PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

Course Outcomes

Regulation-2017

SUB/SUB CODE	COURSE OUTCOME
HS8151- Communicative English	Ability to develop the basic reading and writing skills of first year engineering and technology students.
	Ability to help learners develop their listening skills, which will, enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
	Ability to help learners develop their speaking skills and speak fluently in real contexts.
	Ability to help learners develop vocabulary of a general kind by developing their reading skills
	Ability to help developing their presenting skills
MA 8151 – Engineering Mathematics – I	Ability to achieve conceptual understanding and to retain the best traditions of traditional calculus.
	Ability to provide the basic tools of calculus
	Ability to learn the purpose of modelling the engineering problems mathematically and obtaining solutions.
	Ability to deals with topics such as single variable and multivariable calculus
	Ability to deals with topics of science, engineering, economics and computer science, among other disciplines.
PH8151- Engineering Physics	Ability to gain knowledge on the basics of physics
	Ability to gain knowledge properties of matter, optics, acoustics

	etc.,
	Ability to gain knowledge on acoustics
	Ability to apply these fundamental principles to solve practical problems related to materials used for engineering applications.
	Ability to apply these fundamental principles to for engineering applications.
CY8151- Engineering Chemistry	Ability to make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
	Ability to develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
	Ability to understand the preparation, properties and applications of engineering materials.
	Ability to gain knowledge on the types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
	Ability to apply the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
GE8151- Problem Solving and Python Programming	Ability to know the basics of algorithmic problem solving
	Ability to define, read and write simple Python programs.
	Ability to develop Python programs with conditionals and loops and call them.
	Ability to apply Python data structures – lists, tuples, dictionaries.
	Ability to obtain the input/output with files in Python.
GE8152- Engineering Graphics	Ability to perform free hand sketching of basic geometrical constructions and multiple views of objects.
	Ability to perform multiple views of objects.

PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

	Ability to develop in students, graphic skills for communication of concepts
	Ability to develop in students ideas and design of Engineering products.
	Ability to expose them to existing national standards related to technical drawings.
GE8161-Problem Solving and Python Programming Laboratory	Ability to write, test and debug simple Python programs.
	Ability to implement Python programs with conditionals and loops.
	Ability to apply the functions for structuring Python programs.
	Ability to represent compound data using Python lists, tuples, dictionaries.
	Ability to read and write data from/to files in Python.
BS8161-Physics and Chemistry Laboratory	Ability to learn different experiments to test basic understanding of physics concepts.
	Ability to learn the concepts in optics
	Ability to learn the concepts in thermal physics
	Ability to apply the properties of matter
	Ability to apply the concepts properties of liquids.
HS8251- Technical English	Ability to develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
	Ability to foster their ability to write convincing job applications and effective reports.
	Ability to develop their speaking skills to make technical

	presentations, participate in group discussions.
	Ability to strengthen their listening skill
	Ability to strengthen the comprehend lectures and talks in their areas of specialisation.
MA8251 – Engineering Mathematics – II	Ability to understand the topics such as Matrix Algebra, Vector Calculus, Complex Analysis and Laplace Transform.
	Ability to understand powerful tools to handle practical problems arising in the field of engineering.
	Ability to understand vector calculus for modelling the various laws of physics.
	Ability to apply the various methods for complex analysis and Laplace transforms
	Ability to apply the solving problems that occur in various branches of engineering disciplines.
PH8254 Physics Of Materials	Able to gain knowledge on phase diagrams and various material processing methods,
	Ability to acquire knowledge on basics of conducting materials, superconductors and their applications
	Ability to get knowledge on the functioning of semiconducting materials and their applications in LED and solar cells,
	Ability to understand the functioning of various dielectric and magnetic materials ,
	Ability to have the necessary understanding on various advanced materials.
BE8252-Basic Civil and Mechanical	Ability to impart basic knowledge on Civil and Mechanical Engineering.

PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

Engineering	Ability to familiarize the materials and measurements used in Civil Engineering.
	Ability to provide the exposure on the fundamental elements of civil engineering structures.
	Ability to enable the students to distinguish the components
	Ability to enable the students to distinguish the components and working principle of power plant units, IC engines, and R & AC system.
BT8251- Biochemistry	Ability to apply the fundamental knowledge on structure and properties of carbohydrates in biological concepts.
	Ability to apply the structure of biomolecules to solve the biological problem.
	Ability to analyze the metabolic pathways of the major biomolecules relevance to clinical conditions.
	Ability to select and assess the importance of intermediary metabolism and its regulation in biotechnology
	Ability to correlate biochemical process with biotechnology applications.
BT8291- Microbiology	Ability to develop understanding the principles of Microbiology
	Ability to develop emphasize structure and biochemical aspects of various microbes particularly to identify microbes.
	Ability to develop biochemical aspects of various microbes particularly to identify microbes.
	Ability to study the biochemical aspects of various microbes

	Ability to solve the problems in microbial infection and their control.
BT8261- Biochemistry Laboratory	Ability to learn and understand the principles behind the qualitative estimation of biomolecules.
	Ability to learn and understand the principles behind the quantitative estimation of biomolecules.
	Ability to understand the nature of biomolecules
	Ability to apply the techniques for estimation
	Ability to identify the biomolecules and laboratory analysis of the same in the body fluids.
GE8261 - Engineering Practices Laboratory	Ability to fabricate carpentry components and pipe connections including plumbing works.
	Ability to use welding equipments to join the structures.
	Ability to carry out the basic machining operations and make the models using sheet metal works.
	Ability to illustrate on centrifugal pump, air conditioner, operations of smithy, foundary and fittings
	Ability to carry out basic home electrical works and appliances to measure the electrical quantities
	Ability to elaborate on the components, gates, soldering practices.
MA8353- Transforms And Partial Differential Equations	Ability to understand how to solve the given standard partial differential equations.
	Ability to solve differential equations using Fourier series analysis which plays a vital role in engineering applications.

PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

	Ability to Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
	Ability to understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
	Ability to use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
BT8301- Stoichiometry	Able to solve problems related to units and conversions and fit the given data using the methodologies
	Able to solve problems related to material and energy balance concepts and design reactors for biochemical processes
	Able to apply their knowledge in the field of biochemical engineering from the principles of thermodynamics.
	Apply knowledge of chemistry in separation of components.
	Apply chemical engineering techniques in biological process.
BT8302- Applied Thermodynamics for Biotechnologists	Ability to give to strong foundation on the Ist law of thermodynamics, Maxwell's relations , volumetric properties and applications.
	Able to gain knowledge in solution thermodynamics and chemical potential, fugacity , activity coefficient and Gibbs equation.
	Ability to analyze the vapour liquid equilibrium calculations and knowledge in the design of reactors and CRE concepts.
	Ability to gain knowledge in thermodynamic description of microbial growth and product formation.

	Ability to understand the legal steps and process in the end of bioprocesses and microbial growth kinetics.
BT8303- Basic Industrial Biotechnology	Able to explain the steps involved in the production of bio products and methods to improve modern biotech.
	Able to apply basic bioprocess design for industrial needs.
	Able to apply basic biotechnological principles, methods and models for solving biotechnology tasks.
	To identify and debate the ethical, legal, professional, social issues in the field of biotechnology.
	To design and deliver useful modern biotechnology products to the society.
BT8304- Bioorganic Chemistry	Ability to understand the elements of atom, charges and their bonding rules.
	Ability to predict the time for product formation by measuring rate constants with kinetic mechanisms.
	Ability to learn how to implement the learning for bioorganic molecules.
	Ability to know the method for chemical synthesis of biomolecules.
	Ability to predict the possible reactions for the formulation of products.
BT8305 Cell Biology	Able to understand cell organisation of microbes and their functions.
	Able to understand cell organisation of plants animals and their functions.

	The course is also a prerequisite for other biology related subjects
	Able to identify the plant and animal cells structures
	Able to do multiple changes in the given plant and animal cells for a new development
BT8361-Microbiology Laboratory	Ability to understand the advanced technical information pertaining to laboratory
	Ability to understand the bio-safety and preventive measures from pathogenic microorganism.
	Ability to understand the preventive measures from pathogenic microorganism.
	Ability to know the various aseptic techniques and sterilization methods.
	Ability to develop the minimum skills to work on several important techniques for the study of microorganisms in the laboratory.
BT8311 Cell Biology Laboratory	Able to understand the basic techniques to work with cells
	Able to demonstrate working principles of Microscopy
	Able to understand cell staining techniques
	Able to perform cell staining techniques
	Able to identify the various stages of mitosis
HS8381 Interpersonal Skills/Listening and	Ability to listen and respond appropriately.
	Ability to provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities.
	Ability to engage in specific academic speaking activities.

	Ability to improve effective presentations skills
	Ability to participate confidently and appropriately in conversations both formal and informal.
MA8391- Probability and Statistics	Ability to understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
	Ability to understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
	Ability to apply the concept of testing of hypothesis for small and large samples in real life problems.
	Ability to apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
	Ability to have the notion of sampling distributions and statistical techniques used in engineering and management problems.
BT8401- Fluid Mechanics and Heat Transfer Operations	Ability to understand the purpose of fluids in state kinematic and dynamic equilibrium.
	Ability to understand the fluidization phenomenon.
	Ability to know different modes of heat transfer, different laws and terms used for design purpose and industrial applications, steady state and transient conduction
	Able to know the concept of forced and natural convection, boiling and condensation and radiation heat transfer
	Able to know heat exchangers and its design, NTU concepts,

	evaporators and its types
BT8402- Molecular Biology	Ability to describe the basic structure and biochemistry of nucleic acid
	Ability to describe the basic structure and biochemistry of nucleic acid, proteins and discriminate between them.
	Ability to identify the principles of DNA replication, transcription translation and explain how they relate to each other.
	Ability to understand clearly about the gene organization and mechanisms of controlling the gene expression in various organisms.
	Ability to articulate the applications of molecular biology in the modern world.
BT8403 Enzyme Technology And Biotransformation	Able to impart knowledge on enzyme and enzyme reactions will be the key step in to proceed towards various concepts in biotechnology.
	Able to impart theoretical and practical aspects of kinetics will provide the importance and utility of enzyme kinetics towards research.
	Able to learn the process of immobilization has been increased steadily in food, pharmaceutical and chemical industries
	Able to learn the process which will provide simple and easy method of implementation.
	Able to know the ideas on Processing, Production and Purification of enzymes at an industrial scale will be helpful to work technologically.

PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

BT8404 Bioprocess Principles	Ability to apply engineering principles to systems containing biological catalysts to meet the needs of the society.
	Ability to convert the promises of molecular biology
	genetic engineering into new processes to make bio-products in economically feasible way.
	Ability to measure the kinetics of the biological process
	Ability to apply the bioprocess principles for the production of the product
GE8291 Environmental Science and	Able to introduce an important aspect which improves environmental protection.
	Able to create public awareness of environment in young stage.
	Able to eliminate ignorance and incomplete knowledge that has lead to misconceptions
	Able to introduce an important aspect which improves environmental protection.
	Able to create awareness on development and improvement in standard of living that has lead to serious environmental disasters
BT8411- Chemical Engineering Laboratory for Biotechnologists	Able to have knowledge on the basic principles of chemical engineering
	Able to apply the skill of material balance and energy balance in unit operations unit process of chemical engineering and biotechnology
	Able to analyze the principles of chemical engineering and its applications in chemical, mechanical and biological perspectives
	Able to understand the design and working principles of fluid moving machinery and transport phenomena.

PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

	Ability to demonstrate knowledge and understanding of the principles underpinning important techniques in molecular biology.
BT8412- Molecular Biology Laboratory	Ability to demonstrate important techniques in molecular biology.
	Ability to demonstrate knowledge and understanding of applications of these techniques.
	Ability to demonstrate the ability to carry out laboratory experiments and interpret the results.
	Ability to create awareness of the hazardous chemicals and safety precautions in case of emergency.
HS8461- Advanced Reading and Writing	Ability to write different types of essays.
	Ability to write winning job applications.
	Ability to read and evaluate texts critically.
	Ability to display professional contexts.
	Ability to display critical thinking in various professional contexts.
BT8501 Mass Transfer Operation	Ability to demonstrate about gas -liquid, vapour- liquid and solid-liquid and liquid–liquid equilibrium.
	Ability to classify and use the accurate engineering correlations of diffusion and mass transfer coefficients to model a separation process.
	Ability to investigate a multi-stage equilibrium separation processes
	Ability toimultaneous phase equilibrium and mass balances in continuous separation processes (absorbers, strippers, and distillation columns) and sizing continuous separation units.
	Ability to design and construct with operating principles of process

	economics of separating equipments
BT8591 Bioprocess Engineering	Ability to select appropriate bioreactor configurations and operation modes based upon the nature of bioproducts and cell lines and other process criteria.
	Ability to understand the basics of bioengineering skills for scale up.
	Ability to understand the immobilized enzyme systems, its kinetics and design criteria.
	Ability to utilize the modeling and simulation of bioprocesses so as to reduce costs and to enhance the quality of products and systems.
	Ability to utilize the skills for the production of products using integrated biochemical recombinant process.
BT 8502 Analytical Methods And Instrumentation	Able to visualize and interpret the theory of spectroscopic methods
	Ability to have a practical hands on experience on Absoprtion Spectroscopic methods
	To acquire experience in the purification by performing chromatography
	To validate and analyse using spectrometric and microscopic techniques
BT8003 Principles Of Food Processing	Ability to develop knowledge in food processing
	Ability to understand the chemical nature and usage of food constituents and additives.
	Ability to familiarize with the food processing techniques.
	Ability to understand prevent food spoilage

PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

	Ability to develop their knowledge in understanding food preservation methods ,unit operations in modern food processing and impact of the process on food quality
OA 8151- Open elective	Ability to understand environmental basis for agriculture to understand the impact of globalization change in social system
	Ability to apply the concepts of irrigation development and water shed
	Ability to evaluate the concepts of sustainability especially climate change emerging global issues
	Ability to analyze the ecological diversity and application of biotechnology in sustainable agriculture
	Ability to develop engineering solutions for sustainable agriculture
BT8503 Protein Engineering	Ability to analyze the various interactions in protein makeup.
	Ability to predict different levels of protein structure.
	Ability to interpret the role of functional proteins in various field of study.
	Ability to apply the latest application of protein science in their research
	Able to predict protein structure using computational biology methods.
BT8511 Bioprocess Laboratory – I	Ability to explain about enzyme kinetics and characterization and how to use them for practical applications.
	Ability to evaluate the growth kinetics of microorganisms and become adept with medium optimization techniques.

PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

	Ability to determine an experimental objective, understands the theory behind the experiment, and operates the relevant equipment safely.
	Ability to demonstrate good lab citizenry and the ability to work in team.
BT8512 Analytical Methods And Instrumentation Laboratory	Ability to visualize and interpret the theory of spectroscopic methods by hands on experiments.
	Ability to interpret the theory of spectroscopic methods by hands on experiments.
	Ability to acquire experience in the purification by performing chromatography
HS8581 Professional Communication	Ability to make effective presentations.
	Ability to participate confidently in Group Discussions.
	Ability to attend job interviews and be successful in them.
	Ability to be successful in team.
	Ability to develop adequate Soft Skills required for the workplace
BT8651 Bioinformatics	Ability to develop bioinformatics tools with programming skills.
	Ability to apply computational based solutions for biological perspectives.
	Ability to pursue higher education in this field.
	Ability to adopt life-long learning of applied biological science.

	Ability to predict the 3D structure and support tool development.
BT8601 Genetic Engineering	Ability to apply their knowledge to clone commercially important genes.
	Ability to analyze DNA libraries to produce commercially important recombinant proteins.
	Ability to compare gene and genome sequencing techniques.
	Ability to correlate various genome mapping techniques.
	Ability to adopt the techniques such as microarray, analysis of gene expression and proteomics
BT8691 Applied Chemical Reaction Engineering	Ability to write the rate equation for any type of reaction.
	Ability to design reactors for heterogeneous reactions and optimize operating conditions.
	Ability to relate and calculate the conversions, concentrations and rates in a reaction
	Ability to identify, formulate and solve chemical engineering problems.
	Ability to calculate concentrations and rates in a reaction
BT8005 Animal Biotechnology	Ability to understand the animal cell culture, animal diseases and its diagnosis
	Ability to understand the animal diseases and its diagnosis
	Ability to gain the knowledge for therapy of animal infections
	Ability to know the concepts of micromanipulation technology and

	transgenic animal technology
	Ability to apply the knowledge gained in this section to apply in the field of clinical research
BT8010 Bio entrepreneurship	Ability to determine relevant licensing and regulatory issues for specific small business plan
	Ability to enrich the marketing plan component for specific bio-industry
	Ability to defend business reports in a professional manner.
	Ability to frame strategies for professional development and advancement.
	Ability to develop and manage the business ethics.
BT8017 Biofuel	Ability to understand the generation of bio fuels, energy security, environmental and economic sustainability.
	Ability to analyze the raw materials and technologies needed for biodiesel production and apply them.
	Ability to analyze the production of bio ethanol and apply them for pilot scale.
	Ability to apply the technologies for bio hydrogen bio methane production.
	Ability to analyze the other fuels development by pyrolysis and its life cycle assessment.
BT6612 Bioprocess Laboratory II	Ability to investigate, design and conduct experiments, analyze and interpret data, and apply the laboratory skills to solve complex bioprocess engineering problems.

PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

	Ability to apply the laboratory skills to solve complex bioprocess engineering problems.
	Ability to become creative, innovative and adaptable engineers as leaders or team members in their organizations and society.
	Ability to perform competently in chemical and bioprocess industries and become important contributors to national development.
	Ability to will demonstrate advancement in their careers through increasing professional responsibility and continued life-long learning.
BT8612 Genetic Engineering Laboratory	Ability to describe the main principles for cloning of DNA in various organisms.
	Ability for preparation and cloning of DNA in various organisms.
	Ability to express clearly about the gene amplification and methods for analysis of DNA, such as hybridization, restriction analysis and gene expressions.
	Ability to use genetic and biotechnological techniques
	Ability to manipulate genetic materials and develops new and improved living organisms.
GE8077 Total Quality Management	Ability to know the basic knowledge of total quality management principles and concepts
	Ability to apply the tools and techniques of quality management
	Ability to apply the tools for manufacturing and services processes.
	Ability to know the six sigma concept methodology and application

	and the TQM tools.
	Ability to know the design of quality systems of ISO auditing
BT8751 Downstream Processing	Ability to define the fundamentals of downstream processing for product recovery.
	Ability to understand requirements for successful operations of downstream processing.
	Ability to describe the components of downstream equipment and explain the purpose of each.
	Ability to apply principles of various unit operations used in downstream processing and enhance problem solving techniques
BT8791 Immunology	Ability to create awareness of immune system structure and functions.
	Ability to create awareness of immunity to various pathogens
	Ability to create awareness of the principles behind the production of therapeutic/ diagnostic molecules.
	Ability to create awareness awareness of the concepts and mechanism behind tumour development
	Ability to create awareness awareness of the concepts and mechanism behind allergy and hyper sensivity reactions.
BT 8021 Genetics	Ability to apply the knowledge of bacterial genetics in genetic manipulation
	Ability to analyse the various laws of geentics and its experiments
	Ability to apply the knowledge of cytogenetics in research

PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

	Ability to design models of population genetics
	Ability to analyse the genetic diseases to design new drugs
BT 8023 Tissue Engineering	Ability to understand the components of tissue architecture
	Ability to find the opportunity to get familiarized with stem cell characteristics and relevance in medicine
	Ability to create awareness about the properties an broad application of biomaterial
	Ability to understand various source of stem cells and characteristics
	Ability Overall exposure to the role of tissue engineering and stem cell therapy in organogenesis
OBM752 Hospital management	Ability to explain the principles of hospital management
	Ability to identify the importance of human resource management
	Ability to list various marketing research techniques
	Ability to identify information system and its uses
	Ability to understand safety procedures followed in Hospital
BT8711 Downstream Processing Laboratory	Will be able to acquire knowledge for the separation of whole cells and other insoluble ingredients from the culture broth.
	Ability to learn cell disruption techniques to release intracellular products Learned various techniques like evaporation, extraction, precipitation, membrane separation for concentrating biological products.

PRATHYUSHA ENGINEERING COLLEGE

"A gateway to technical excellence"

DEPARTMENT OF BIOTECHNOLOGY

	Ability to learn the basic principles and techniques of chromatography to purify the biological products and formulate the products for different end uses.
BT8712 Immunology Laboratory	Ability to have awareness of immune system cells and tissues.
	Ability to have knowledge on immunological /clinical tests.
	Ability to isolate lymphocytes and monocytes.
	Ability to identify various immune system cells.
BT8811 Project Work	Ability to define, formulate and analyze a problem in biotechnology
	Ability to solve specific problems independently or as part of a team by relating engineering concepts
	Ability to perform and conduct experiments to interpret data and separate them
	Ability to work independently as well as in teams
	Ability to formulate the product