

FACULTY OF LIFE SCIENCES

SYLLABUS

Of

Bachelor of Science Bio-Technology (Semester: I-VI)

(Under Continuous Evaluation System)

Session: 2022-23



The Heritage Institution
KANYA MAHA VIDYALAYA
JALANDHAR
(Autonomous)

Upon successful completion of this course, students will be able to:

PSO1: gain and apply knowledge of Biotechnology and Science concepts to solve problems related to field of Biotechnology.

PSO2: design, perform experiments, analyze and interpret data for investigating complex problems in the field of biotechnology.

PSO3: apply ethical principles and commit to professional ethics and responsibilities and norms of the Biotechnological practices.

PSO4: design and develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environment & society.

PSO5: to undertake any responsibility as an individual and as a team in a multidisciplinary environment.

PSO6: contribute to the field of biotechnology and allied industries designing, developing and providing solutions for product/processes/technology development.

PSO7: able to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological engineering practices.

B.Sc. Bio-Technology Semester-I

Bachelor of Science (Bio-Technology) Semester-I

Session: 2022-23

Course Code: BBTL-1421

Punjabi Compulsory

(Theory)

COURSE OUTCOMES

CO1:ਆਤਮ ਅਨਾਤਮ' ਪੁਸਤਕ ਦੇ ਕਵਿਤਾ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋ+ਕ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਵਿਤਾ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚੱਲ ਰਹੀਆਂ ਕਾਵਿ ਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰ ਸਕਣ।

CO2:ਇਸ ਦਾ ਹੋਰ ਮਨੋਰਥ ਕਵਿਤਾ ਦੀ ਵਿਆਖਿਆ, ਵਿਸ਼ਲੇਸ਼ਣ ਤੇ ਮੁਲੰਕਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ ਵੀ ਹੈ ਤਾਂ ਕਿ ਉਹ ਸਮਕਾਲੀ ਸਮਾਜ ਦੀਆਂ ਸਮੱਸਿਆਵਾਂ ਨੂੰ ਸਮਝ ਸਕਣ ਅਤੇ ਆਲੋਚਨਾਤਮਕ ਦ੍ਰਿਸ਼ਟੀ ਬਣਾ ਸਕਣ।

CO3:ਗੱਦ ਪ੍ਰਵਾਹ (ਰੇਖਾ ਚਿਤ੍ਰ ਤੇ ਹਲਕੇ ਲੇਖ) ਪੁਸਤਕ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਮੁੱਲਵਾਨ ਇਤਿਹਾਸ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ ਹੈ।

CO4:ਪੈਰ੍ਹਾ ਰਚਨਾ ਅਤੇ ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ ਦੇਣ ਦਾ ਮਨਰੋਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO5:ਧੁਨੀ ਵਿਉਂਤ ਪੜ੍ਹਣ ਨਾਲ ਵਿਦਿਆਰਥੀ ਧੁਨੀਆਂ ਦੀ ਉਚਾਰਨ ਪ੍ਰਣਾਲੀ ਤੋਂ ਵਾਕਫ਼ ਹੋਣਗੇ।

Bachelor of Science (Bio-Technology) Semester-I

Session: 2022-23

Course Code: BBTL-1031

Basic Punjabi

(In lieu of Punjabi Compulsory)

COURSE OUTCOMES

CO1:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸਿਖਾਉਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਪਾ ਕੇ ਇਕ ਹੋਰ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦਾ ਮੌਕਾ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ।

CO2:ਇਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਬਾਰੀਕਬੀਨੀ ਨਾਲ ਭਾਸ਼ਾ ਦਾ ਅਧਿਐਨ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO3:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO4:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਦੱਸਣਾ ਹੈ।

CO5:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦਾ ਸ਼ਬਦ ਘੇਰਾ ਵਿਸ਼ਾਲ ਕਰਨਾ ਹੈ।

CO6:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਵਿਚ ਹਫਤੇ ਦੇ ਸੱਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਂ, ਇਕ ਤੋਂ ਸੌ ਤੱਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿਚ ਸਿਖਾਉਣਾ ਹੈ।

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTL-1431
Punjab History and Culture (From Earliest Times to C 320)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

COURSE OUTCOMES:

After completing Semester I and course on Punjab History and Culture students of History will be able to identify and have a complete grasp on the sources & writings of Ancient Indian History of Punjab.

CO1: Identify and understand the sources and physical features of Punjab

CO 2: To study the earliest civilisation (Indus Valley Civilization) and original home of Aryans

CO 3: To examine the Social, Religious and Economic life during Early and Later Vedic Age

CO 4: To comprehend the Buddhist, Jain and Hindu faith and their relevance in the modern times

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTL-1102
Communication Skills in English
(Theory)

COURSE OUTCOMES:

At the end of this course, the students will develop the following Skills:

CO 1: Reading skills that will facilitate them to become an efficient reader

CO 2: Through reading skills, the students will have an ability to have a comprehensive understanding of the ideas in the text and enhance their critical thinking

CO 3: Writing skills of students which will make them proficient enough to express ideas in clear and grammatically correct English

CO 4: The skill to use an appropriate style and format in writing letters (formal and informal) and resume, memo, notices, agenda, minutes

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTM-1483
Cell Biology
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

- CO1.** Understanding the basic unit of life – cell and broad classification of cell types.
- CO2.** Understanding the structure and functions of cell organelles.
- CO3:** Understand Cell Division and Cell Cycle.
- CO4.** Understanding the biological membranes along with membrane transport mechanism.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTM-1483(P)
Course Title: Cell Biology
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1. Perform a variety of molecular and cellular biology techniques.

CO2. Describe cellular membrane structure and function, fine structure and function of cell organelles.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTM-1074
Botany-I
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand the diversity of plants.

CO2: Understand the structure of root and stem.

CO3: Understand structure and development of anther, male gametophyte, ovule and female gametophyte.

CO4: Understand different aspects of Pollination, fertilization and sterility.

CO5: Understand terminology related to floral descriptions.

Bachelor of Science (Bio-Technology) Semester-I

Session: 2022-23

Course Code: BBTM-1074

Botany-I

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand the diversity of plants.

CO2: Understand the structure of root and stem.

CO3: Understand structure and development of anther, male gametophyte, ovule and female gametophyte.

CO4: Understand different aspects of Pollination, fertilization and sterility.

CO5: Understand terminology related to floral descriptions.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTM-1085
Biochemistry-I
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Gain basic knowledge about water and pH.

CO2: Acquire the knowledge of Carbohydrates, their classification, biological functions that can relate in day to day life

CO3: Understand the definition, structure and biological function of lipids and their subclasses.

CO4: Understand the definition, structure, biological function and classification of proteins

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTM-1085 (P)
Biochemistry-I
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Perform Beer Lamberts Law

CO2: Determine pKa value while performing practical

CO3: Estimate carbohydrates and sugars in the given sample

CO4: Estimate proteins and fats in the sample by different methods

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTM-1346
General Microbiology-I
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Know the contribution of microbiologists, the principle and application of various types of microscopic techniques.

CO2: Apply the concept, principle and types of sterilization techniques while performing microbiological experiments

CO3: Apply the concept and characteristics of antiseptics, disinfectants & their mode of action in day to day life

CO4: Perform microbial preservation methods.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTM-1346(P)
General Microbiology-I
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

- CO1:** Sterilize glassware & plastic ware while performing microbiological experiments.
- CO2:** Learn and do basics of microbiological experiments like to make cotton plugs
- CO3:** Cultivate various bacteria, fungi, yeast etc. by different methods
- CO4:** Study motility of microbes.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTM-1087
Course Title: Chemistry-I
(Theory)

COURSE OUTCOMES:

Students will be able to:

CO1: understand the key features of coordination compounds viz. variety of structures, oxidation numbers and electronic configurations, coordination numbers and explain the bonding and stability of complexes along with their nomenclature and structure.

CO2: understand the postulates of VBT, inner and outer orbital complexes

CO3: describe the stability of metal complexes by the use of formation constants and to calculate thermodynamic parameters from them, understand macrocyclic effect, crown ethers, cryptands

CO4: understand Crystal field splitting of d-orbitals in octahedral, tetrahedral, cubic and square planer fields of ligands.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: BBTM-1087
Course Title: Chemistry-I
(Theory)

COURSE OUTCOMES:

Students will be able to:

CO1: understand the technique of volumetric analysis

CO2: understand Iodimetry, Iodometry

CO3: understand Redox titrations using $K_2Cr_2O_7$ and $KMnO_4$.

CO4: identify the various ions present in the mixture.

Bachelor of Science (Bio-Technology) Semester-I
Session: 2022-23
Course Code: AECD-1161
Course Title: Drug Abuse: Problem Management and Prevention (Compulsory)
(Theory)

COURSE OUTCOMES

After completing the course, the students will be able to:

CO1. Learn how to include factual data about what substance abuse is; warning signs of addiction; information about how alcohol and specific drugs affect the mind and body;

CO2. Learn how to be supportive during the detoxification and rehabilitation process.

CO3. Focus on substance abuse education- is teaching individuals about drug and alcohol abuse and how to avoid, stop, or get help for substance use disorders.

CO4. Understand that substance abuse education is important for students alike; there are many misconceptions about commonly used legal and illegal substances, such as alcohol and marijuana

B.Sc. Bio-Technology Semester-II

Bachelor of Science (Bio-Technology) Semester-II

Session: 2022-23

Course Code: BBTL-2421

Punjabi Compulsory

COURSE OUTCOMES:

CO1: ਆਤਮ ਅਨਾਤਮ ਪੁਸਤਕ ਦੇ ਕਹਾਣੀ ਭਾਗ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀ ਨੂੰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਕਹਾਣੀ ਜਗਤ ਨਾਲ ਜੋੜਣਾ ਹੈ।

CO2: ਗੱਦ ਪ੍ਰਵਾਹ (ਰੇਖਾ ਚਿਤ੍ਰ ਤੇ ਹਲਕੇ ਲੇਖ) ਪੁਸਤਕ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਮੁੱਲਵਾਨ ਇਤਿਹਾਸ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ ਹੈ।

CO3: ਸੰਖੇਪ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸਮੇਂ ਅਤੇ ਮਿਹਨਤ ਦੀ ਬੱਚਤ ਕਰਨ ਬਾਰੇ ਦੱਸਣਾ ਹੈ।

CO4: ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

CO5: ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ। ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।

Bachelor of Science (Bio-Technology) Semester-II

Session: 2022-23

Course Code: BBTL-2031

Basic Punjabi

In lieu of Punjabi (Compulsory)

Time: 3 Hours

Max. Marks: 50

Theory: 40

CA: 10

COURSE OUTCOMES:

CO1:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸਿਖਾਉਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਪਾ ਕੇ ਇਕ ਹੋਰ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦੇ ਮੌਕੇ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ।

CO2:ਇਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਬਾਰੀਕਬੀਨੀ ਨਾਲ ਭਾਸ਼ਾ ਦਾ ਅਧਿਐਨ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO3:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO4:ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

CO5:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦਾ ਸ਼ਬਦ ਘੇਰਾ ਵਿਸ਼ਾਲ ਕਰਨਾ ਹੈ।

CO6:ਵਿਦਿਆਰਥੀ ਵਾਕ ਦੀ ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਇਸਦੀ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ ਅਤੇ ਭਾਸ਼ਾ ਤੇ ਪਕੜ ਮਜ਼ਬੂਤ ਹੋਵੇਗੀ।

CO7:ਪੈਰਾ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO8: ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਲਿਖਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾ ਵਿਚ ਨਿਪੁੰਨ ਕਰਨਾ ਹੈ।

CO9:ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ। ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।

Bachelor of Science (Bio-Technology) Semester-II
Session: 2022-23
Course Code: BBTM-2431
Punjab History and Culture (C. 320 to 1000 A.D.)
(Special Paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

COURSE OUTCOMES

After completing Semester II and course on Ancient History of Punjab students will be able to understand:

CO 1: The reasons and impact of Alexander's invasions

CO 1 (a): To understand the various factors leading to rise and fall of empires and emergence of new dynasties and their administration specifically of Maurya rule in general and Ashok in particular

CO 2: art and architecture of Gupta period and the Indo-Greek style of architecture under Gandhara School

CO 3: To have an insight into the socio-cultural history under Harshvardhan and Punjab under the stated period

CO 4: To enable students to have thorough insight into the various forms/styles of Architecture and synthesis of Indo - Greek Art and Architecture in Punjab

Bachelor of Science (Bio-Technology) Semester-II
Session: 2022-23
Course Code: BBTM-2102
Communication Skills in English
(Theory)

COURSE OUTCOMES

At the end of this course, the students will develop the following skills:

CO 1: Enhancement of listening skills with the help of listening exercises based on conversation, news and TV reports

CO 2: The ability of Note-Taking to be able to distinguish the main points from the supporting details and the irrelevant information from the relevant one using Listening Skills

CO 3: Acquisition of knowledge of phonetics which will help them in learning about correct pronunciation as well as effective speaking

CO 4: Speaking skills of the students enabling them to take active part in group discussion and present their own ideas

Bachelor of Science (Bio-Technology) Semester-II

Session: 2022-23

Course Code: BBTL-2333

Biostatistics

(Theory)

Time: 3 Hours

Max. Marks: 40

Theory: 32

CA: 8

COURSE OUTCOMES

Upon completion of this course, students should be able to:

CO 1: Calculate summary statistics (mean, median, mode, range, standard deviation and variance) from the data.

CO 2: Familiar with the concepts of probability, conditional probability and Bayes theorem.

CO 3: Familiar with the concepts of correlation and regression, Scatter diagram, linear correlation, linear regression lines

CO 4: State the null hypothesis and alternative hypothesis (both one way and two ways) appropriate to a given scenario and determine if it is appropriate to use the Chi-Square test for testing the significance of fit between data and predicted data.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2022-23
Course Code: BBTM-2484
Course Title: Zoology-I
(Theory)

COURSE OUTCOMES

After passing this course the student will be able to:

CO1: Understand the general classification of Kingdom Animalia.

CO2: Understand the digestive system, respiratory system of man.

CO3: Understand the excretory and circulatory system of man.

CO4: Understand the skeletal system, neural integration and endocrine system of man.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2022-23
Course Code: BBTM-2484 (P)
Course Title: Zoology-I
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand the estimation of blood haemoglobin.

CO2: Familiarize with the various systems of human such as digestive, arterial, venous and urinogenital systems.

CO3: The students will be able to record blood pressure and blood groups.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2022-23
Course Code: BBTM-2065 (P)
Genetics
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand Mendelian laws.

CO2: Solve Paternity disputes.

CO3: Demonstrate segregation in preserved material.

CO4: Study polytene chromosomes and dermatoglyphics.

CO5: Study mitosis from onion root tips.

Bachelor of Science (Bio-Technology) Semester-II
Session: 2022-23
Course Code: BBTM-2086
Biochemistry – II
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Familiarize with biomolecules, enzymes and related Metabolic pathways

CO2: Know the importance & metabolic role of ATP and other energy rich metabolites

CO3: Familiarize with enzymes and related mechanism through which they work

CO4: Get acquainted with the concept of bioenergetics and various metabolic processes

CO5: Differentiate between equilibrium and steady state kinetics and analysed simple kinetic data and estimate important parameter (Km. Vmax)

Bachelor of Science (Bio-Technology) Semester-II
Session: 2022-23
Course Code: BBTM-2086(P)
Biochemistry – II
(Practical)

COURSE OUTCOMES:

Upon completion of this course, the student will be able to:

CO1: Estimate salivary amylase and acid phosphatase activity.

CO2: Know the Effect of temperature and pH on enzyme activity.

CO3: Determine K_m value for the activity of acid phosphatase

CO4: Perform and analyse Competitive and non-competitive inhibition

Bachelor of Science (Bio-Technology) Semester-II
Session: 2022-23
Course Code: BBTM-2347
General Microbiology-II
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Know the concept of microbial growth in batch and continuous system.

CO2: Know the whole process of Natural resistance and Non-specific defense mechanism against microorganisms occurs in the human body

CO3: Have the full knowledge of mechanism of action, its diagnosis and treatment for different Viral, Bacterial & Fungal diseases

CO4: Acquire the best knowledge of Industrial Microbiology

CO5: Describe how biotechnology is used to understand and protect the environment, treat sewage and Domestic waste water treatment

Bachelor of Science (Bio-Technology) Semester-II

Session: 2022-23

Course Code: BBTM-2347(P)

General Microbiology-II

(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Enumerate the microorganisms by different methods while performing microbiological practices

CO2: Know the real importance of Personal hygiene.

CO3: Identify different fungus by lactophenol staining

CO4: Apply basic knowledge of nutrients to study the Growth curve of different microorganisms

CO5: Acquire skills and competency in microbiological laboratory practices applicable to microbiological research

B.Sc. Bio-Technology Semester-III

Bachelor of Science (Bio-Technology) Semester-III
Session: 2022-23
Course Code: BBTM-3061
Fundamentals of Biotechnology
(Theory)

COURSE OUTCOMES

After passing this course the student will be able to:

CO1: Know Basic Concept of Biotechnology and recombinant technology

CO2: Understand applications of biotechnology in health care and agriculture

CO3: Know how biotechnology can impact the research and development in industry and food technology.

CO4: Know different Ethical issues pertaining to biotechnology

CO5: Understand the concept of biodegradation, bioremediation and biotransformation

Bachelor of Science (Bio-Technology) Semester-III
Session: 2022-23
Course Code: BBTM-3061(P)
Fundamentals of Biotechnology
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Learn Good lab practices in Biotechnology Laboratory

CO2: Apply principle, working and applications of instruments viz., laminar air flow, autoclave, hot air oven etc.

CO3: Know the Handling and disposal procedure regarding hazardous reagents

CO4: Know different steps in Patent writing

Bachelor of Science (Bio-Technology) Semester-III

Session: 2022-23

Course Code: BBTM-3062

Immunology-I

(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Familiarize with the Immune system

CO2: Know about different immune cells providing immunity

CO3: Understand immunoglobulin structure and different pathways of complement systems

CO4: Have understanding of Major Histocompatibility system in relation to disease susceptibility

Bachelor of Science (Bio-Technology) Semester-III
Session: 2022-23
Course Code: BBTM-3062(P)
Immunology-I
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Collect blood sample by different methods

CO2: Calculate Differential leucocyte count, Total leucocytes and RBC count in the given blood sample

CO3: Perform Blood group testing, isolation of mononuclear cells from peripheral blood

CO4: Perform various immunological techniques

Bachelor of Science (Bio-Technology) Semester-III
Session: 2022-23
Course Code: BBTM-3083
Chemistry-II
(Theory)

COURSE OUTCOME:

Students will be able to

CO1: explain the various reactive intermediates.

CO2: explain the bonding between different organic compounds

CO3: explain the effect of various substituents on the reactivity of aromatic compounds

CO4: learn Molecular chirality, enantiomers, the Cahn-Ingold Prelog R-S notational system, Resolution of enantiomers, chiral centres other than carbon.

CO5: understand mechanism of nucleophilic substitution, stereochemistry of SN^1 and SN^2 reactions

Bachelor of Science (Bio-Technology) Semester-III

Session: 2022-23

Course Code: BBTM-3083 (P)

Chemistry-II

(Practical)

COURSE OUTCOMES:

Students will be able to

CO1: Detect elements (N, S and halogens) in simple organic compounds

CO2: Detect functional groups (Aldehydes, ketones carbohydrates, hydrocarbons, Amides, Amines, Carboxylic acids and phenols) in simple organic compounds

CO3: Prepare their derivatives of organic compounds.

CO4: Confirm the unknown organic compounds by determining its M.P.

Bachelor of Science (Biotechnology) Semester – III
Session 2022-23
Course Code: BBTM-3074
Botany-II
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

- CO1:** Understand the plants and plant cells in relation to water
- CO2:** Understand the chemical contents of the plant products
- CO3:** Know the concept and characteristics of antiseptic, disinfectant and their mode of action.
- CO4:** Know the prevention and control measures of plant diseases and its effect on economy of crops.

Bachelor of Science (Bio-Technology) Semester- III
Session 2022-23
Course Code: BBTM-3074 (P)
Botany-II
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to develop:

CO1: Practical skill on plants and plant cells in relation to water

CO2: Know the symptoms and control measures of plant diseases and its effect on economy of crops.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2022-23
Course Code: BBTM-3085
Biochemistry-III
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Develop an understanding of Carbohydrates metabolisms in cell

CO2: Understand the Amphibolic nature of Kreb's cycle

CO3: Know Electron transport chain and ATP synthesis occurring inside cell

CO4: Understand the lipid metabolism occurring inside the cell

Bachelor of Science (Bio-Technology) Semester-III
Session: 2022-23
Course Code: BBTM-3085 (P)
Biochemistry-III
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Perform carbohydrate estimation and determination of reducing sugar in the given sample

CO2: Understand the importance of absorbance maxima and perform spectral analysis of plant pigments

CO3: Separate lipids from wheat grains sample

CO4: Perform thin layer chromatography to separate macromolecules

Bachelor of Science (Bio-Technology) Semester-III
Session: 2022-23
Course Code: BBTM-3066
Molecular Biology
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Study Molecular aspects of genetics.

CO2: Have full understanding of basic mechanism and essential component required for DNA replication in prokaryotic & eukaryotic organisms

CO3: Explain the concept of genetic code, decoding system, codon-anticodon interactions, and selection of initiation codons, initiation, elongation, termination and also regulation of translation.

CO4: Know how different genes are expressed and regulated in a cell by using different operon model.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2022-23
Course Code: BBTM-3066(P)
Molecular Biology
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Isolate genomic DNA and RNA from plants

CO2: Perform agarose gel electrophoresis.

CO3: Quantify DNA.

CO4: Do SDS-PAGE electrophoresis of different protein samples.

Bachelor of Science (Bio-Technology) Semester-III
Session: 2022-23
Course Code: BBTM-3221
Environmental Studies (Compulsory Paper)

Time: 3 Hours

Max. Marks: 100

Theory: 60

Practical: 20

CA: 20

COURSE OUTCOMES:

After passing this course student will be able to:

CO1: Understand the concept and need of environmental education.

CO2: Understand the role of an individual in conservation of natural resources.

CO3: Learn about role of major Eco system and their conservation.

CO4: Develop desirable attitude value and respect for protection of Biodiversity.

CO5: Learn about the control measure of pollution and solid waste management.

CO6: Understand the role of different agencies in the protection of environment.

CO7: Knowledge regarding welfare programmes and Human rights.

CO8: Knowledge about the applied value of environmental studies.

B.Sc. Bio-Technology Semester-IV

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2022-23
Course Code: BBTM-4061
Industrial Biotechnology-I
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand the basics of microbial industrial process

CO2: Know about isolation of industrially important microbes and their screening methods

CO3: Understand different Strain Improvement method required for industrial important microbes and Know Media formulation and its optimization process

CO4: Understand Primary and secondary metabolite production at industrial level

Bachelor of Science (Bio-Technology) Semester-IV

Session: 2022-23

Course Code: BBTM-4061(P)

**Industrial Biotechnology-I
(Practical)**

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Measure any bacterial size

CO2: Perform IMVIC test for metabolic characterization of bacteria

CO3: Isolation of enzyme producing microbes

CO4: Starter culture preparation

Bachelor of Science (Bio-Technology) Semester-IV

Session: 2022-23

Course Code: BBTM-4062

Immunology-II

(Theory)

COURSE OUTCOMES:

After passing this course, student will be able to

CO1: Familiarize with immune effector mechanisms, hybridoma technology and vaccination

CO2: Have sound knowledge of how immune system deals with various pathogens, different processes and different cell types involved in the prevention of disease.

CO3: Become aware about concept, synthesis and action mechanism of vaccines.

CO4: Perform various immune-diagnostic techniques.

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2022-23
Course Code: BBTM-4062(P)
Immunology-II
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Prepare Vaccine chart of child.

CO2: Study Haemagglutination & Haemagglutination inhibition assay.

CO3: Perform Direct and indirect ELISA.

CO4: Perform Double immunodiffusion test.

Bachelor of Science (Bio-Technology) Semester-IV

Session: 2022-23

Course Code: BBTM-4083

Biochemistry-IV

(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Know the main objective of amino acid metabolism and urea cycle

CO2: Have knowledge of importance of essential amino acids, its biosynthesis and their regulation.

CO3: Explain the Biosynthetic pathways of purines and pyrimidines nucleotides

CO4: Explain the Degradative pathways of purines and pyrimidines

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2022-23
Course Code: BBTM-4083(P)
Biochemistry-IV
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Quantitatively estimate amino acids by using Ninhydrin reaction

CO2: Acquire skills to perform protein purification by using salt precipitation

CO3: Isolate casein from milk to determine isoelectric pH of casein

CO4: Check fat content in milk sample

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2022-23
Course Code: BBTM-4064
Skill Development in Biotechnology
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Detect different food borne infections by different methods

CO2: Test food adulterants Biochemically/ microbiologically.

CO3: Learn all the nutritional aspects of the carbohydrates, lipids & proteins.

CO4: Describe the role of biotechnologies in food production and food processing

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2022-23
Course Code: BBTM-4064(P)
Skill Development in Biotechnology
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Check different food adulterants in the given products.

CO2: Determine Gluten content in wheat flour.

CO3: Give quality index of fats content in different food products

CO4: Calculate BMR

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2022-23
Course Code: BBTM-4065
Fundamentals of Bioinformatics
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand basics of computer and data storage devices

CO2: Understand basics of bioinformatics and sequence alignment

CO3: Know about scoring matrices and database searching

CO4: Know about primary and secondary databases

Bachelor of Science (Bio-Technology) Semester-IV
Session: 2022-23
Course Code: BBTM-4065 (P)
Fundamentals of Bioinformatics
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Use and perform MS -office

CO2: Know and use various databases

CO3: Perform Sequence alignment

CO4: Perform prediction of protein functional domain

Bachelor of Science (Bio-Technology) Semester-IV

Session: 2022-23

Course Code: BBTM-4486

Zoology-II

(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand evolution of Prokaryotes and Eukaryotes.

CO2: Understand the process and theories in evolutionary biology.

CO3: Aware the students about various pathogenic protozoans and helminths and diseases caused by them in humans.

CO4: Understand diseases caused by arthropod vectors and their control measures.

Bachelor of Science (Bio-Technology) Semester-IV

Session: 2022-23

Course Code: BBTM-4486(P)

Zoology-II

(Practical)

COURSE OUTCOMES

After passing this course the student will be able to:

CO1: Aware the students for various parasites and diseases which spreads in human with the help of study of host-parasite relationship.

CO2: Aware about the typhoid, cholera likes disease.

CO3: Understand the evolutionary phenomena.

B.Sc. Bio-Technology Semester-V

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5061
rDNA Technology-I
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

- CO1:** Understand the concept of genetic engineering and Know about different DNA Modifying enzymes
- CO3:** Know about cloning vectors
- CO4:** Study different methods of Transformation.
- CO5:** Study how labelling of DNA and RNA is done

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5061(P)
rDNA Technology-I
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Isolate genomic DNA from bacteria.

CO2: Quantify DNA using Spectrophotometer and determine their purity.

CO3: Perform and understand concept of restriction digestion

CO4: Perform and understand concept of transformation

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5062
Plant Biotechnology-I
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Study the macronutrients and micronutrients and their deficiency symptoms in plants.

CO2: Know about the different physiological functions & biosynthesis of major plant growth regulators.

CO3: Understand the concept of Totipotency.

CO4: Understand the different methods of gene transfer in plants.

Bachelor of Science (Bio-Technology) Semester-V

Session: 2022-23

Course Code: BBTM-5062 (P)

Plant Biotechnology-I

(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Get acquainted with functions and operations of various instruments used in plant tissue culture laboratory.

CO2: Prepare cotton plugs.

CO3: Prepare stock solutions of Murashige & Skoog (1962) medium.

CO4: Clean glassware, plasticware and contaminated cultures.

CO5: Prepare, sterilize and inoculate the explants.

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5063
Animal Biotechnology-I
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Learn about the different aseptic techniques used in Animal Tissue Culture (ATC).

CO2: Know about the different sources, types and eradication of contamination.

CO3: Study the different culture media and reagents used in ATC.

CO4: Study different safety considerations in ATC laboratory.

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5063(P)
Animal Biotechnology-I
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Perform different Sterilization techniques.

CO2: Prepare Hanks Balanced salt solution.

CO3: Prepare Minimal Essential Growth medium.

CO4: Isolate lymphocytes for culturing.

CO5: Isolate macrophages from blood for culturing.

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5064
Bioprocess Engineering-I
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand the fundamental principles of chemical Engineering and biochemical engineering.

CO2: Perform assay of various enzymes according to their properties and can analyse their kinetics data.

CO3: Learn about different types of microbial culture

CO4: Know the effect of temperature, pH and inducer on the product synthesis.

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5064 (P)
Bioprocess Engineering-I
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Study growth curve of microorganisms while growing them in different media under optimal conditions.

CO2: Determine the specific growth rate and generation time of a bacterium during fermentation.

CO3: Study the effect of temperature, pH and aeration on microbial growth

CO4: Know about the production of an enzyme in a Bioreactor/shaking flask.

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5065
Biochemical and Biophysical Techniques-I
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Gain fundamental knowledge about the basic principles of sedimentation, centrifugation machines and rotors.

CO2: Understand the principles of different types of chromatography (Paper, column, ion-exchange etc).

CO3: Understand the principles of single and double beam UV/Visible spectroscopy.

CO4: Understand the basic principle and instrumentation of NMR and ESR.

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5065
Biochemical and Biophysical Techniques-I
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand the concept of differential centrifugation.

CO2: Separate bio-molecules by paper chromatography and thin layer chromatography.

CO3: Separate proteins by ion-exchange column chromatography.

CO4: Separate proteins by affinity column chromatography.

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5066
Industrial Biotechnology-II
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Know about production of antibiotics and solvents from industrial microbes

CO2: Understand concept of Biotransformation, microbial production of organic acids, Vitamins and amino acids

CO3: Know about Biofertilizers, vermicomposting, fermented foods

CO4: Importance of Biological Nitrogen Fixation

Bachelor of Science (Bio-Technology) Semester-V
Session: 2022-23
Course Code: BBTM-5066(P)
Industrial Biotechnology-II
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand the concept of additive and synergistic effect of antibiotics

CO2: Perform different types of Fermentation

CO3: Isolate nitrate reducing bacteria from the environment

CO4: Learn about wine production

B. Sc. Bio-Technology Semester-VI

Bachelor of Science (Bio-Technology) Semester-VI
Session: 2022-23
Course Code: BBTM-6061
rDNA Technology-II
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand basics of cloning and expression vectors.

CO2: Understand Gene expression and processing of recombinant proteins

CO3: Know about primer designing and the concept of gene amplification.

CO4: Understand different generations of sequencing.

Bachelor of Science (Bio-Technology) Semester-VI
Session: 2022-23
Course Code: BBTM-6061(P)
rDNA Technology-II
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand the role of restriction digestion in cloning

CO2: Understand the concept of transformation

CO3: Learn about ligation

CO4: Amplify genes.

Bachelor of Science (Bio-Technology) Semester-VI
Session: 2022-23
Course Code: BBTM-6062
Animal Biotechnology-II
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand the basics of animal cell culture.

CO2: Understand about Transfection methods and expression vectors

CO3: Know about Stem cells and their benefit for human benefit.

CO4: Understand the role of genetic engineering in the improvement of animal cell for human welfare.

Bachelor of Science (Bio-Technology) Semester-VI

Session: 2022-23

Course Code: BBTM-6062(P)

Animal Biotechnology-II

(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Maintain cultures of animal cells and established cell lines with good viability, minimal contamination and appropriate documentation.

CO2: Perform supportive tasks relevant to cell culture, including preparation and evaluation of media, cryopreservation and recovery, and assessment of cell growth and health.

CO3: Recognise and troubleshoot problems common to routine cell culture.

Bachelor of Science (Bio-Technology) Semester-VI
Session: 2022-23
Course Code: BBTM-6063
Plant Biotechnology-II
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Understand basic concepts of Micropropagation.

CO2: Understand the concept of generation of variations in plants.

CO3: Learn important milestones in plant tissue culture.

CO4: Understand the concept of protoplast fusion and somatic cell hybridization and secondary metabolite production

Bachelor of Science (Bio-Technology) Semester-VI
Session: 2022-23
Course Code: BBTM-6063(P)
Plant Biotechnology-II
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Perform micropropagation techniques.

CO2: Learn different pathways of plant regeneration under in vitro conditions.

CO3: Understand techniques of establishing cell suspension cultures

CO4: Carry out culture experiments with different explants.

Bachelor of Science (Bio-Technology) Semester-VI
Session: 2022-23
Course Code: BBTM-6064
Bioprocess Engineering-II
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Learn about the Design of a Fermenter and how to use it.

CO2: Study about all the parameters to be considered while operating a fermenter.

CO3: Study about different techniques of Downstream Processing.

CO4: Learn about Effluent treatment and fermentation Economics.

Bachelor of Science (Bio-Technology) Semester-VI

Session: 2022-23

Course Code: BBTM-6064(P)

**Bioprocess Engineering-II
(Practical)**

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Undergo two-week training in fermentation technology in industry/institute and learn practical aspects of fermentation technology

Bachelor of Science (Bio-Technology) Semester-VI
Session: 2022-23
Course Code: BBTM-6085
Chemistry-III
(Theory)

COURSE OUTCOME:

Students will be able to

CO1: understand the various thermodynamic properties and laws of Thermodynamics, and acquire knowledge about the various thermodynamic terms like enthalpy of formation, enthalpy of ionisation, entropy, internal energy. Calculate entropy change for reversible and irreversible processes under isothermal and non-isothermal conditions and also absolute entropies of substances.

CO2: acquire the knowledge of structure and intermolecular forces present between solids, liquids and gases.

CO3: Understand the concept of reaction rates and determine the rate law from initial rate data. Determine the order of reaction with respect to each reactant, the overall order of reaction, the rate constant with units. Learn about the Catalysis, hydrogenation Catalysis

CO4: understand the concept of Electrochemistry and various terms related to it like resistance, conductance, specific resistance, cell constant, EMF and determine the transference number of ions using Hittorf and moving boundary methods.

Bachelor of Science (Bio-Technology) Semester-VI

Session: 2022-23

Course Code: BBTM-6085 (P)

Chemistry-III

(Practical)

Time: 3 Hrs

Practical Marks: 18

Course outcome:

Students will be able to

CO1: know the principle and mechanism of Conductometric titrations and polarimetric experiments

CO2: determine the heat of neutralization and Heat of solution calorimetrically

CO3: verify Beer Lambert Law for different solutions.

CO4: determine the pH of the solution and analyze optical active substances

Bachelor of Science (Bio-Technology) Semester-VI
Session: 2022-23
Course Code: BBTM-6066
Biochemical and Biophysical Techniques-II
(Theory)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Illustrate the working principles electrophoresis techniques and their role in science.

CO2: Understand concept of Iso-electric focusing

CO3: How to measure radioactivity, instruments used for detecting and measuring radiations.

CO4: Understand the concepts of Mass spectrometry

Bachelor of Science (Bio-Technology) Semester-VI
Session: 2022-23
Course Code: BBTM-6066(P)
Biochemical and Biophysical Techniques-II
(Practical)

COURSE OUTCOMES:

After passing this course the student will be able to:

CO1: Learn about the qualitative and quantitative analysis of DNA sample

CO2: Prepare standard curve of protein

CO3: Prepare standard curve of DNA

CO4: Separation of bio-molecules by vertical and horizontal gel electrophoresis