic categories, Systematic and Binomial System of nomenclature. Classification of living organism (Two Kingdom and five Kingdom system), major groups of Kingdom and salient features , Viruses, Lichens, Plant Kingdom-Salient features of major groups from Algae to Angiosperms Animal Kingdom- Salient features of Nonchordates up to phylum and Chordates upto class level.

Cell , Structure and Function:

Cell, wall, cell membrane, Endomembrane system, Mitochondria, plastids, Ribosomes, Cystkeleton Cilia, and Flagella, Centriole, Nucleus, Microbodies, Structural differences between prokaryotic, and eukaryoticm and between plant and animal cell. Cell cycle, Mitosis, Meiosis, Lipids Bio-molecules - Structure and function of Carbohydrates, proteins lipids and Nucleic acids. Enzymes - chemical nature, Types- properties and mechanism action.

Genetic and Evolution:

Mendelian inheritance, Chromosome theory, Gene interaction, Incomplete dominance, Co-dominance, Complementary genes, multiple alleles, linkage and Crossing over, inheritance patterns of hemophilia and blood groups in human.

Structure and functions of Plant: Morphology of a flowering plant, Tissues and tissue system, Anatomy and function of root, stem, leaf, inflorescence, flower fruit and seed, Types of fruit, Secondary growth, Absorption and movement of water and of nutrients, Translocation of food, transpiration and gaseous exchange, Stomatal movement.

Mineral nutrition - macro and micro-nutrient, deficiency disorders, Nitrogen fixation.

Photophosynthesis --- Light reaction, cyclic and non-cyclic photophosphorylation, pathways of carbon dioxide fixation, Photophospiration, limiting factors. Respiration - anaerobic, fermentation, Aerobic, Glycol sis, TCA cycle, electron transport system, Energy relations.

Structure and function of animals: Tissue, elementary knowledge of morphology, anatomy and function of earthworm, cockroach and frog.

Human physiology - Digestic system -organs, digestion and absorption, respiratory system - organ, breathing an exchange and transport of gases, Body fluid and circulation- blood, lymph, double circulation, regulation of cardiac activity, hypertension, Coronary artery diseases.

Excretion-urine formation, regulation of kidney function

Locomotion and movement: skeletal system, joints, muscles, types of movement -control and co-ordination -central and peripheral nervous system, nervous, reflex action and sensory reception, role of types of endocrine glands, hormone action.

Reproduction and development plant : asexsual and sexual reproduction - development of male and female gametophytes.

Pollination, fertilization, Development of embryo, endosperm, seed and fruit, Growth phases, Types of growth regulators and their role in seed dormancy, germination and movement, Apical dominance, Senescence, Abscission, Photoperiodism, Vernalisation, types of movements.

Humans: Male and female reproductive systems, Menstrual cycle, Gamete production , Fertilization, Implantation, Embryo development, Pregnancy and parturition, Birth control and contraception

Ecology and Environment: Meaning of ecology, environment, Habitat and niche. Ecological levels of organization, Characteristics of Species, Population, Biotic Community and Ecosystem, Succession and climax.

Ecosystem - Biotic and obiotic components, Ecological pyramids, Food chain and Food web, Energy flow, Major types of ecosystems.

Ecological adaptations: Structural and physiological features in plants and animals of aquatic and desert habitats.

Biodiversity - Meaning types and conservation strategies.

Environmental issues: Air and Water pollution, Global warming and climate change, Ozone depletion, Noise pollution, Radioactive pollution, pollution control, Deforestation, Extinction of species.

Biology and Human Welfare: Animal husbandry - Livestock, Fisheries, Major animal diseases and control. Pathogens of major communicable diseases of humans caused by fungi, bacteria, viruses, protozoans and helminthes, and their control. Cancer and AIDS, drug / alcohol abuse, Basic concepts

of immunology. Plant Breeding and Tissue Culture in crop improvement. Bio-fertilizers, Bio-spesticides, Bio-herbicides.

Microorganisms as pathogens of plant diseases rust and smut of wheat, bacterial leaf blight of rice, late blight of potato, bean mosaic, and root-knot of vegetables. Bioenergy - Hydrocarbon - rich plants as substitute of fossil fuels.

Biotechnology and Applications: Microbes and Microbial technology in food processing, industrial production, sewage treatment and energy generation. Steps in recombinant DNA technology - restriction enzymes. DNA insertion, regeneration of recombinants

Applications of R - DNA techonolgy: Production of Insulin, Vaccines and Growth hormones, Organ transplant, Gene therapy - Production of expensive enzymes, strain improvement to scale up bioprocesses. GM crops including Bt crops.

MATHEMATICS

Complex numbers: Argand diagram, algebra of complex numbers, De Moivre's theorem and applications, complex roots of unity.

Matrices and determinants: Types of matrices, matrix algebra, determinants, properties of determinations, ad-joint and inverse matrices, inverse by ad-joint and by elementary transformation, cayleigh - Hamilton theorem, consistency and solution of linear simultaneous equations.

Permutations and combinations: Relations, simple application. Binomial theorem: positive integral index, general term, middle term, binomial coefficients.

Sequences and series : Arithmetic , geometric and harmonic progressions, sums of first, second and third powers of natural numbers, arithmetic geometric series

Limit, continuity, and differentiability: Polynomials, rational, circular, logarithmic exponential and hyperbolic functions, inverse functions, graphs, limits, continuity and differentiability.

Differentiation of standard functions, applications on derivatives as rate measurer, increasing / decreasing functions, maxima / minima / inflection, tangents, normals, angles of intersection.

Partial Differentiation, homogeneous function and Euler's result.

Integral calculus: Standard integrals, integration by parts, substitution, definite integrals, properties. Area and volume of revolution by integration.

Differential equations : Ordinary differential equations, order and degree, formation. Solution : separation of variables, homogeneous and linear equations, integrating factors, Bernoulli type linear equations, integrating factors, Bernoulli type linear equations of higher order.

Vectors: Vector algebra, scalar and vector products, double and triple products, geometrical and physical applications

Analytical plane geometry: Rectangular Cartesian Coordinates, points, distance point of division. **Straight line:** Slope, angle between lines, Perpendicular and parallel lines, centroid, orthocenter and circumcentre of triangles.

Circles: Standard forms, circle with given extremities of a diameter, tangent line to a circle.

Conics: Parabola, ellipse and hyperbola, rectangular hyperbola, standard, forms, properties, tangent line.

Analytical solid geometry: Point distance, section, direction cosines and ratios, angle between lines, skew lines, shortest distance between lines, Equation of lines, skew lines, shortest distance between lines, equation of line and plane, intersection of line and plane, coplanar lines.

Sphere: Standard equation, section of a sphere by a plane, intersection of spheres.

Statistics and Probability: Measures of central tendency and dispersion: mean, median, mode, mean deviation, standard deviation, consistency, coefficient of variation, regression, correlation. Events, probability, addition and multiplication theorems, Baye's theorem, probability distribution, Bernoulli trials and Binomial distribution.

APPENDIX - II

SYLLABUS

Post Graduate Programme in Engineering and Technology - M Tech

General

Part A : Common for all specializations (Consists of Sections 1 and 2)	Section 1 (On Engineering Mathematics) : Questions are on the commonly found topics on mathematics in the syllabi for different branches of B Tech or equivalent, in this Univesity and other major Universities / bodies Section 2 (On Basic Engineering) : Questions are on basic topics in major branches of B Tech or equivalent courses offered by this University and other major Universities / bodies
Part B : (Consists of Section 3)	Different sections for different groups of specialization of M Tech programme, with 50 questions in each section. All sections are called Section 3, but each has a code indicating the relevant group. A candidate has to choose the relevant group for answering. The questions are at the level of graduate programmes in Engineering / Technology approved for the specialization.

Syllabus

The group codes, specializations in the group and the topics of the Syllabi for questions under each group code of Section 3 are as follows:

Group Code : BT

Specializations in the Group	Major Topics of the Syllabus
• Biotechnology	❖ Biochemistry ❖ Cell Biology ❖ Microbiology ❖ Genetics ❖ Bioorganic Chemistry ❖ Principles of Biotechnology and Analytical Techniques in Biotech Unit Operations ❖ Molecular Biology ❖ Immunology ❖ Principles of Chemical and Thermodynamics and Biothermodynamics ❖ Chromatographic Separations ❖ Biological Biotechnology ❖ Enzyme Engineering and Technology ❖ Protein Engineering ❖ Genetic Engineering ❖ Bioinformatics ❖ Mass Transfer Operations ❖ Bioprocess Engineering ❖ Genomics and Proteomics ❖ Principles of Chemical Engineering ❖ Food Science and Engineering ❖ Bioreaction Engineering ❖ Instrumental Analysis ❖ Bioethics ❖ Environmental Biotechnology ❖ Biopharmaceutical Engineering ❖ Economic and Biosafety ❖ Downstream Processing in Biotechnology ❖ Total Quality Management

Group Code : CL

Specializations in the Group	Major Topics of the Syllabus
• Structural Engineering • Environmental Engineering • Irrigation, Water Management and Resources Engineering • Construction Engineering and Management • Disaster Mitigation & Management • Real Estate Valuation	❖ Engineering Mechanics ❖ Engineering Geology ❖ Basic Mechanical Engineering ❖ Applied Material Science ❖ Engineering Graphics ❖ Architecture ❖ Building Science ❖ Fluid Mechanics ❖ Mechanics of Solids ❖ Surveying ❖ Strength of Materials ❖ Applied Hydraulic Engineering ❖ Concrete and Construction Technology ❖ Hydraulic Engineering ❖ Structural Analysis and Designs ❖ Basics of Remote Sensing and G/S ❖ Transportation Engineering ❖ Computer Aided Building ❖ Foundation Engineering ❖ Irrigation and Management Engineering ❖ Ground Water and Resource Engineering ❖ Coastal Zone Management ❖ Environment Engineering ❖ Industrial Waste and Solid Waste Management ❖ Air Pollution Management ❖ Estimate and Cost Engineering ❖ Economics and Business Finance For Civil Engineering ❖ Professional Ethics and Engineering ❖ Sociology ❖ Management Concepts for Civil Engineers

Group Code : CS

Specializations in the Group	Major Topics of the Syllabus
• Computer Science and Engineering • Information Technology • Computer Forensic & IT Security	❖ Discrete Mathematics ❖ Programme and Data Structures ❖ Database Management System ❖ Digital System ❖ Analysis of Algorithms ❖ System Software ❖ Artificial Intelligence ❖ Computer Architecture ❖ Electronic Circuits ❖ Interactive Computer Graphics ❖ Object Oriented Programme ❖ Analog, Digital and Data Communication ❖ Digital Signal Processing ❖ Microprocessors ❖ Operating System ❖ Theory of Computation ❖ Computer Network ❖ Visual Programming ❖ Engineering Economics and financial Accounting ❖ Principles of Compiler Design ❖ Software Engineering ❖ Information Coding Techniques ❖ Object Oriented system Analysis and Design ❖ Principles of Management ❖ Network Protocols, Management and Security ❖ Multimedia Systems ❖ Web Technology ❖ Mobile Communication ❖ Professional Ethics

Group Code : EC

Specializations in the Group	Major Topics of the Syllabus
• Applied Electronics • Embedded System Technology • Power Electronics and Drives • Power System Engineering • VLSI Design • Biomedical Engineering	❖ Circuit Theory ❖ Electronic Devices ❖ Electronic Engineering ❖ Electro Magnetic Fields ❖ Electronic Circuit ❖ Network Analysis and Synthesis ❖ Signals and Systems ❖ Random Processes ❖ Digital Electronics ❖ Programming and Data Structures ❖ Linear Integrated Circuits ❖ Measurement and Instrumentations ❖ Microprocessor and Applications ❖ Communication Theory and Systems ❖ Digital Signal Processing ❖ Control Systems ❖ Transmission Lines, Network and Distribution ❖ Computer Architecture ❖ Digital Communication Networks ❖ Television and Radio Engineering ❖ EM Waves and Waveguides ❖ Computer Communication Networks ❖ Antennas and Propagation ❖ Microwave Engineering ❖ Optical Communication ❖ Protection and Switch Gear ❖ Power System Analysis and Control ❖ Solid State Devices ❖ High Voltage and Engineering ❖ Digital System Design

Group Code : ML

Specializations in the Group	Major Topics of the Syllabus
• Manufacturing Engineering • Computer Aided Design • Thermal Engineering • Metallurgy & Material Science	❖ Engineering Mechanics ❖ Thermodynamics ❖ Engineering Graphics ❖ Electrical Machines and Drives ❖ Fluid Mechanics and Machines ❖ Kinemaics and Machines ❖ Applied material science ❖ Dynamics of Machines ❖ Production Technology ❖ Strength of Materials ❖ Thermal Engineering ❖ Computer Aided Design ❖ Design of Machine Elements ❖ Engineering Metrology ❖ Engineering Metallurgy ❖ Foundry Technology and Metal Forming ❖ Gas Dynamics and Space Propulsion ❖ Machine Tools ❖ Measurements and Controls ❖ Heat and Mass Transfer ❖ Hydraulic and Pneumatic Controls ❖ Computer Aided Manufacturing ❖ Design of Jigs, Fixtures and Press Tools ❖ Design of Transmission System ❖ Mechatronics ❖ Power Plant Engineering ❖ Process Planning and Cost Estimation ❖ Automobile Engineering ❖ Operations Research ❖ Total Quality Management ❖ Engineering Management ❖ Professional Ethics