

ENGINEERING CHEMISTRY (BTCH-101)

COURSE OBJECTIVES

The objective of the Engineering Chemistry is to acquaint the students with the basic phenomenon/concepts of chemistry, the student face during course of their study in the industry and Engineering field. The student with the knowledge of the basic chemistry, will understand and explain scientifically the various chemistry related problems in the industry/engineering field. The student will able to understand the new developments and breakthroughs efficiently in engineering and technology. The introduction of the latest (R&D oriented) topics will make the engineering student upgraded with the new technologies.

1. To appreciate the need and importance of engineering chemistry for industrial and domestic use.
2. To gain the knowledge on existing and future upcoming materials used in device fabrication.
3. To impart basic knowledge related to material selection and the techniques for material analysis.
4. To impart knowledge of green chemical technology and its applications.
5. To provide an insight into latest (R&D oriented) topics, to enable the engineering student upgrade the existing technologies and pursue further research.
6. To enhance the thinking capabilities in line with the modern trends in engineering and technology.

COURSE OUTCOMES

After the completion of the course, the learner will be able to:

- CO1. Analyze the need, design and perform a set of experiments.
- CO2. Identify the structure of unknown/new compounds with the help of spectroscopy.
- CO3. Differentiate hard and soft water, solve the related numerical problems on water purification and its significance in industry and daily life.

- CO4. Apply the principles of green chemistry in designing alternative reaction methodologies to minimize hazards and environmental degradation.
- CO5. Understand the causes of corrosion, its consequences and methods to minimize corrosion to improve industrial designs.
- CO6. Explain the properties, separation techniques of natural gas and crude oil along with potential applications and role of petrochemicals in national economy.
- CO7. Acquire Basic knowledge of Nanochemistry to appreciate its applications in the field of Medicine, data storage devices and electronics.
- CO8. Equipped with basic knowledge of polymer reinforced composites, applications of semiconductor photochemistry in energy harnessing and optical sensors.

ENGINEERING CHEMISTRY LABORATORY (BTCH-102)

COURSE OBJECTIVES

The objective of this course is to acquaint the students with practical knowledge of the basic phenomenon/concepts of chemistry, the student face during course of their study in the industry and engineering field. The students will be able to understand and explain scientifically the various chemistry related problems in the industry/engineering and develop experimental skills for building technical competence.

COURSE OUTCOMES

After the completion of the course the student will be able to:

CO1: analyze & generate experimental skills.

CO2: enhance the thinking capabilities in the modern trends in Engineering & Technology.

CO3: learn and apply basic techniques used in chemistry laboratory for preparation, purification and identification.

CO4: employ the basic techniques used in chemistry laboratory for analyses such as chromatography, spectroscopy, volumetric titrations, conductometric, Pinsky-Martens apparatus and stalagmometer.

CO5: learn safety rules in the practice of laboratory investigations.

ENGINEERING PHYSICS (BTPH-101)

COURSE OBJECTIVES

The objective of the course is to develop a scientific temper and analytical capability in the engineering graduates through the learning of physical concepts and their application in engineering & technology. Comprehension of some basic physical concepts will enable graduates to think logically the engineering problems that would come across due to rapidly developing new technologies. The student will be able to understand the various concepts effectively; logically explain the physical concepts; apply the concept in solving the engineering problem; realize, understand and explain scientifically the new developments and breakthroughs in engineering and technology; relate the developments on Industrial front to the respective physical activity, happening or phenomenon.

- To understand the Importance of applications of Applied Physics in daily life
- To provide students with a basic understanding of the Physics that may be required by engineers in the course of their careers
- To impart knowledge related to the importance of EM waves and magnetic materials
- To enhance knowledge related to lasers and its different components to make it suitable for various purposes
- To introduce most important concepts of superconductivity, crystallography and fiber optics to the students
- To introduce the learners to the basics of Special theory of relativity, X- rays, Quantum Mechanics
- To provide an insight into latest topic of research “nanophysics”

COURSE OUTCOMES

After the completion of the course the student will be able to:

- CO1. Understand the importance of Applied Physics in describing physical phenomena.
- CO2. Employ the knowledge of crystallography and X-Rays to understand the structure-property relationship of materials.
- CO3. Implement the concept of Theory of relativity and Quantum mechanics for research applications.
- CO4. Recognize the use of Laser, Magnetic materials, Superconductors and optical fibers in various fields.
- CO5. Acquire Basic knowledge of EMFT in communication and Nanophysics for its applications in the field of medicine, data storage devices and electronics.

ENGINEERING PHYSICS LABORATORY (BTPH-102)

COURSE OBJECTIVES

- 1 To impart physical measurement skills.
- 2 To make the students understand coherence between theoretical and practical measurement
- 3 Develop the skills needed to set up the equipment required to test models or theory developed in the lecture course
- 4 Be able to interpret results and develop correct conclusions.
- 5 Maintain a laboratory notebook and write formal reports of practical workout.

COURSE OUTCOMES

After the completion of the course the student will be able to:

- CO1. Develop skills to impart practical knowledge in real time solutions.
- CO2. Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.
- CO3. Design new experiments/instruments with practical knowledge
- CO4. Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoretical problems.
- CO5. Understand measurement technology, usage of new instruments and real time applications in engineering studies.

ENGINEERING MATHEMATICS-I (BTAM-101)

COURSE OBJECTIVES

Math and basic science are certainly the foundations of any engineering program. This fact will not change in the foreseeable future” said by Ellis et al. Engineering Mathematics is an essential tool for describing and analyzing engineering processes and systems. Mathematics also enables precise representation and communication of knowledge. Core mathematics courses have broader objectives than just supporting engineering programs. The learning objectives of core mathematics courses can be put into three categories:

- **Content Objectives:** Students should learn fundamental mathematical concepts and how to apply them.
- **Skill Objectives:** Students should learn critical thinking, modeling/problem solving and effective use of technology.
- **Communication Objectives:** Students should learn how to read mathematics and use it to communicate knowledge.

COURSE OUTCOMES

After Successful completion of the course the students are expected to:

- CO1. Understand the fundamentals of the mathematics to apply while designing technology and creating innovations
- CO2. Compute limits and derivatives of functions of two and three variables, develops skill of higher derivative, expansion of functions in ascending power of variable & value of the function in neighborhood of some points.
- CO3. Analyze multidimensional functions to find derivatives, tangent lines to level curves, and to solve optimization problems using extremum value of a given function related to engineering application
- CO4. Find integrals, arc length, double and triple integrals for finding area, volume, centre of mass and various other engineering applications
- CO5. Represent vectors analytically and geometrically, and compute dot and cross products for presentations of lines and planes and Differentiate vector fields, Determine gradient, Divergence & Curl of vector fields and Evaluate line & surface integrals directly and by the fundamental theorems which is useful to represent conservation principles for physical vector fields important in gravitation and electric fields
- CO6. Develops the ability to understand basics of geometry, find radius of curvature & torsion of given curve which is helpful to trace the curve for a given equation of a curve & its nature

ENGINEERING MATHEMATICS-II (BTAM-102)

COURSE OBJECTIVES

Math and basic science are certainly the foundations of any engineering program. This fact will not change in the foreseeable future” said by Ellis et al. Engineering Mathematics is an essential tool for describing and analyzing engineering processes and systems. Mathematics also enables precise representation and communication of knowledge. Core mathematics courses have broader objectives than just supporting engineering programs. The learning objectives of this course are:

- **Content Objectives:** Students should learn fundamental mathematical concepts and how to apply them.
- **Skill Objectives:** Students should learn critical thinking, modeling/problem solving and effective use of technology.
- **Communication Objectives:** Students should learn how to read mathematics and use it to communicate knowledge.
- The students are expected to understand the fundamentals of the mathematics to apply while designing technology and creating innovations.

COURSE OUTCOMES

After Successful completion of the course the students will be able to:

- CO1. Classify differential equations according to certain features and will be able to apply techniques to solve first order and first degree differential equations and apply them in engineering applications involving the Kinematics and Kinetics of Resisted Gravitational, Simple Harmonic & Vibratory Motion, Electric circuits
- CO2. Solve higher order & first degree linear non homogenous differential equation arising in various branches of engineering and related mathematical model develops arising to form mathematical modeling of Real World Problems involving rate of growth of population & Electric oscillators
- CO3. Use ideas of matrices and their applications in solving problems involving systems of linear equations and linear programming problems, Also they will be capable of representing geometric transformations by means of matrices and to express the volume of certain figures and equation of line using determinants.
- CO4. Show skills in computations and applications of infinite sequences and sums (infinite series). Students will show familiarity with the properties of infinite series to either converge to a finite value or diverge to an infinite value, and will learn about methods to determine convergence
- CO5. Express Complex Numbers in Cartesian, Polar, Trigonometric, Exponential and Logarithmic form, and use the theory of complex numbers to solve various practical problems in Engineering and Sciences.

COMMUNICATIVE ENGLISH (BTHU-101)

COURSE OBJECTIVE

The objective is to help the students to become independent users of English language. Students should be able to understand spoken and written English language of varied complexity including some abstract topics; particularly the language of their chosen technical field. They must show awareness of appropriate format and a capacity for explaining their views in a rational manner. The students should be able to converse fluently, without strain with international speakers of English in an accent and lexis that is widely understood across the globe. They should be able to produce on their own texts which are clear and coherent.

COURSE OUTCOMES

After the Completion of the Course the students will be able to:

- CO 1 Demonstrate an understanding of written English language of varied complexity on most topics including some abstract topics
- CO2 Write grammatically correct English in diverse situations
- CO3 Produce on their own texts which are clear and coherent. They must show awareness of appropriate format and a capacity for explaining their views in a rational manner.
- CO4 Exhibit an ability to draft documents effectively to apply for various job Interviews and to conduct business in general.
- CO5 Display the ability to analyze data and present it in the form of a concise written document
- CO6 Show an ability to generally read the stance or the point of view of the writer and present it in the form of a summary

ENVIRONMENTAL SCIENCES (EVSC-101)

COURSE OBJECTIVES

- To understand the basic concepts and problems related to the environment.
- To evaluate local, regional and global environmental topics related to resource use and management.
- To interpret the results of scientific studies of environmental problems.
- Describe threats to global biodiversity, their implications and potential solutions
- To develop critical thinking on management of natural resources.

COURSE OUTCOMES

After the completion of the course the student will be able to:

- CO1. Develop critical thinking skills in relation to environmental affairs
- CO2. Acquire knowledge about natural resources and their effective management
- CO3. Expand awareness of self in a global society and effectively engage diverse perspectives, values, and cultures, ranging from local to global, in dealing with environmental and social issues
- CO4. Interpret and propose solutions to various environmental pollution
- CO5. Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives

HUMAN VALUES & PROFESSIONAL ETHICS

(HVPE-101)

COURSE OBJECTIVES

To help the students to discriminate between valuable and superficial in the life. To help develop the critical ability to distinguish between essence and form, or between what is of value and what is superficial, in life - this ability is to be developed not for a narrow area or field of study, but for everyday situations in life, covering the widest possible canvas. To help students develop sensitivity and awareness; leading to commitment and courage to act on their own belief. It is not sufficient to develop the discrimination ability, it is important to act on such discrimination in a given situation.

- To enable the students to decide and pursue what is really valuable i.e. conducive to human happiness & human welfare.
- To guide the students to explore themselves for their basic aspirations of life and to make them understand the real meaning of “Happiness” & “Prosperity” in the view of relationship & physical facilities.
- To provide an insight about the complementarity of skill and values and to enable them to live a fulfilling life, in harmony with oneself and with family, society and Nature/Existence.
- To prepare the young professionals to have the right understanding, commitment, competence and the practice of holistic way of living with definite Human Conduct and to participate in the development of Human Society.

COURSE OUTCOMES:

Course Outcomes

After the completion of the course the student will be able to:

CO1. Recognize what is valuable to human being and what are the basic aspirations of life.

CO2. Understand the importance of mutually satisfying human behavior and enriching interaction with nature.

CO3. Develop appropriate technologies and management patterns to create harmony in Nature/Existence

CO4. Implement the understanding of value education in solving the various practical problems of professional and personal life.

CO5. Acquire basic knowledge of harmony in existence and to understand existence as coexistence.

ENGINEERING DRAWING (BTME 102)

COURSE OBJECTIVES

- Main objective of the Engineering Drawing is to introduce the students to visual technique in the form of technical graphics.
- Familiarize the students related to Theory of Orthographic Projection, Projection of points, lines, planes and solids as per the BIS codes prevalent to drawing practice.
- Section of solids, intersection and development of surface will further elaborate the detailed concept of geometrical objects.
- Isometric projection and orthographic projection of simple solids/blocks will enable to visualize the geometrical objects and to certain extent the machine parts.

COURSE OUTCOMES

After the completion of the course the student will be able to:

CO1. Apply the knowledge to visualize engineering objects.

CO2. Draw basic sketching techniques related to engineering drawing.

CO3. Recognize the detailed concept of 3D isometric and orthographic projections.

CO4. Develop competence with industry practice and standards.

ELEMENTS OF MECHANICAL ENGINEERING

(BTME101)

COURSE OBJECTIVES

- Main objective of the course is to introduce the students to fundamentals involved in the inter-conversion of thermal energy into mechanical energy and vice versa
- Familiarize the students about the common engineering materials finding wide application in Mechanical Engineering Industry.
- Provide basic knowledge of design parameters of various mechanical components.

COURSE OUTCOMES

After the completion of the course the student will be able to:

- CO1: Identify the applications of Mechanical engineering in general, Thermal science and energy conversion in particular.
- CO2: Recognize the various engineering materials and describe their properties.
- CO3: Analyze and calculate thermal and mechanical energy utilization problems.
- CO4: Demonstrate the use of energy conversion process.
- CO5: Solve problems in various situations that may arise in the field of mechanics.

FUNDAMENTALS OF COMPUTER PROGRAMMING & IT (BTCS101)

COURSE OUTCOMES

- CO1. To understand the basic building blocks of general purpose digital computer system like computer hardware/software, memory and peripheral devices, internet applications and services.
- CO2. To understand the program development life cycle using various tools like flowcharts and algorithms and pseudo-code.
- CO3. To classify operators, expressions, character set, data types and control structures.
- CO4. To understand the concept of modular programming and code reusability using library functions.
- CO5. To write programs using object oriented concepts like classes and objects, file handling.

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING (BTEE-101)

COURSE OBJECTIVES

- Be able to complete detailed study of Basic Electrical and Electronics Engineering.
- Explain the working principle and parts of various electrical and electronic devices
- To impart the basic knowledge about the Electric and Magnetic circuits.
- Discuss the nonstructural features and working of ac and dc machines.

COURSE OUTCOMES

- CO1. To predict the behavior of any electrical and magnetic circuits
- CO2. To identify the type of electrical machine used for that particular application
- CO3. Acquired knowledge about basics of digital electronics
- CO4. Understand various methods of electrical generation.
- CO5. Identify schematic symbols and understand the working principles of electronic devices.

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB (BTEE-102)

COURSE OBJECTIVE

- Be able to complete detailed study of Basic Electrical and Electronics Engineering.
- Explain the working principle and parts of various electrical and electronic devices
- To impart the basic knowledge about the Electric and Magnetic circuits.
- To inculcate the understanding about the AC fundamentals
 - Discuss the nonstructural features and working of ac and dc machines.

COURSE OUTCOMES

At the end of the course students will be able:

- CO1. To predict the behavior of any electrical and magnetic circuits
- CO2. To identify the type of electrical machine used for that particular application
- CO3. Acquired knowledge about basics of digital electronics
- CO4. Understand various methods of electrical generation
- CO5. Identify schematic symbols and understand the working principles of electronic devices