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I & II Semester

Prospectus No. 111731

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY
(FACULTY OF ENGINEERING & TECHNOLOGY)

PROSPECTUS

PRESCRIBED FOR

FOUR YEAR DEGREE COURSE
BACHELOR OF TECHNOLOGY
(FOOD, PULP & PAPER, OIL & PAINT,
PETROCHEMICAL)
TECHNOLOGY

I & II Semester Examinations,

2010-2011

Semester Pattern
Credit Grade System



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**SYLLABUS PRESCRIBED FOR
FOUR YEAR DEGREE COURSE IN
BACHELOR OF TECHNOLOGY
(CHEMICAL TECHNOLOGY)
(FOOD, PETRO, PULP & PAPER, OIL & PAINT)
SEMESTER PATTERN
SEMESTER : FIRST**

1 SCT 1 APPLIED INORGANIC CHEMISTRY

Aim :

To impart a sound knowledge on the principles of inorganic chemistry involving the different application oriented topics required for Food, Petro, Pulp and Paper, Oil and Paint Technological branches.

Objectives :

- The student should be conversant with :
- Concept of atomic structure, related various theories and principles.
 - Knowledge with respect to water and various treatments of water.
 - Utilization of engineering materials towards different applications.
 - The principles involved in corrosion control.

SECTION-A

UNIT I : Atomic structure : Bohr's theory, Modern quantum theory of atom, deBroglie's equation, Exclusion Principle, Hund's rule, Aufbau principle, quantum number and distribution of electrons. Atomic size, ionization energy, factors determining ionization energy, electron affinity and electro negativity. (8)

UNIT II: Chemical Bonds and their types : ionic bond, covalent bond, metallic bond. Hydrogen bond, coordinate bond, odd electron bond, van der Waals forces, lattice energy, Born Haber cycle, hybridization and molecular shapes, resonance. (7)

UNIT III: Water : Impurities in water and their effect on hardness, Estimation of hardness by EDTA and Soap solution method, softening of water, methods of softening : Lime Soda, Zeolite process and Ion Exchange method, problems based on Lime Soda & Zeolite process, industrial uses, boiler corrosion structure of water, concept of bond and free water. (7)

SECTION-B

UNIT IV: Alloys: Introduction, purpose of making alloys, composition, properties, different types of alloys, carbon steel, copper (Brass, Bronze), Nickel, Aluminum, Tin. (7)

UNIT V: Corrosion: Definition, factors affecting the rate of corrosion, different types of corrosion, cathodic and anodic protection, prevention against corrosion, protective coating, metallic, inorganic, organic coating and corrosion inhibitors. (7)

UNIT VI: Cement: Raw materials, compositions, manufacture, by wet and dry process, properties of cement, special cements. **Glass:** Different kinds of glass, manufacture of glass color imparting on glass uses of glass. **Refractories:** Classification, raw materials, manufactures, application in industry. (9)

TEXT BOOK:

1. Chemical Process Industries: R.N.Shreve, McGraw Hill, New York.

REFERENCE BOOKS:

1. Fundamental Concepts of Inorganic Chemistry: E.S.Gilbreath, McGraw Hill Kogakusha Ltd, International students edition.
2. Concise Inorganic Chemistry, J.D. Lee, Low Price Ed.
3. A Textbook on Engineering Chemistry: S.S.Dara.
4. Outlines of Chemical Technology: E.Dryden, East-west press New Delhi.
5. Basic Inorganic Chemistry, F.A.Cotton, G.Wilkinson and P.L.Gaus, John Wiley & Sons, Inc, Singapore 3rd Ed, 1996.

1 SCT 2 / I A 2 ENGINEERING PHYSICS

Aim :

To enable the students to correlate the theoretical principles of fundamentals of modern aspects in Physics with application oriented studies of engineering.

Objectives :

At the end of the course the students would be exposed to fundamental knowledge in:

- Electromagnetic phenomena and wave propagation,
- Interferometric techniques in metrology, communication
- Application of quantum physics to optical & electrical phenomena
- Application of lasers and Fiber Optics in Engineering and Technology
- Conducting, superconducting and dielectric materials
- Semi conducting and new engineering materials
- Physics of Modern engineering materials
- Application of ultrasonics, acoustics

SECTION-A

Unit I : Solid State Physics : Energy band diagrams, covalent bonds, bound & free electrons, holes, electron and hole mobilities intrinsic and extrinsic semiconductors, fermi and impurity levels, charge neutrality equation and semiconductor conductivity, Einstein relation, p-n junction diode, Zener diode, Light Emitting Diode. (9)

Unit II: Modern Physics : Elements of wave properties of particle and particle properties of wave, LASER, spontaneous and stimulated emission of radiation, Einstein coefficient, Ruby Laser, characteristics & application of Laser. (7)

Unit III: Electric and Magnetic Fields : Motion of electron in uniform transverse electric field and transverse magnetic fields, velocity selector (energy filter), positive rays, Bainbridge mass spectrograph, Hall effect, cathode ray oscilloscope : working and its block diagram. (7)

SECTION-B

Unit IV: Interference and Diffraction : Fundamental condition of interference, thin film interference due to reflected light, Newton's ring, Fresnel and Fraunhofer diffraction, single and double slit diffraction, plane transmission grating. (7)

Unit V: Fibre Optics : Principle and construction of optical fibre, acceptance angle and acceptance cone numerical aperture, types of optical fibres and refractive index profile, attenuation in optical fibres, different mechanisms of attenuation, application of optical fibres. (8)

Unit VI: Fluid Dynamics and Acoustics : Continuity equation, Bernoulli's theorem and its applications, Viscosity, flow of liquids through a capillary tube, Stoke's formula. Production and application of Ultrasonics. Acoustics of buildings. (7)

TEXT BOOK:

1) M.N.Avadhnanulu & P.G.Kshirsagar : Engineering Physics, S.Chand Pub., 2008

REFERENCE BOOKS:

- 1) R.K.Gaur & S.L.Gupta : Engineering Physics, Dhanpat Rai & Sons.
- 2) Hiendra K. Malik & A.K.Singh : Engineering Physics, Tata McGraw Hill
- 3) Beiser : Modern Physics, Tata McGraw Hill
- 4) Mani & Mehta : Modern Physics, Affiliated East-West Press
- 5) N.Subrahmanyam, Brijlal, M.N.Avadhnanulu : A Text Book of Optics, S.Chand & Company Ltd.

ISCT 3 / IA I ENGINEERING MATHEMATICS

Aim:

The course is aimed at developing the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many fields of engineering and technology.

Objectives:

On completion of the course the students are expected:

- to identify algebraic problems from practical areas and obtain the solutions in certain cases
- to understand maxima and minima concept.
- to solve differential equations of certain types, including systems of differential equations that they might encounter in the same or higher semesters.
- to understand double and triple integration and enable them to handle integrals of higher orders.

SECTION-A

Unit I: Successive differentiation, Leibnitz's theorem on the n^{th} derivative of a product, Expansion of a function by using Taylor's theorem and Maclaurin's theorem, Indeterminate forms. (10)

Unit II: Partial differentiation, total differential coefficients, exact differential, Euler's theorem on homogeneous function, Transformation of independent variables. (10)

Unit III: Jacobians of explicit functions and implicit function with properties, functional dependence, Maxima and Minima of a function of two independent variables, Maxima and Minima of a function of several independent connected variables by Lagrange's method of undetermined multipliers. (10)

SECTION-B

Unit IV: Complex Numbers : Demoivre's theorem and its applications, Hyperbolic and inverse hyperbolic functions, separation of real and imaginary parts, Logarithm of complex numbers. (10)

Unit V: Ordinary differential equations of first order and first degree in various forms; (Variable separable, linear differential equation, homogeneous differential equation, exact differential equation) and reducible to above forms, methods of substitution. (10)

Unit VI: Solution of differential equation of first order and higher degree by various methods application of differential equations of first order and first degree to the problems on orthogonal trajectories and electrical engineering. (10)

TEXT BOOK :-

(1) Wartikar P.N. & Wartikar J.N. - A Text Book of Applied Mathematics, Vol.-I, & II, Pune V.G. Prakashan, Pune.

REFERENCE BOOKS :-

- 1) Grewal B.S. - Higher Engineering Mathematics, 40/e, Khanna Publishers.
- 2) Kreysszig E.K. - Advanced Engineering Mathematics, John Wiley.

- 3) Ramana B. V. - Higher Engineering Mathematics, (TMH)
- 4) Singh R.R. & Bhatt M. - Engineering Mathematics, (TMH)

1 SCT 4 / I B 3 COMPUTER PROGRAMMING

Aim:

To impart knowledge to analyze, solve, design and code real-life problems using C language.

Objectives:

To learn the basic concepts of computing.
To know the methodology of problem solving.
To develop skills in programming using C language.

Guidelines for Tutorial Classes:

Course instructors have to plan for programming exercises to be solved independently by students during tutorial classes.

SECTION-A

UNITI:

Problem Solving:
Organization of PC, Basic concepts of problem solving on computer, Input-Process-Output cycle: Algorithms, Flowcharts and algorithm development. Examples of algorithms for sorting a list with insertion sort and bubble sort. Examples of algorithms for searching: Linear search and binary search. (10)

UNITII:

C Fundamentals:
Introduction to C language, First C program, Program execution, Keywords, Character set, Built in Data Types, Variables, Expressions, Operators & their precedence. Assignment statement. I/O using scanf() and printf() functions, Format specifiers for scanf() and printf() functions. (10)

UNITIII:

C Control constructs:
Decision-making using if, if-else and switch-case statements, Loops using for, while, do-while statements, break and continue statements. Functions: declaration, definition and parameter passing mechanism. (10)

SECTION-B

UNITIV:

Scope Rules and Arrays
Storage classes: automatic, static, extern, register type. Introduction to arrays: single dimensional and multi-dimensional. Strings, Arrays of strings and string related functions. Programs for Searching and sorting the arrays of strings. (10)

UNITV:

Pointers:
Definition and uses of pointers. Address of operator, pointer arithmetic, Pointers and functions. Parameter passing mechanism

using pointers. Pointers and Arrays, Arrays of pointers. Pointers and Strings. (10)

UNITVI:

Structures and Files:
Declaring and using the Structures. Operation on structures. Arrays of structures, Pointers to structures. Unions and their comparison with Structures. Introduction to Files File types. File handling functions. Command line arguments. (10)

TEXT BOOK:

K R Venugopal & S R Prasad. "Mastering C" Tata-McGraw Hill-2207.

REFERENCE BOOKS:

1. Pradeep Dey & Manas Ghosh " Computer Fundamentals & Programming in C" Oxford University Press 2006.
2. Herbert Schildt - C Complete Reference (Tata-McGraw Hill)
3. Gottfried – Problem Solving in C (Schaum Outline Series- McGraw Hill)
4. Noel Kalcharam - C by Example (Cambridge University Press)

1 SCT 5 MECHANICAL TECHNOLOGY

Aim :

The course is aimed at developing the basic Mechanical Engineering knowledge to technology students that are imperative for effective understanding of Mechanical processes and operation.

Objectives :

On completion of the course the students expected :
- to understand the manufacturing process, metals and alloys.
- to basic principles of casting, patterns, mould making and its technology.
- to understand theory of metal cutting, speed transmission and motion.
- to specify, identify and classify operators of Lathe, Drill and grinding.
- to understand various joining processing and operations like Welding, Soldering and Brazing.

SECTION –A

Unit I :

Introduction to manufacturing process. Fundamentals of metals and alloys. Different engineering materials, properties. Ferrous and non – Ferrous non - metals used in foundry. (7)

Unit II :

Introduction to pattern making- Pattern materials, tools, pattern making allowances. Types of patterns, General properties of moulding sands, Basic principle and Terminology, tools of sand casting, types of gate risers and runners,. Preparation of sand moulds of different types, core making. (7)

Unit III :

Casting process and their principle of operation and applications permanent mould casting, slush casting, investment casting, centrifugal casting, continuous casting, die casting equipment

and processes, and casting methods. Casting inspections, casting defects, their causes and remedies. (9)

SECTION - B

Unit IV : Theory of Metal cutting, Tool material, Tool Geometry, Tool life, Tool wear, Machinability, Metal cutting economy, Cutting fluid, Machine Tool classification. Speed transmission by belts, simple and compound gear trains, and quick return mechanism for motions. (8)

Unit V : Specification, construction, operations and accessories of Lathe, Shaper, Drill and Grinder Facing, Turning, Screw cutting, Drilling, Shaping, and Cylindrical grinding operations. (7)

Unit VI : Joining Processes, Brazing, Soldering and Welding, Gas Welding, Electric arc and resistance welding, hermit welding. (7)

TEXT BOOK :-

1. Elements of Workshop Technology, Vols. I and II by S.K.Hajra Choudhary and S.K.Bose, Asia Publishing House, Bombay, 2nd Edition.

REFERENCE BOOKS :-

1. Production Technology By R.D.Jain and B.C.Gupta, Khanna Publisher Delhi 1972.
2. Production Technology, Vols. I, II and III by W.A.J.Chapman, Edward Arnold Publishers, Ltd. London. 1961.
3. Process and Materials of Manufacture by R.A.lindberg, PHI Pub.
4. Workshop Technology Vol. I & II by Bawa.

1 SCT 6 APPLIED INORGANIC CHEMISTRY

List of Experiments :

1. Determination of Normality and strength of Sodium hydroxide by Oxalic acid.
2. To determine the normality and strength of Hydrochloric acid by sodium hydroxide.
3. Determination of normality and strength of Oxalic acid by using potassium permanganate solution.
4. Determination of permanent NaOH and Na₂CO₃ in the given alkali mixture solution.
5. Determination of NaHCO₃ and Na₂CO₃ in the given alkali mixture solution.
6. Determination of hardness of water by using EDTA method.
7. Determination of free chlorine in a water sample.
8. Estimation of copper iodometrically using hypo solution.
9. Estimation of Zinc in the given sample.

10. Estimation of Iron from the given solution.
11. To estimate amount of Tin in the given stannous chloride solution.
12. To estimate the percentage of lime in cement.
13. To determine the amount of copper in given sample of brass.
14. To estimate the percentage of iron in plain carbon steel.

NOTE: At least EIGHT laboratory experiments mentioned above have to be performed.

1 SCT 7 / I A 6 ENGINEERING PHYSICS

PRACTICALS :

- 1) Determination of Band gap energy of semiconductor.
- 2) To study the forward and reverse characteristics of P-N junction diode.
- 3) To study the reverse characteristics of Zener diode.
- 4) To study the forward characteristics of Light Emitting Diode.
- 5) To determine the wavelength of monochromatic light by Newton's rings method
- 6) Determination of wavelength of spectral lines using diffraction grating.
- 7) Determination of grating element of a diffraction grating using LASER beam.
- 8) Study of Hall effect
- 9) Amplitude and frequency measurement of ac signal using CRO
- 10) Study of CRO
- 11) Determination of unknown frequency of ac signal using Lissajou's pattern
- 12) To determine resolving power of telescope
- 13) Determination of Planck's constant using photo cell
- 14) To determine the coefficient of viscosity of water by capillary flow (Note : Minimum 08 experiments shall be conducted)

1 SCT 8 / I B 7 COMPUTER PROGRAMMING

COMPUTER PROGRAMMING LABORATORY :

The objective of this lab is not only to provide a Hands-on Experience to C programming, but also to expose the students to the latest tools of the trade. This lab is based on modern operating systems like Linux/Windows. The students should be exposed to word processor, spreadsheet software, presentation software and web browser. Use of open source software like Star Office, Open Office with open source OS like Linux/ Ubuntu/BOSS should be encouraged.

It is expected that the candidate demonstrates adequate to high skills with these tools and programming with C.

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should

not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

1. Basic interface of a GUI based OS.
2. File handling using Text Editor/Word Processor.
3. Presentation using Presentation software.
4. Spreadsheet software usage.
4. Introduction to Internet and Web Browsing.
5. Programming in C: Minimum ten programs based on the above syllabus. The programs should cover Functions, Control constructs, Decision constructs, Arrays, Pointers, Structures Files and Command-line arguments.

SEMESTER : SECOND

2 SCT 1 APPLIED PHYSICAL CHEMISTRY

SECTION A

UNIT I: Basic principle of wave mechanics, Schrodinger wave equation, application of Schrodinger wave equation, linear harmonic oscillator, Activity and activity coefficient, Gibbs Duhem equation. (7)

UNIT II: Kinetic molecular theory of gases: Equation of state of ideal and real gases, Distribution of molecular speeds in an ideal gas, Molecular collisions and mean free path, Vander Waals equation, Principle of corresponding states. (7)

UNIT III: Estimation of molecular diameter, molecular velocities, Root mean square velocity (RMS), average velocity and most probable velocity, collision number, collision frequency, critical constants, diffusion, heat conduction in gases numericals. (7)

SECTION B

UNIT IV: Chemical Kinetics: Scope of kinetics, elementary reaction steps and rate expression, complex reactions and their molecularity and order determination, factors affecting reaction rate, integrate rate expression of zero, first, second and third order reaction with examples, numericals. (8)

UNIT V: Methods for determination of order of reaction: Integration methods, graphical method, isolation method, Von't-Hoff method and fractional change method, half life period, energy of activation, Arrhenius equation, numericals. (8)

UNIT VI: Thermodynamics: Objective and scope of thermodynamics, definition of thermodynamics system, state, property, first law of thermodynamics, second law of thermodynamics, processes, enthalpy, free energy, Gibbs Helmholtz equation. (7)

Text Book :

1. Text Book of Physical Chemistry : P.L. Sony, Sultan Chand and Sons, New Delhi.

Reference Book :

1. Physical Chemistry : G.M. Barrow . Benjamin Publication.
2. Thermodynamic for Chemist: Glasstone, S. Affiliated, East Press, New Delhi.
3. Advance Physical Chemistry: Gurudeep Raj, GEOL, Publication Meerut.
4. Physical Chemistry, P.W. Atkins, Oxford University, Press 8th Ed.

2 SCT 2 / IB 4 ELECTRICAL ENGINEERING

Aim :

To impart basic knowledge of electric circuits, magnetic circuits, D.C. machines and transformers, A.C. machines and control systems.

Objectives :

To expose the students to the analysis of electric and magnetic circuits, performance characteristics of D.C. machines, A.C. machines and transformers and to give awareness of the basics of Control System Engineering.

SECTION-A

Unit I:

Fundamentals

- a) Basic concept of Voltage, Current, Power, Energy and relationship between them
- b) Resistance Resistivity, Conductivity, Temperature effect on resistance and temperature coefficient of resistance.
- c) Series and parallel circuits, Star-Delta transformation,
- d) Kirchoff's laws, Superposition theorem, Thevenin's theorem, Maximum Power Transfer Theorem (8)

Unit II:

Magnetic Circuit & Electromagnetism

- a) Basic concept of Magnetic flux, Flux density, MMF, Reluctance, Magnetic field intensity and their relationship
- b) Leakage and fringing of flux
- c) Series and Parallel Magnetic circuits
- d) Principles of Electromagnetic induction self and mutual induction coefficient of coupling and Energy stored in magnetic circuit
- e) Magnetization curves (8)

Unit III :

A.C. Fundamentals

- a) RMS, Average values form factor, peak factor for Sinusoidal Wave form only

- b) Single phase A.C. Series circuit with Resistance Inductance, Capacitance and phasor Diagrams Series resonance.
- c) Single phase A.C. Parallel circuit with Resistance Inductance, Capacitance and phasor Diagrams Parallel resonance.
- d) Impedance Triangle Active and Reactive power (7)

SECTION-B

Unit IV: Polyphase Circuits

- a) Balanced Three phase circuits: Production of three phase supply, Star and Delta balanced load. Relationship of phase and line values of voltage and current for Star and Delta connections. (7)

Unit V : Electrical machines

- A) Single Phase Transformer
 - a) Principle of operation Construction and Classification EMF Equation
 - b) EMF Equation, Losses, Efficiency, Regulation
- B) Electromechanical Energy Conversion
 - a) Working principle, Construction and various parts of D.C. Machines
 - b) Classification, characteristics and applications of D.C. Machines (8)

Unit VI Electrical Apparatus and safety

- a) Measurement of Current, Voltage, Power, Energy
- b) Range extension of Ammeter, Voltmeter, Wattmeter and Energy meter
- c) Necessity of earthing, limiting values for various installations
- d) Types of earthing (Pipe earthing and Plate earthing) (7)

TEXT BOOKS:-

1. Basic Electrical Engineering, First Ed., Kulshreshtha D.C., TMH - 2008
2. Principle of Electrical Engineering, 4th Edition, Del Toro V., PHI 2005

REFERENCE BOOKS:-

1. Basic Electrical Engineering, Fifth Edition, Fitzgerald A.E., TMH -2006.
2. Basic Electrical Engineering, First ed., R. Anand Natrajan, P.Ramesh Babu, SCITECH Publications, 2009
3. Basic Electrical Engineering –First ed., T.K.Nagsarkar, OXFORD University Press, 2005

2 SCT 3

ENGINEERING MECHANICS SECTION-A

Unit I Resolution and composition of forces, Free body diagrams, system of parallel concurrent and non-concurrent, coplaner force, resultant.

Unit II Analytical and graphical condition of equilibrium, centre of gravity, second moment of area of plane figures.

Unit III Various types of supports, analysis of simple plane trusses and simple beams, friction, inclined plane, wedge.

SECTION-B

Unit IV Displacement, velocity and acceleration (rectilinear and rotary), motion with uniform and variable acceleration and projection. Definition and analysis of plane motion, relation between translation and rotation for spheres on rough plane, instantaneous centre and axis of rotation.

Unit V D'Alembert's principle, kinetics of rectilinear translation and rotary motion of a rigid body, dynamic equilibrium in plane motion.

Work, power and energy, conservation of momentum and energy.

Unit VI Velocity ratio, mechanical advantage and efficiency of simple machine, law of machine, differential wheel and axle, screw jack, single and double purchase crabs, pulley block. Transmission of power by belts, gears.

Books Recommended :

1. Timoshenko and Mount : Engineering Mechanics, 4th edition, Kogakusha Co. Ltd., Tokyo.
2. Junnarkar : Applied Mechanics, Charotar Book Stall, Anand, W.Rly, India, 1965.
3. Saluja : Applied Mechanics, Satya Prakashan, New Delhi, 3rd edition, Text Book of 1979.
4. Prasad I.B. : Applied Mechanics, 7th edition, 1978, Khanna Publishers.

2 SCT 4 / I A 4 ENGINEERING DRAWING

Aim :

To provide mechanical engineering (orthographic) drawing skills in the context of engineering design.

Objectives :

To develop in students graphic skills for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.

SECTION-A**UNIT I:** Engineering Curves

a) Conic Section

Construction of ellipse, parabola & hyperbola by various methods

b) Cycloidal curves.

Construction of cycloid, epicycloids & hypocycloid. Tangent & normal to the curve.

c) Involute

Involutes of circle, square, pentagon, hexagon.

d) Loci of points :

Locus problems on

- i. four bar chain mechanism
- ii. Simple slider crank mechanism
- iii. Offset slider crank mechanism.

(8)

UNIT II: Introduction to Projections.

1st angle, 3rd angle method of projection

a) Projection of points

b) Projection of lines

(Inclined to one plane at a time.)

c) Projection of planes.

(Inclined to both the planes)

(8)

UNIT III: Orthographic projection

Conversion of simple pictorial views into orthographic views.

(7)

SECTION-B**UNIT IV:** Projection of regular solids.

Projection of prism, pyramid, cone, cylinder

Projection on auxiliary planes.

(7)

UNIT V: Section of solids.

Section of solids keeping solids in different position.

(7)

UNIT VI: Isometric views & projection.

Construction of isometric scale.

Isometric views & projection of objects having rectangular, cylindrical surfaces & representation of sloping faces and slots. Dimensioning of isometric views/projection.

(8)

TEXT BOOK :-

1. Bhatt N.D. & Panchal V.M. – Engineering Drawing, 49th edition, Charotar Pub. House, Anand, Gujrat, 2007.

REFERENCE BOOKS:

1. Shah P.J. - Engineering Drawing, S.Chand Publication, 2008.
2. Narayana K.L., Kannaiyah P. - Engineering Drawing, Scitech Publication, 2009.
3. Dhawan R.K. - Engineering Drawing, S.Chand Publication, (5th edition, 2008)
4. Jolhe D.A. - Engineering Drawing, Tata McGraw Hill Publication, 2008.

2 SCT 5**WORKSHOP****COURSE OBJECTIVES:**

- To give students 'hands on experience' of craftsmanship.
- To make students familiar with different work trades.
- To develop quality & safety consciousness amongst the students.
- To develop awareness of fire safety amongst the students.
- To develop respect towards labour work amongst the students.
- To develop skill sets for creating entities from primitive engineering materials.
- To develop skill sets for establish in connections through wires and cables.
- This exercise also aims at inculcating respect for physical work and hard labour in addition to some value addition by getting exposed to interdisciplinary engineering domains.

A) PERFORMANCE:

D) SHEET METAL: Introduction to sheet metal tools, their use, different sheet metal joints, soldering, surface development. Specifications of metal sheets, Surface coatings; Operations like cutting, bending, folding, punching, riveting ; Joining by brazing and soldering.

One job on sheet metal: Job involving soldering operation, making, cutting, bending, joining operations of small parts using sheet metal like Tray, Funnel, Dust Bin, etc.

II)

WELDING : Classification & brief introduction to welding

processes - Arc, Gas and Resistance. Definition of welding, brazing and soldering processes, and their applications. Oxy-Acetylene Gas welding process, Equipment and Techniques, Type of flames and their applications. Manual metal arc welding technique and equipment, AC and DC welding Electrodes, constituents and functions of Electrode coating. Welding positions. Type of welding joint. Common welding defects such as cracks, undercutting, slag inclusions, porosity.

One job on welding: Job involving, edge preparation for Arc welding for different jobs like Lap welding of two plates, butt welding of two plates and welding to join plates at right angles.

III) CARPENTRY : Brief study of various hand tools like chisel, saw, planer. Timber, definition, engineering applications, seasoning and preservation, plywood and plyboards. Introduction, use of marking tools & hand tools such as marking gauge, try squares, steel rules, saws, jackplane, etc. Use of power tools, safety precautions.

One job on carpentry: Job involving a joint, wood sizing exercise in planning, marking, sawing, chiseling and grooving to make. Use and setting of hand tools like hack saw, jack plane, chisels and gauges for construction of various joints like T – Lap joint, Bridle joint, Corner mortise joint, Dovetail/ butt joint such as a tray, frame etc.

IV) FITTING: Introduction to different fitting tools. Use and setting of fitting tools for marking, center punching, chipping, cutting, filing, drilling, their use, different measuring tools, Files – Material and Classification.

One job on fitting: Job involving Fitting involving marking, filing, hacksaw cutting, drilling and tapping such as a male-female type pare.above mentioned operations.

B) DEMONSTRATION:
Minimum two physical demonstrations provided from following. In addition to physical demonstrations **Video / LCD** presentations for rest of demonstrations may be provided.

1) SAFETY : Common hazards while working with engineering equipment and related safety measures. Colour Codes floor marking in industries, various hazard indication signs. Posters for safety. Fire Safety, fire prevention precautions, necessity of fire fighting, fire extinguishers, rules of fire fighting, risk elements in fire fighting and demonstration of use of fire extinguishers.

2) MATERIALS : Brief introduction of materials used in Industries, steels and alloys, cast iron, non-ferrous metals, timber, plastics and polymers, glass etc. and; their applications.

3) MEASURING INSTRUMENTS: Brief introduction to instruments other than used in above performing trades. Like – Vernier Caliper, Micrometer, Dial indicator, thickness gauge, height gauge, Their least counts, common errors and care while using them, Use of marking gauge, 'V' block and surface plate.

4) MACHINE TOOLS AND PROCESSES: Brief introduction to metal removing, Showing basic operations like plain turning facing, step turning etc. metal shaping.

5) FOUNDRY: Moulding sand, constituents and characteristics. Pattern, definition, materials, types, core printing. Role of gate, runner, riser, core and chaplets. Causes and remedies of some common casting defects like blow holes, cavities, inclusions. Demonstration to Preparation of sand mould like pipe flange, anvill, etc.

6) SMITHY: Introduction to smithy operations like upsetting, drawing, bending, Forming; Tools- hammer, hot and cold chisels, swages, drifts, flatters, tongs, anvils and various smithy tools & equipments, their use. Forging Principle, forge welding, use of forged parts.

7) PLASTIC INJECTION MOULDING: Introduction, principle, equipment & its operation, mould introduction & setting, Safety precautions and demonstration of plastic injection molding process.

8) PLUMBING : Use of plumbing tools, spanners, wrenches, threading dies, demonstration of preparation of a domestic plumbing line involving fixing of a water tap and use of coupling, elbow, tee and union etc.

9) TAPS & DIES: introduction to Taps & Dies, Different sizes of Taps & Dies their uses, Holding instruments of taps & dies. Demonstration involving, External and internal threads on plate or pipe, marking, center punching, cutting, filing, drilling.

10) MASONRY: Use of mason's tools like trowel, hammers, spirit level, square, plumb, line and pins etc. Demonstration of mortar making, single and one and half brick masonry, English and Flemish bonds, block masonry, pointing and plastering

11) IT & COMPUTERS: Introduction and identification of hardware components of a typical computer system. Handling and operating peripheral devices like printer, scanner, pen drives, CD-ROM, Multimedia Devices, UPS etc. Identification and study of communication elements like Single pair wires (phone lines), multi-pair wires (UTP), fibre-optic cables, printer data cables, connectors-RJ-45, RJ-9, RJ-11, USB, 9-Pin and 25-Pin serial and parallel connectors; converters- serial to USB, 9-Pin to 25- Pin, Vice-Versa and others. POST (power on selftest), Power related problems. Use of CD Read / Write operations etc. Installation of Operating system windows and Linux, simple diagnostic exercises.

12) ELECTRONICS: Introduction to Active & Passive Electronic components. Demonstration and use of electrical and electronics hand and power tools. Measurement of resistor and capacitor, measurement of voltage and frequency using oscilloscope. Demonstration and performance measurement of any two electronic

components / devices – Diodes, Transistor & Logic gates. Working of Remote Controller.

- 13) CONSTRUCTION OF ELECTRICAL BOARD WIRING:** House wiring, staircase wiring for fluorescent tube light, store wiring, three-phase wiring for electrical motors & Machines. Working of Electrical Batteries, demonstration of electrical cable wires, starters and MCB's.
- 14) PRINTED CIRCUIT BOARDS :** Layout drawing, +ve and -ve film making, PCB etching and drilling, tinning and soldering techniques. Assembly of Electronic components on the printed circuit board (PCB).
- 15) GLASS BLOWING:** Definition of glass, Basic concepts of glass structure, Batch materials and minor ingredients and their functions, Elementary concept of glass manufacturing process, Different types of glasses. Application of glasses. Types of Glasses, Manufacturing & properties of Glasses. Demonstration of glass blowing.

REFERENCES:

1. B. S. Raghuvanshi, A Course in Workshop Technology, Vol – I, Dhanapat Rai and Sons.
 2. Hajara Choudhari, Elements of Workshop Technology, Vol – I, Media Promoters.
 3. Gupta and Kaushik, Workshop Technology, Vol – I, New Heights.
 4. Chapman, Workshop Technology, Vol – I, The English Language Book Society.
 5. H.S.Bawa, Workshop Technology, Vol.-I, TMH Publications, New Delhi.
 6. K.T.Kulkarni, Introduction to Industrial Safety, K.T.Kulkarni, Pune Reference Books
 7. Hwaiyu Geng, Manufacturing Engineering Handbook, McGraw Hill Publishing Co.Ltd.
 8. Lawrence E.Doyle, Manufacturing Processes and Materials for Engineers, Prentice Hall Inc.
 9. Mark Minasi, The complete PC upgrade and maintenance guide — BPP. Publications
 10. Elements of Ceramics - F.H.Norton
 11. Fundamentals of Ceramics - Barsoum
- NOTE:** Journal should prepared and submitted based on information of tools and equipments used, jobs prepared by using various tools, equipments, machines in the above three trades of performance sections. It also consist of details of demonstration (minimum two) demonstrated to students with brief description. The term work shall be assessed based on a) the record of attendance, b) Term work done, c) the written/ practical / oral

tests on the term work to decide the depth of understanding. The term work is to be assessed weekly.

PRACTICAL EXAMINATION:

Practical examination will consists of actual preparation of one job from any of the above performance sections. Duration of examination will be 3 hrs. Total marks are 25, out of which 15 marks are for job preparation and 10 marks for viva voce which should be conducted when the students are on job.

2 SCT 6 APPLIED PHYSICAL CHEMISTRY

List of Experiments

1. To determine the Surface tension of given sample by stalagmometer method.
2. To determine the viscosity of a given liquid by Ostwald viscometer.
3. To study the partition coefficient of iodine between organic solvent and water.
4. To study the hydrolysis of ethyl acetate in presence of sodium hydroxide.
5. To study the hydrolysis of an ester in presence of hydrochloric acid
6. To investigate the autocatalytic reaction between potassium permanganate and oxalic acid.
7. To determine energy of activation of the reaction between potassium persulphate and potassium iodide.
8. To determine the refractive index of given liquids by Abbe's refractometer.
9. Determine the specific and molar refraction of a given liquid by Abbe's refractometer.
10. Kinetic study of Second order reaction of equal concentration.
11. To Determination heat of neutralization HCl by NaOH.
12. To Determination the integral heat of solution of KNO_3
13. Determine the solubility of benzoic acid in water at different temperature and hence its heat of solution.
14. To study the effect of addition of an electrolyte on the solubility of monobasic organic acid at room temperature.

(NOTE: Minimum EIGHT laboratory experiments shall be conducted)

2 SCT 7 / I B 8 ELECTRICAL ENGINEERING

PRACTICALS :

- 1] To verify Kirchoff's laws.
- 2] To verify Thevenin's theorem
- 3] To verify Superposition theorem

- 4] To verify Maximum Power Transfer theorem
- 5] To plot B-H curve for given magnetic material
- 6] To verify vector relationship of Current & Voltage in RLC series circuit.
- 7] To verify vector relationship of Current & Voltage in RLC parallel circuit
- 8] To plot resonance curve in RLC series circuit.
- 9] To verify line & phase relationship of current & voltage in balanced three phase STAR Connection
- 10] To verify line 7 phase relationship of current & voltage in balanced three phase DELTA Connection
- 11] To determine Voltage ratio & current ration for given single phase transformer.
- 12] To determine efficiency & regulation of given single phase transformer by direct loading.
- 13] Starting & reversing of DC shunt motor.
- 14] Measurement of power & energy in given single phase circuit using Wattmeter & Energy meter.

(Note : Minimum 08 experiments shall be conducted.)

2 SCT 8 ENGINEERING MECHANICS

Practicals : Based on the syllabus 2 SCT 3 ENGINEERING MECHANICS

2 SCT 9 / IA 8 ENGINEERING DRAWING

PRACTICAL - Each student will submit a set of at least 8 drawing sheets based on the syllabus evenly distributed as per list attached. Practical examination will consist of orals on the topic based on the syllabus.

1. Construction of Engineering curves.
2. Loci of points on link mechanism
3. projection of straight lines
4. Projection of planes
5. Projection of regular solids
6. Section of solids
7. Orthographic projection (1st & 3rd angle)
8. Isometric projection/view
9. Free hand sketches of simple machine elements
 - a) Screw threads ISI profile
 - b) Types of nuts, bolts, studs, set screws, washer, locking arrangement of nuts & bolts.
 - c) Foundation bolts (Rag, Eye, Lewis foundation bolts)

SANT GADGE BABAMRAVATI UNIVERSITY AMRAVATI
SPECIAL NOTE FOR INFORMATION OF THE STUDENTS

- (1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.

- (2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc., refer the University Ordinances Booklet the various conditions/provisions pertaining to examination as prescribed in the following Ordinances.

| | | |
|-----------------------|---|--|
| Ordinance No. 1 | : | Enrolment of Students. |
| Ordinance No. 2 | : | Admission of Students |
| Ordinance No. 4 | : | National cadet corps |
| Ordinance No. 6 | : | Examinations in General (relevant extracts) |
| Ordinance No. 18/2001 | : | An Ordinance to provide grace marks for passing in a Head of passing and Improvement of Division (Higher Class) and getting Distinction in the subject and condonation of deficiency of marks in a subject in all the faculties prescribed by the Statute NO.18, Ordinance 2001. |
| Ordinance No. 9 | : | Conduct of Examinations (relevant extracts) |
| Ordinance No. 10 | : | Providing for Exemptions and Compartments |
| Ordinance No. 19 | : | Admission of Candidates to Degrees. |
| Ordinance No. 109 | : | Recording of a change of name of a University student in the records of the University. |

Ordinance No. 5/2010 :
 Ordinance No.19/2001 :

For improvement of Division/Grade.
 An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answerbooks and preparation of results of the examinations, conducted by the University, Ordinance 2001.

Dineshkumar Joshi

Registrar

Sant Gadge Baba Amravati University

PATTERN OF QUESTION PAPER ON THE UNIT SYSTEM

The pattern of question paper as per unit system will be broadly based on the following pattern.

- (1) Syllabus has been divided into units equal to the number of question to be answered in the paper. On each unit there will be a question either a long answer type or a short answer type.
- (2) Number of question will be in accordance with the unit prescribed in the syllabi for each paper i.e. there will be one question on each unit.
- (3) For every question long answer type or short answer type there will be an alternative choice from the same unit. However, there will be no internal choice in a question.
- (4) Division of marks between long answer and short answer type question will be in the ratio of 40 and 60.
- (5) Each short answer type question shall Contain 4 to 8 short sub question with no internal choice.

DIRECTION

No. 30/2010

Date : 24/6/2010

Subject : Examinations leading to the Degree of (गिनिकी त्पातक) Bachelor of Technology (Chemical Technology) (Four Year Degree Course... Semester Pattern Credit Grade System)

Whereas the schemes of teaching & examinations of I and II Semesters of B.Tech. (Chem. Tech.) (Food Tech., Pulp & Paper Tech., Oil & Paint Tech. and Petrochemical Tech.) courses has been accepted by the Academic Council vide Item No. 49 (I) (R-1) in its meeting held on 28-05-2010 as per the Credit Grade System based on the guidelines given by the A.I.C.T.E., New Delhi for its implementation from the Academic Session 2010-2011,

AND

Whereas admissions to the First Year of B.Tech. (Chem. Tech.) (Food Tech., Pulp & Paper Tech., Oil & Paint Tech. and Petrochemical Tech.) courses are to be made in the Academic Session 2010-2011,

AND

Whereas the matter for admission of the students at the examinations is required to be regulated by an Ordinance,

AND

Whereas the schemes of teaching & examinations of I and II Semesters of B.Tech. (Chem. Tech.) (Food Tech., Pulp & Paper Tech., Oil & Paint Tech. and Petrochemical Tech.) courses are to be implemented from the academic session 2010-2011,

AND

Whereas the schemes of teaching & examinations are required to be regulated by the Regulation,

AND

Whereas the process of making an Ordinance and the Regulation is likely to take some time,

AND

Whereas syllabus for I and II Semesters of B.Tech. (Chem. Tech.) (Food Tech., Pulp & Paper Tech., Oil & Paint Tech. and Petrochemical Tech.) courses are to be sent for printing.

Now, therefore, I, Dr.Ku.Kamal Singh, Vice-Chancellor of Sant Gadge Baba Amravati University in exercise of powers confirmed upon me under sub section (8) of Section 14 of the Maharashtra Universities Act, 1994, hereby direct as under :

1. This Direction may be called "Examinations leading to the Degree of (गिनिकी त्पातक) Bachelor of Technology (Chemical Technology) (Four Year Degree Course... Semester Pattern Credit Grade System) Direction, 2010.

2.

This Direction shall come into force w.e.f. its issuance.

3.

Subject to the conditions prescribed by the Government from time to time, for admission to First Year B.Tech.(Chemical Technology) (Food Tech., Pulp & Paper Tech., Oil & Paint Tech. and Petrochemical Tech.) courses the candidate shall be considered eligible :

Passing 12th Standard Examination of the Maharashtra State Board of Secondary and Higher Secondary Education, with subjects :

1. English (Higher or Lower)
2. Modern Indian Language (Higher or Lower)
3. Mathematics and Statistics.
4. Chemistry.
5. Physics.

6. Any other optional subject from out of the list prescribed by the said Secondary and Higher Secondary Education Board.

OR

1. English (Higher or lower)
2. Mathematics and Statistics.
3. Chemistry
4. Physics
5. Vocational subject (Defined by the said Board as a Technical Subject)

OR

An Examination recognised by the Sant Gadge Baba Amravati University as an equivalent to the above.

4.

Subject to the conditions prescribed by the Govt. from time to time for direct admission to the Second Year B.Tech. (Chemical Technology) (Food Tech., Pulp & Paper Tech., Oil & Paint Tech. and Petrochemical Tech.), the candidates shall be considered eligible :-

Passing Diploma in respective branch in First Division, awarded by the Board of Technical Examination of Maharashtra State, Mumbai.

OR

Any Diploma equivalent to the corresponding Diploma of the Board of Technical Examination of Maharashtra State, Mumbai. The Degree of Bachelor of Technology (Chemical Technology) shall be awarded to examinee who in accordance with the provisions of this Direction qualifies for the award in any of the following branches of Technology with specialization in :-

- i) Food Technology

5.

- ii) Pulp & Paper Technology
- iii) Oil & Paint Technology
- iv) Petrochemical Technology

6. (i) There shall be eight semester examinations leading to the Degree of Bachelor of Technology (Chemical Technology) {(First, Second, Third, Fourth, Fifth, Sixth, Seventh & Eight Semester B.Tech. (Chem. Tech.))}

(ii) The first & Second Semester Examinations shall be common for all the branches.

7. The period of Academic Session shall be such as may be notified by the University.

8. The main examination of first, third, fifth and seventh semester B.Tech. (Chem. Tech.) shall be held by the University in winter & supplementary examination in summer every year. And main examination of second, fourth, sixth & eighth semester B.E. will be held in summer & the supplementary examination in winter every year.

9. The Internal Assessment marks for theory should be based on Class Test and Attendance as follows :-

| | | | |
|----|---|---|--------|
| a) | Class Test | - | 15 |
| | Marks will be based upon two Class Tests. | | |
| b) | Attendance | - | Mark/s |
| | 75% to 80% | - | 1 |
| | 81% to 85% | - | 2 |
| | 86% to 90% | - | 3 |
| | 91% to 95% | - | 4 |
| | 96% to 100% | - | 5 |

Where ever if internal assessment marks are 'ten (10)' then it should be converted out of "20".

10. Subject to his/her compliance with the provisions of this Direction & other Ordinances pertaining to Examination in force from time to time, the applicant for admission, at the end of the course of study of a particular semester/session, to an Examination specified in column (1) of the table below, shall be eligible to appear if

- i) he/she satisfies with the conditions in the table and the provisions thereunder.
- ii) he/she complies with the provisions of the ordinance pertaining to the Examination in general from time to time.
- iii) he/she has prosecuted a regular course of study in a college affiliated to the University.

iv) he/she has in the opinion of the Principal shown satisfactory progress in his/her studies.

TABLE

| Name of Exam | The student should have passed Exam. of | The Student should have satisfactorily completed the following semester | The student should have passed the following examination |
|--------------------------------------|---|---|--|
| 01 | 02 | 03 | 04 |
| First Semester B.Tech.(Chem. Tech.) | XII standard Examination or equivalent | ..... | ..... |
| Second Semester B.Tech.(Chem. Tech.) | ..... | I Semester B.Tech.(Chem. Tech.) | ..... |
| Third Semester B.Tech.(Chem. Tech.) | ..... | II Semester B.Tech.(Chem. Tech.) | 2/3rd heads of I & II Sem. (Chem. Tech.) combined together |
| Fourth Semester B.Tech.(Chem. Tech.) | ..... | III Semester B.Tech.(Chem. Tech.) | ..... |
| Fifth Semester B.Tech.(Chem. Tech.) | I & II Sem. B.Tech.(Chem. Tech.) | IV Semester B.Tech.(Chem. Tech.) | 2/3rd heads of III & IV Sem. combined together |
| Sixth Semester B.Tech.(Chem. Tech.) | ..... | V Semester B.Tech.(Chem. Tech.) | ..... |
| Seventh Semester (C.T.) | III & IV Sem. B.Tech.(Chem. Tech.) | VI Semester B.Tech.(Chem. Tech.) | 2/3rd heads of V & VI Sem. combined together |
| Eighth Semester B.Tech.(Chem. Tech.) | ..... | VII Semester B.Tech.(Chem. Tech.) | ..... |

11. An examinee who has passed 2/3 rd heads of passing shall be allowed to keep term in the next higher class.

Explanation :

- i) While calculating 2/3 rd heads of passing, fraction if any shall be ignored
 - ii) For considering the heads of passing, every theory and every practical shall be considered as separate head of passing
12. The schemes of teaching & examinations shall be as provided under "Appendix-A" appended with this Direction.
13. The fees for each B. Tech (Chemical Tech.) Examination (Theory & Practical) shall be as prescribed by University from time to time.

14. The computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) of an examinee shall be as given below :-

The marks will be given in all examinations which will include college assessment marks and the total marks for each Theory / Practical shall be converted into Grades as per Table II.

SGPA shall be calculated based on Grade Points corresponding to Grade as given in Table II and the Credits allotted to respective Theory / Practical shown in the scheme for respective semester. SGPA shall be computed for every semester and CGPA shall be computed only in VIII semester. The CGPA of VIII semester shall be calculated based on SGPA of VII and SGPA of VIII semester as per following computation :-

$$\text{SGPA} = \frac{C_1 \times G_1 + C_2 \times G_2 + \dots + C_n \times G_n}{C_1 + C_2 + \dots + C_n}$$

Where C_1 = Credit of Individual Theory / Practical

G_1 = Corresponding Grade Point obtained in the respective Theory / Practical

$$\text{CGPA} = \frac{(\text{SGPA})_{\text{VII}} \times (\text{Cr})_{\text{VII}} + (\text{SGPA})_{\text{VIII}} \times (\text{Cr})_{\text{VIII}}}{(\text{Cr})_{\text{VII}} + (\text{Cr})_{\text{VIII}}}$$

Where $(\text{SGPA})_{\text{VII}}$ = SGPA of VIII Semester

$(\text{Cr})_{\text{VII}}$ = Total Credits for VII Semester

$(\text{SGPA})_{\text{VIII}}$ = SGPA of VIII Semester

$(\text{Cr})_{\text{VIII}}$ = Total Credits for VIII Semester

CGPA equal to 6.00 and above shall be considered as equivalent to First Class which shall be mentioned on Grade Card of VIII Semester as a foot note.

TABLE II
THEORY

| Grade | Percentage of Marks | Grade Points |
|-------|-----------------------|--------------|
| AA | 80 ≤ Marks ≤ 100 | 10 |
| AB | 70 ≤ Marks < 80 | 9 |
| BB | 60 ≤ Marks < 70 | 8 |
| BC | 55 ≤ Marks < 60 | 7 |
| CC | 50 ≤ Marks < 55 | 6 |
| CD | 45 ≤ Marks < 50 | 5 |
| DD | 40 ≤ Marks < 45 | 4 |
| FF | 00 ≤ Marks < 40 | 0 |
| ZZ | Absent in Examination | — |

PRACTICAL

| Grade | Percentage of Marks | Grade Points |
|-------|-----------------------|--------------|
| AA | 85 ≤ Marks ≤ 100 | 10 |
| AB | 80 ≤ Marks < 85 | 9 |
| BB | 75 ≤ Marks < 80 | 8 |
| BC | 70 ≤ Marks < 75 | 7 |
| CC | 65 ≤ Marks < 70 | 6 |
| CD | 60 ≤ Marks < 65 | 5 |
| DD | 50 ≤ Marks < 60 | 4 |
| FF | 00 ≤ Marks < 50 | 0 |
| ZZ | Absent in Examination | — |

15. (i) The scope of the subjects shall be as indicated in the syllabi.
(ii) The medium of instruction and examination shall be English.
16. Provisions of Ordinance No.18 of 2001 in respect of an Ordinance to provide grace marks for passing in a Head of passing and improvement of Division (Higher Class) and getting distinction in the subject and condonation of deficiency of marks in a subject in all the faculties prescribed by the Statute No.18, Ordinance, 2001 shall apply to each examination under this Direction.
17. An examinee who does not pass; or who fails to present himself/herself for the examination shall be eligible for readmission to the same examination/semester, on payment of fresh fees and such other fees as may be prescribed.
18. A candidate who could not complete a semester satisfactorily or who has failed will be eligible for readmission to the same semester. However readmission to semester should be allowed only when a regular session is running for the particular semester.
19. One who has passed the Final B.Tech. (Chem. Tech.) examination of the University in one branch and who desirous of taking B.Tech. (Chem. Tech.) Degree in another branch (except Polymer (Plastic) Tech.), shall be admitted to the Third semester of that branch and shall be governed by this Direction for all other purposes.
20. As soon as possible after examinations the Board of Examinations shall publish a result of the examinees and the branchwise merit list shall be notified as per Ordinance No.6.
21. Notwithstanding anything to the contrary in this Direction, no one shall be admitted to an examinations under this Direction, if he/she has already passed the said examinations or an equivalent examinations of any statutory University.

22. (i) The examinees who have passed in all the subjects prescribed for all the examinations of the particular branch shall be eligible for award of the Degree of Bachelor of Technology (Chemical Technology) in the branch concerned.
- (ii) The Degree certificate in the prescribed form, shall be signed by the Vice-Chancellor.

Sd/-

Dr. Kamal Singh
Vice-Chancellor

APPENDIX-A
FOUR YEAR DEGREE COURSE IN B.TECH. (CHEM. TECH.) (FOOD, PULP & PAPER, OIL & PAINT AND PETROCHEMICAL) TECH.
SEMESTER PATTERN
CREDIT GRADE SYSTEM
FIRST SEMESTER

| Sl.No. Subject Code | Teaching Scheme | | | | Examination Scheme | | | | | | | | | |
|--------------------------------------|-----------------------------|------------|------------|------------|------------------------|-------------------------|-------------------------------|-------------|--------------------|----------|----------|-------|--------------------|----|
| | Lecture | Tutorial | P/D | Total | Theory | | | Practical | | | | | | |
| | Hours/Week | Hours/Week | Hours/Week | Hours/Week | Duration of Paper (Hr) | Max. Marks Theory Paper | Max. Marks College Assessment | Total Marks | Min. Passing Marks | External | Internal | Total | Min. Passing Marks | |
| THEORY | | | | | | | | | | | | | | |
| 1 ISCT1 | Applied Inorganic Chemistry | 3 | 1 | 0 | 4 | 4 | 3 | 80 | 20 | 100 | 40 | - | - | - |
| 2 ISCT2/ IA2 | Engineering Physics | 3 | 1 | 0 | 4 | 4 | 3 | 80 | 20 | 100 | 40 | - | - | - |
| 3 ISCT3/ IA1 | Engineering Mathematics-I | 4 | 1 | 0 | 5 | 5 | 3 | 80 | 20 | 100 | 40 | - | - | - |
| 4 ISCT4/ IB3 | Computer Programming | 4 | 1 | 0 | 5 | 5 | 3 | 80 | 20 | 100 | 40 | - | - | - |
| 5 ISCT5 | Mechanical Technology | 3 | 1 | 0 | 4 | 4 | 3 | 80 | 20 | 100 | 40 | - | - | - |
| PRACTICALS / DRAWING / DESIGN | | | | | | | | | | | | | | |
| 6 I SCT6 | Applied Inorganic Chemistry | 0 | 0 | 2 | 2 | 2 | - | - | - | - | - | 25 | 25 | 50 |
| 7 I SCT7/ IA6 | Engineering Physics | 0 | 0 | 3 | 3 | 3 | - | - | - | - | - | 25 | 25 | 50 |
| 8 ISCT8 | Computer Programming | 0 | 0 | 2 | 2 | 2 | - | - | - | - | - | 25 | 25 | 50 |
| IB7 | | | | | | | | | | | | | | |
| TOTAL | | 17 | 5 | 7 | 29 | 26 | | | | 500 | | | 150 | |
| | | | | | | | | | | | | | TOTAL : 650 | |

(Note : One Lecture / One Tutorial of one hour equal to one Credit, One Practical of Three hours equal to two Credit, One Practical of Two hours equal to one Credit, One Practical / Lab. without theory of one hour equal to one Credit.)

APPENDIX-A
FOUR YEAR DEGREE COURSE IN B.TECH. (CHEM. TECH.) (FOOD, PULP & PAPER, OIL & PAINT AND PETROCHEMICAL) TECH.
SEMESTER PATTERN
CREDIT GRADE SYSTEM
SECOND SEMESTER

| Sr.No. Subject Code | Teaching Scheme | | | | Examination Scheme | | | | | | | | | | |
|--------------------------------------|----------------------------|---------|----------|-----|--------------------|---------|------------------------|-------------------------|-------------------------------|-------------|--------------------|---------------------|---------------------|--------------------|--------------------|
| | Hours/Week | Lecture | Tutorial | P/D | Total Hours/Week | Credits | Duration of Paper (Hr) | Max. Marks Theory Paper | Max. Marks College Assessment | Total Marks | Min. Passing Marks | Max. Marks External | Max. Marks Internal | Total Marks | Min. Passing Marks |
| THEORY | | | | | | | | | | | | | | | |
| 1 2SCT1 | Applied Physical Chemistry | 3 | 1 | 0 | 4 | 4 | 3 | 80 | 20 | 100 | 40 | - | - | - | - |
| 2 2SCT2/ IB42 | Electrical Engineering | 4 | 1 | 0 | 5 | 5 | 3 | 80 | 20 | 100 | 40 | - | - | - | - |
| 3 2SCT3 | Engineering Mechanics | 3 | 1 | 0 | 4 | 4 | 3 | 80 | 20 | 100 | 40 | - | - | - | - |
| 4 2SCT4/ IA4 | Engineering Drawing | 3 | 0 | 0 | 3 | 3 | 3 | 80 | 20 | 100 | 40 | - | - | - | - |
| PRACTICALS / DRAWING / DESIGN | | | | | | | | | | | | | | | |
| 5 2SCT5 | Workshop | 0 | 0 | 4 | 4 | 4 | - | - | - | - | - | 25 | 25 | 50 | 25 |
| 6 2SCT6 | Applied Physical Chemistry | 0 | 0 | 2 | 2 | 1 | - | - | - | - | - | 25 | 25 | 50 | 25 |
| 7 2SCT7/ IB8 | Electrical Engineering | 0 | 0 | 2 | 2 | 1 | - | - | - | - | - | 25 | 25 | 50 | 25 |
| 8 2SCT8 | Engineering Mechanics | 0 | 0 | 2 | 2 | 1 | - | - | - | - | - | 25 | 25 | 50 | 25 |
| 9 2SCT9/ IA8 | Engineering Drawing | 0 | 0 | 4 | 4 | 2 | - | - | - | - | - | 25 | 25 | 50 | 25 |
| TOTAL | | 13 | 3 | 14 | 30 | 25 | - | - | - | 400 | - | - | - | 250 | - |
| | | | | | | | | | | | | | | TOTAL : 650 | |

(Note : One Lecture / One Tutorial of one hour equal to one Credit, One Practical of Three hours equal to two Credit, One Practical of Two hours equal to one Credit, One Practical / Lab. without theory of one hour equal to one Credit.)