

PEOPLE'S UNIVERSITY, BHOPAL***(Applicable for Admitted from Academic Session 2022-23 onwards)***Programme: **Bachelor of Technology**

Semester –III

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (70)	Internal (30)	Total (100) Min: 40 (D Grade)	End Sem (Nil)	Internal (Nil)	Total (Nil)
CBBT-301	Introduction to Biotechnology	3	1	-						

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance Max. Marks: 10
Practical Internal Max Marks: Nil	Lab Performance / Attendance / Quiz - Max. Marks: Nil	

Pre-Requisite	Nil
Course Objective	The objective of the course is to provide a basic understanding of biotechnology and acquaint students with various fields of Biotechnology and their applications
Course Outcomes	Students will be able to learn: <ol style="list-style-type: none"> 1. Historical Perspectives. 2. The environmental issue of biotechnology. 3. Applications of Modern Biotechnology. 4. Biotechnology in India: Academic Prospects. 5. Biotechnology in India: Industrial Scenario.

Unit	Contents (Theory)	Marks Weightage
I	Introduction: Historical development of biotechnology. Basic concepts of biotechnology. Definition and descriptions of some important terminology in biotechnology. Introduction to Genes, Genomes, Recombinant DNA Technology, Genomics and proteomics	14
II	Branches of Biotechnology: Various branches of biotechnology include Plant, Animal, Microbial, Healthcare, Agricultural, Pharmaceutical, Industrial, Environmental, Aquaculture and Marine, Mining and Metal Environmental Biotechnology, Bioinformatics, etc. Colour Classification Branches of Biotechnology.	14
III	Biotechnology in India: Biotechnology and developing world- concerns and consequences. Role of biotechnology in Indian industry. Impact on Health, industry and agricultural sector.	14
IV	Biotechnology and Other Disciplines: Biotechnology- an interdisciplinary pursuit, a three-component central core, product safety. New trends in biotechnology. Biotechnology Regulations and Ethics.	14
V	Applications and Scope of Biotechnology: Practice of biotechnology in medicine, industry, agriculture, livestock improvement, environment, DNA Fingerprinting and Forensic Analysis. Future perspectives.	14

Text Book/References Books/ Websites:

1. B.D. Singh – Biotechnology, Expanding Horizons, Kalyani Publication.
2. P.K. Gupta – Biotechnology and Genomics, Rastogi Publication.
3. K.S. Bilgrami and A.K. Pandey – Introduction to Biotechnology.
4. U. Satyanarayan, Biotechnology.
5. Atul Kumar and Vandana A. Kumar – Plant Biotechnology and Tissue Culture, Principle and Perspectives, International Books Distributing.

Suggested List of Laboratory Experiments :-(Expandable): Nil

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Semester –III

SubjectCode	Subject Title	Credit			Theory			Practical		
CBBT-302	Material Sciences & Biomaterials	L	T	P	End Sem (70)	Internal (30)	Total (100)	End Sem (Nil)	Internal (Nil)	Total
		3	1	-			Min: 40 (D Grade)			(Nil)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test –Max Marks: 20	Assignment/Quiz/Attendance Max. Marks: 10
Practical Internal Max Marks: Nil	Lab Performance /Attendance / Quiz - Max. Marks: Nil	

Pre-Requisite	Nil
Course Objectives	The aim of this course is to provide an introduction and issues related to different types of biomaterials and give an overview of basic biology: proteins/cells/tissues, tissue material interactions in vivo.
Course Outcomes	Student will be able to learn: <ol style="list-style-type: none"> 1. Various types of materials and their properties. 2. Understand the materials used in medicine. 3. Explain methods to modify surfaces of biomaterials and choose material for the desired biological response. 4. Describe interactions between biomaterials, proteins, cells and tissue for short-term and long term implantations. 5. Material used to replace different organs & tissues of human body.

Unit	Contents (Theory)	Marks Weightage
I	Properties of Materials: Types of Materials, Chemical, Physical, Mechanical, Bulk properties and Surface properties of Materials. Characterization methods of surface properties of Biomaterials.	14
II	Materials Used In Medicine: Metals; Polymers; Hydrogels; Bioresorbable and Biodegradable Materials. Fabrics; Biologically Functional Materials; Ceramics; Natural materials; Composites, thin films, grafts and coatings; Pyrolytic Carbon for long-term medical Implants; Porous materials; Nano biomaterials.	14
III	Host Reactions to Biomaterials: Inflammation; Wound healing and the Foreign body response; Systemic toxicity and Hypersensitivity; Blood coagulation and Blood-materials Interactions; Tumorigenesis. Degradation of Materials in Biological Environment: Degradation of Polymers, Metals and Ceramics.	14
IV	Application of Biomaterials: Cardiovascular Applications; Dental implants; Adhesives and Sealants; Ophthalmologic Applications; Orthopedic Applications; Drug Delivery System; Sutures; Bioelectrodes; Biomedical Sensors and Biosensor.	14
V	Miscellaneous: Biomaterials in Artificial Organs; Regulatory environment: FDA rules and regulations.	14

Text Book/References Books/ Websites:

1. Schoen, F. J., Ratner, B. D., Hoffman, A. S., Lemons, J. E. , "Biomaterials Science: An Introduction to Materials in Medicine" Netherlands: Elsevier Science.
2. Hench, L. L., Ethridge, E. C. (1982); Biomaterials: an interfacial approach. United Kingdom: Academic Press. Optional Materials: Reference Books.
3. Bronzino, J. D. (2000). The Biomedical Engineering Handbook. Germany: CRC Press.

Suggested List of Laboratory Experiments :-(Expandable): Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (70)	Internal (30)	Total (100) Min: 40 (D Grade)	End Sem (35)	Internal (15)	Total (50) Min: 20 (D Grade)
CBBT-303	Cell Biology	3	1	1						

Duration of Theory (Externals): 4 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: 15	Lab Performance /Attendance / Quiz - Max. Marks: 15	

Pre-Requisite	Nil
Course Objective	To increase understanding of living systems and to consider the systems in relationship to the self and other organisms in the natural environment. The course gives the life activities at cellular and molecular level and basic functions of the various cellular compartments and organelles. This course also aims to develop knowledge among the students about cancer cell.
Course Outcomes	On completion of the course, students shall be able to: <ol style="list-style-type: none"> 1. Identify and present relevant information dealing with issues of cell biology. 2. Assess and relate the information to the context of cell biology. 3. Gain knowledge on cell division and regulation. 4. Plan and carry out simple experiments on the basis of cell.

Unit	Contents (Theory)	Marks Weightage
I	Introduction, Scope, Importance and history of Cytology. Prokaryotic cell, Eukaryotic cell (Plant and Animal Cell). Structure of cell wall. Plasma membrane: structure and functions (simple diffusion, facilitated diffusion, active transport, endocytosis, pinocytosis, phagocytosis, and exocytosis).	14
II	Structure and functions of mitochondria, chloroplast, Structure and functions of Endoplasmic reticulum, Endoplasmic reticulum targeting proteins, protein folding, Targeting of lysosomal protein. Structure and function of Golgi complex, Protein Glycosylation within the Golgi. Structure and functions of Ribosome. Lysosome and Intracellular digestion.	14
III	The nucleus and nucleolus. structure and classification of Chromosomes. Chromosome structure and its types. Lampbrush and Polytenic Chromosomes. Cellular reproduction: Cell cycle-mitosis and meiosis.	14
IV	Cell Motility and Shape I: Structure and function of microfilaments and intermediate filaments. Molecular mechanisms of Cell-Cell Adhesions. Extracellular Matrix of animals, Cell signaling. Introduction and application of stem cells.	14
V	General introduction of Cancer, Apoptosis and necrosis: Techniques in cell biology: chromosomal banding techniques. Principles and applications of light microscope and electron microscope (Scanning and transmission). Karyotyping and Idiogram.	14

Text Book/References Books/ Websites:

1. Cell Biology and Genetics-By P.K. Gupta
2. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc.
3. De Robertis, E.D.P. and De Robertis, E.M.F. 2006. Cell and Molecular Biology. 8th edition. Lippincott Williams and Wilkins, Philadelphia.

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4. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
5. Becker, W.M., Kleinsmith, L.J., Hardin, J. and Bertoni, G. P. 2009. The World of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco.

Suggested List of Laboratory Practical (Expandable):

1. Separation of nucleic acid bases by paper chromatography.
2. Microscopy and positive staining, negative staining.
3. Structure of cell organelles through electron micrographs.
4. Study of polyploidy in Onion root tip by colchicine treatment.
5. Study of mitosis and meiosis from permanent slides.
6. Identification and study of cancer cells-Slides


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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (70)	Internal (30)	Total (100) Min: 40 (D Grade)	End Sem (35)	Internal (15)	Total (50) Min: 20 (D Grade)
CBBT-304	Biochemistry	3	1	1						

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: 15	Lab Performance /Attendance / Quiz - Max. Marks: 15	

Pre-Requisite	Nil
Course Objective	The course is designed to give students basic concepts of biochemistry and its nature of interdisciplinary importance. To let students, understand the physical and chemical properties of molecules, and their status of occurrence in biological system.
Course Outcome	Student will be able to learn: <ol style="list-style-type: none"> 1. Nature of biochemistry. 2. Physical and chemical properties of molecules as a linkage of biochemistry. 3. Concept and properties of acid-base relationship. 4. Understand basic structure and functions of mono, di and polysaccharides, amino acids, Fatty acids, Purines and pyrimidines. 5. Understand basic structure and functions of macromolecules.

Unit	Contents (Theory)	Marks Weightage
I	Carbohydrates: Structure, Nomenclature, classification and properties of Monosaccharides, Disaccharides, and Polysaccharides (starch, glycogen, peptidoglycan, cellulose). Ringed and closed structures. Stereoisomerism-Optical isomerism. Chirality, Dextro and laevo rotatory, Carbohydrates and its derivatives.	14
II	Amino Acids and Proteins: Structure, nomenclature, classification and properties of amino acids, Structures and functions of proteins (Hb and Myoglobin). Acid base chemistry of amino acids. Primary, secondary, tertiary and quaternary structure of proteins. Holoenzyme apoenzyme and coenzyme and cofactors. Isomerism and types. Dihedral angles, Ramachandran plot. Hydropathy plot, Models of protein folding. Chaperone assisted protein folding; Amyloid disease, Dnak and DnaJ mechanism of action; Circular dichroism.	14
III	Lipids: Structure, nomenclatures, classification and properties of Fatty acids, triglycerides, oil and wax, Mono and polyunsaturated fatty acids. Glycerolipid, Sphingolipid and their derivatives, phospholipids, lipoproteins, Cholesterol, steroid and related molecules	14
IV	Nucleic Acids: Purines and pyrimidines, nucleosides, nucleotides, deoxy and ribose sugars, polynucleotides, DNA, types and function, RNA types and functions. Derivatives of purine and pyrimidines, Forces stabilizing nucleic acid structure. Stability of nucleic acid. Temperature curve and Nucleic acid, Tm. Ribosome and its types.	14
V	Vitamins, Nutrition and Minerals: Water and fat soluble vitamins, chemical composition, structure and function, Mechanism of synthesis, digestion, absorption, excretion and related disorders/deficiency. Mineral Metabolism and Abnormalities. Energy Metabolism and Nutrition. Detoxification and Biotransformation of Xenobiotics.	14

Text Book/References Books/ Websites

1. Andrew Pytel, FedrinandL.Singer; Strength of Material; Addison Wesley Longman Inc.
2. G.H.Ruder; Strength of Material; ELBS with Macmillan third edition.

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3. B.K.Sarkar, Strength of Material ; Tata McGraw hill New Delhi.
4. Dr. R. K.Bansal; A Text Book strength of Material; Laxmi Publication New Delhi.
5. S Ramamrutham, Strength of Material; Dhanpat Rai & Publication New Delhi.
6. R.S.Khurmi; Strength of Material;S.Chand Company Ltd. Delhi.

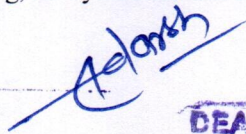
Suggested List of Laboratory Experiments (Expandable): -

1. Principles of Biochemistry- AlbertL. Lehninger CBS Publishers & Distributors
2. Biochemistry – Lubert stryer Freeman International Edition.
3. Biochemistry – Keshav Trehan Wiley Eastern Publications
4. Fundamentals of Biochemistry-J.L.Jain S.Chand and Company
5. Textbook of biochemistry for medical students 9th edition.
6. Stryer Biochemistry- JM Berg, JL Tymoczka 6th edition WH Freeman and Co., 2006.



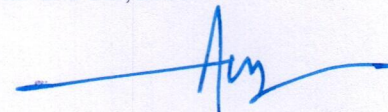
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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem(35)	Internal(15)	Total(50) Min:40(D Grade)	End Sem(35)	Internal(15)	Total(50) Min: 20 (D Grade)
CBBT-305	Microbiology	1	-	1						

Duration of Theory(Externals): 2Hours

Theory Internal-Max Marks: 15	Best of Two Mid Semester Test – Max Marks: 10	Assignment/Quiz/Attendance – Max.Marks:5
Practical Internal Max Marks: 15	Lab Performance/Quiz/Attendance – Max Marks: 15	

Pre-Requisite	Nil
Course Objective	The course introduces microbiology's origin and various scientists' contributions to the origin of microbiology. It will also give various salient features of microbes and the different methods of microbial culture techniques.
Course Outcome	Student will be able to learn: <ol style="list-style-type: none"> 1. Origin of microbiology 2. Scope of microbiology 3. Culturing techniques and factors controlling microbial growth 4. Measures to control growth of microorganisms 5. Concept of microbial diversity and features

Unit	Contents(Theory)	Marks Weightage
I	Definition, Scope and History of Microbiology. Cellular organization of prokaryotic and eukaryotic cells.	07
II	Cultivation and Maintenance of microorganisms	07
III	Identification microorganisms: morphological, biochemical and genetics	07
IV	Sterilization and disinfection: chemical, physical and radiation	07
V	General characteristics and nature of Bacteria, Mycoplasma, Rickettsiae, Chlamydiae, Actinomycetes, Protozoa, Fungi, Algae and Viruses.	07

Text Book/References Books/Websites:

1. Willey JM, Sherwood LM, and Woolverton CJ. (2008). Prescott, Harley and Klein's Microbiology. 7th edition. McGraw Hill Higher Education.
2. Stanier RY, Ingraham JL, Wheelis ML, and Painter PR. (2005). General Microbiology. 5th edition. McMillan.
3. Pelczar MJ, Chan ECS and Krieg NR. (1993). Microbiology. 5th edition. McGraw Hill Book Company.
4. Alexopoulos CJ, Mims CW, and Blackwell M. (1996). Introductory Mycology. 4th edition. John and Sons, Inc.
5. Kumar HD. (1990). Introductory Phycology. 2nd edition. Affiliated East Western Press

Suggested List of Laboratory Experiments (Expandable):

1. Familiarity with equipment to be used in Microbiology Laboratory.
2. Cleaning, washing and sterilization of glass wares.
3. Observation of permanent slides to study the structural characteristics of common bacteria, fungi.
4. Preparation of media & sterilization methods.
5. Isolation of bacteria from soil.
6. To study cultural and morphological characteristics of Bacteria and Fungi
7. Staining methods: simple staining, Gram staining, spore staining, and negative staining

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Subject Code		Credit			Theory			Practical		
CBBT -306	Material Sciences & Biomaterials - Lab	L	T	P	End Sem (Nil)	Internal (Nil)	Total	End Sem (Nil)	Internal (50)	Total (50)
		-	-	1			(Nil)			Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: 50	Lab Performance/ Quiz/Attendance - Max. Marks: 50	

Pre-Requisite	Nil
Course Objective	The aim of this course is to provide practical exposure of different types of biomaterials and proteins/cells/tissues, tissue material interactions.
Course Outcomes	Student will be able to learn: <ol style="list-style-type: none"> 1. Various types of materials and their properties. 2. Describe interactions between biomaterials, proteins, cells and tissue for short-term and long term implantations. 3. Material used to replace different organs and tissues of human body.

Unit	Contents (Theory)	Marks Weightage
I	Material Properties, Biomaterials Surfaces: Physics, Surface (vs. Bulk) Structure and Properties, Surface Energy Protein-Surface Interactions, Proteins: Structure, Properties, Functions Protein Adsorption: Langmuir Model, Adsorption, Segregation, and Reconstruction at Surfaces, Cell-Surface Interactions: Host Response to Biomaterials, Surface Characterization, Biosensors and Diagnostic Devices, Biomaterials for Organ Replacement, Organ Replacement Therapies, Mechanical Properties, Bone Substitutes, FDA Regulatory Issues and Course Evaluations.	50

Text Book/References Books/ Websites:

1. Ratner, Buddy D., et al. Biomaterials Science: An Introduction to Materials in Medicine. 2nd ed. Burlington, MA: Academic Press, 2004. ISBN: 9780125824637.

Suggested List of Laboratory Experiments: - (Expandable):

1. To Study of Mechanical and Chemical Properties of biomaterials.
2. To Study of Biomaterials Surfaces: Physics, Surface (vs. Bulk) Structure and Properties.
3. To study Protein-Surface Interactions, Proteins: Structure, Properties.
4. To study Functions Protein Adsorption: Langmuir Model.
5. To study Cell-Surface Interactions: Host Response to Biomaterials, Surface Characterization.
6. To study of various types Biosensors and Diagnostic Devices.
7. To study the working principle of Fiber Optic Biosensors.
8. To study Biomaterials for Organ Replacement.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (35)	Internal (15)	Total (50) Min: 20 (D Grade)	End Sem (35)	Internal (15)	Total (50) Min: 20 (D Grade)
CBTE-307	NCC-III	1	-	6						

Duration of Theory (Externals): 2 Hours

Theory Internal- Max Marks: 15	Best of Two Mid Semester Test – Max Marks: 10	Assignment/Quiz/Attendance - Max. Marks: 05
Practical Internal Max Marks: 15	Lab Performance/ Quiz/Attendance - Max. Marks: 15	

Pre-Requisite	Nil
Course Objective	<ol style="list-style-type: none"> Understand the life history and leadership qualities of great leaders, sportspersons & entrepreneurs. Understand the various aspects of types of mindset. Understand public speaking methods & qualities. Understand the organizations related to disaster management and their functioning. Understand the role of NCC cadets in disaster management. Understand the various types of adventure activities. Understand the History, Geography & Topography of Border/ Coastal Areas.
Course Outcomes	Student will be able to learn: <ol style="list-style-type: none"> Admire and get inspired from the accomplishments of leaders from various walks of life. Develop public speaking skills. Understand the importance of positive mindset and optimistic attitude in life. Appreciate the need & requirement for disaster management and his role in disaster management activities. Know the history & geographical peculiarity of our borders & coastal regions.

Unit	Contents (Theory)	Marks Weightage
I	Personality Development <ol style="list-style-type: none"> Group Discussions - Change your Mindset Public Speaking. 	07
II	Leadership Development: Case Studies - APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy.	07
III	Disaster Management <ol style="list-style-type: none"> Disaster Management Capsule. Organization. Types of Disasters. Essential Services. Assistance. Civil Defence Organization. 	07
IV	Adventure: Adventure activities.	07
V	Border & Coastal Areas: History, Geography & Topography of Border/ Coastal	07

Note: NCC-III 05 credits will be allotted after successfully completing camp.

Text Book/References Books/ Websites:

- Cadet's handbook, NCC Directorate, MP, CG.
- Supplementary cadet's handbook, NCC Directorate, MP, CG.

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Suggested List of Laboratory Practical (Expandable):**1. Drill**

- Arm Drill.
- Rifle ke saath Savdhan, Vishram aur Aram se.
- Rifle ke saath Parade Para aur Saj, Rifle ke saath Visarjan, Line Tod.
- Bhumi Shastra aur Uthao Shastra, Bagal Shastra aur Baju Shastra.

2. Weapon Training

- Short Range firing.

3. Map Reading

- Setting of Map.
- Findings North and Own Position.

4. Field Craft & Battle Craft

- Observation.
- Camouflage.
- Concealment.

5. Social Service and Community Development

Cadets will participate in various activities throughout the semester, e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days-National and State level.

6. Obstacle Training

- Obstacle training- Introduction, Safety-measures, Benefits.
- Obstacle Course- Straight balance, Clear Jump, Gate Vault, Zig- Zig Zag balance, High Wall

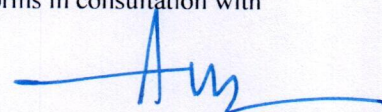
Note: Examination of this NCC course will be conducted as per NCC headquarters norms in consultation with the office of COE, PU.


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		L	T	P	End Sem (70)	Internal (30)	Total (100)	End Sem (35)	Internal (15)	Total (50)
CBTE-308	Introduction to Internet of Things	2	-	1			Min: 40 (D Grade)			Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: 15	Lab Performance /Attendance / Quiz - Max. Marks: 15	

Pre-Requisite	Nil
Course Objective	Internet of Things is a course that deals with the study of how devices are connected and how it helps to stay connected over the Internet. The course teaches the individuals on how the Internet of Things is helpful in our daily lives and how to stay connected over the Internet.
Course Outcomes	Student will be able to learn: <ol style="list-style-type: none"> 1. Fundamental of Internet of Things and its technology. 2. Recognize the factors that contributed to the emergence of IoT. 3. Design and program IoT devices. 4. Use real IoT protocols for communication. 5. Security elements of an IoT device.

Unit	Contents (Theory)	Marks Weightage
I	IoT - What is the IoT and why is it important? Elements of an IoT ecosystem, Technology drivers, Business drivers, Trends and implications, Overview of Governance, Privacy and Security Issues.	14
II	IoT Protocols - Protocol Standardization for IoT – Efforts – M2M , WSN Protocols SCADA and RFID Protocols ,Issues with IoT Standardization – Unified Data Standards Protocols – IEEE802.15.4,BACNet Protocol– Modbus ,KNX , Zigbee, Network layer , APS layer – Security	14
III	IoT Architecture - IoT Open source architecture (OIC) - OIC Architecture & Design Principles- IoT Devices and deployment models- IoTivity: An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction.	14
IV	Web of Things - Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence.	14
V	IoT Applications - IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc.	14

Text Book/References Books/ Websites:

1. Arshdeep Bahga;Vijay Madisetti; Internet of Things (A Hands-on Approach); University Press.
2. Raj Kamal; Internet of things- Architecture and Design Principles; McGraw Hill.
3. Cuno Pfister;Getting Started with the Internet of Things; O'Reilly Media.
- 4.Francis da Costa; Rethinking the Internet of Things: A Scalable Approach to Connecting Everything; A press Open.

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Programme: **Bachelor of Technology**

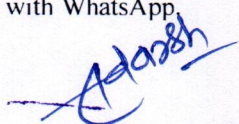
Semester –III

Suggested List of Laboratory Practical (Expandable):

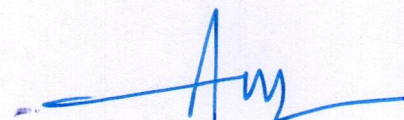
1. Starting Raspbian OS, Familiarizing with Raspberry Pi Components and interface, connecting to ethernet, Monitor, USB.
2. Displaying different LED patterns with Raspberry Pi.
3. Displaying Time over 4-Digit 7-Segment Display using Raspberry Pi.
4. Raspberry Pi Based Oscilloscope.
5. Setting up Wireless Access Point using Raspberry Pi.
6. Controlling Raspberry Pi with WhatsApp



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PEOPLE'S UNIVERSITY, BHOPAL***(Applicable for Admitted from Academic Session 2022-23 onwards)***Programme: **Bachelor of Technology****Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (Nil)	Internal (50)	Total (50) Min: 20 (D Grade)	End Sem (Nil)	Internal (Nil)	Total (Nil)
CBTE-309	Quantitative Aptitude & Logical Reasoning	1	-	-						

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: 50	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: 50
Practical Internal Max Marks: Nil	Lab Performance / Attendance/Quiz -Max. Marks: Nil	

Pre-Requisite	Nil
Course Objective	The logical reasoning and quantitative ability represent a systematic way to judge a candidate's mental capability as how he/she performs certain tasks and reacts to different situations.
Course Outcomes	Student will be able to learn: <ol style="list-style-type: none"> 1. Solve the problem of number system. 2. Discuss basic concept of algebra, geometry and complex number. 3. Elaborate the concept of probability, set theory and trigonometry. 4. Analyze actively to do logical reasoning such as binary logic, family tree, logical sequence, reflecting on their work. 5. Explore and apply key concepts in logical and quantitative thinking to business problems.

Unit	Contents (Theory)	Marks Weightage
I	Quantitative Aptitude I: LCM and HCF, Percentages, Profit and Loss, Interest (Simple and Compound), Speed, Time and Distance; Time and Work; Averages; Ratio and Proportion, Number System	10
II	Quantitative Aptitude II: Algebra, Geometry/Mensuration, Pure Math, Venn diagrams, Linear Equations, Quadratic Equations, Complex Numbers, Logarithm, Progressions	10
III	Quantitative Aptitude III: Permutation and Combination, Binomial Theorem, Surds and Indices, Inequalities, Probability Functions, Set Theory, Mixtures and Allegations, Co-ordinate Geometry, Trigonometry	10
IV	Logical Reasoning, I: Clocks, Calendars, Binary logic, Seating Arrangement, Blood Relations (Family Tree), Logical Sequence, Assumption, Premise, Conclusion	10
V	Logical Reasoning II: Linear and matrix arrangement, Team Formation, Direction Sense and Decision Making, Syllogism, Cubes, Rows, Quantitative Reasoning, Puzzles, Logical Reasoning based on Rankings, Critical Reasoning	10

Text Book/References Books/ Websites:

1. Dr. R.S. Aggarwal; Quantitative Aptitude for Competitive Examinations; S. Chand Publication.
2. Dr. R.S. Aggarwal; A Modern Approach To Logical Reasoning; S. Chand Publication.
3. Arun Sharma; How to Prepare for QUANTITATIVE APTITUDE for CAT; Mc Graw Hill.
4. Arun Sharma; How to Prepare for LOGICAL REASONING for CAT; Mc Graw Hill.
5. Sarvesh K Verma; Quantitative Aptitude Quantum CAT; Arihant Publication.
6. Jaikishan, Premkishan; How to Crack Test of Reasoning; Arihant Publication.

Suggested List of Laboratory Practical (Expandable): Nil

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PEOPLE'S UNIVERSITY, BHOPAL***(Applicable for Admitted from Academic Session 2022-23 onwards)***Programme: **Bachelor of Technology****Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (Nil)	Internal (Nil)	Total	End Sem (Nil)	Internal (50)	Total (50) Min: 20 (D Grade)
CBTE-310	NSS-II/NSO-II	-	-	1			Nil			

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: 50	Lab Performance/ Quiz/Attendance - Max. Marks: 50	

Pre-Requisite	Nil
Course Objective	<ol style="list-style-type: none"> 1. The purpose of this course is to understand the community in which they work. 2. To understand themselves in relation to their community. 3. Identify the needs and problems of the community and involve them in problem solving process.
Course Outcomes	Student will be able to learn: <ol style="list-style-type: none"> 1. The quality of educated manpower by fostering social responsibility. 2. Raising society to a higher material and moral level by preparing students for final dedication in the service of the nation. 3. Introduce urban students to rural life by living in contact with the community in whose midst their institution is located. 4. Making campus relevant to the needs of the community. 5. To work for community services.

Unit	Contents (Theory)	Marks Weightage
I	Introduction and Basic Concepts of NSS: History and Philosophy & Definition of NSS, Aims& Objectives of NSS, Emblem, flag, Motto, Song, Badge, NSS day etc, Organizational structure (from national to regional level), Roles and responsibilities of various NSS functionaries.	50
II	NSS Programmes and Activities: Concept of regular activities (one-day camp), special seven-day conduction camping, day and night camps and relevance of celebration of important days recognized by United Nations, Centre, State Govt. & University, Basis of adoption of village/slums, methodology of conduction survey, financial pattern of the scheme, Coordination with different agencies, Maintenance of the diary	
III	Community Mobilization and Adoption of village: Functioning of community stakeholders, Designing the message in the context of the problem and the culture of the community, Identifying methods of mobilization, Concept of Community development and village adoption. Volunteerism and Shramdan: Indian tradition of volunteerism, Value system of volunteerism, Motivation and constraints of volunteerism, Shramdan as a part of volunteerism, Role of NSS volunteers in Swatch Bharat Abhiyan, Role of NSS volunteers in Digital India	
IV	National Sports Organization (NSO): The following is the List of Sports and Games: Cricket/Volley Ball /Table Tennis / Foot Ball / Throw Ball (Only for Women) / Basket Ball / Athletics • 100 Meters Run • Long Jump • Shot Put Rules and Skills of the above Sports and Games should be taught to the students.	
V	Project Work/Practical: The Project should be related from the above topics.	

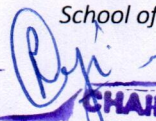
Text Book/References Books/ Websites:

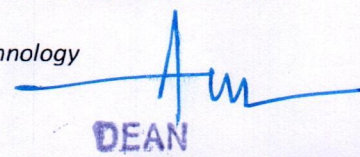
1. <https://nss.gov.in/>

Suggested List of Laboratory Practical (Expandable): Project Work/Practical: The Project should be related from the above topics.

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Semester –III

Subject Code	Subject Title	Credit			Theory			Practical		
CBTE-311	Music Vocal-II/ Music Instruments-II	L	T	P	End Sem (Nil)	Internal (Nil)	Total Nil	End Sem (Nil)	Internal (50)	Total (50)
		-	-	1						Min: 20 (D Grade)

Duration of Theory (Externals): -Nil

Theory Internal- Max Marks: -Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: 50	Lab Performance/ Quiz/Attendance - Max. Marks:50	

Pre-Requisite	Basic knowledge of rag tal and musical instruments.
Course Objective	Impart a basic knowledge of music sound, sangeet and folk songs (Vocal and Instruments)
Course Outcome	Student will be able to learn: <ol style="list-style-type: none"> 1. Basic knowledge of Sound. 2. Basic Knowledge of Rabindra & Karnatak Sangeet. 3. Knowledge of various Indian Folk Songs


Unit	Contents (Theory)	Marks Weightage
I	Elementary Study of medium Sound, musical sound and Noise. Study of Vibratory motion, frequency, pitch, magnitude and timber quality duration. Study of Interval, scale, Octave, major tone, minor tone and semi tone & value of each of the three tones. General Knowledge of Rabindra Sangeet. General Knowledge of various folk songs as kajri, Baul, Chaiti, Bhatialimand, Garba, lavni, Hori, etc.	50

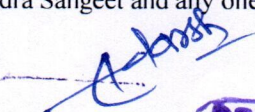
Text Book/References Books/ Websites:

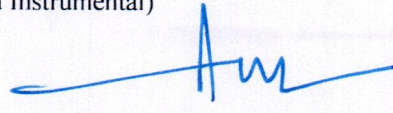
1. Pt. Harishchandra Srivastava ; 'Raga Parichay' (Part 1, 2, 3 & 4).
2. Dr. Geeta Banerjee 'Raga Shashtra' (Part 1 & 2)
3. Shanti Govardhan 'Sangeet Shashtra Darpan' (Part 1 & 2)
4. Vasant Sangeet Visharad

Suggested List of Laboratory Experiments: -(Expandable):

1. Practices on of Rabindra Sangeet and any one folk songs (Vocal and Instrumental)


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PEOPLE'S UNIVERSITY, BHOPAL***(Applicable for Admitted from Academic Session 2022-23 onwards)***Programme: **Bachelor of Technology**

Semester –III

Subject Code	Subject Title	Credit			Theory			Practical		
CBTE-312	Social Engineering	L	T	P	End Sem (Nil)	Internal (50)	Total (50)	End Sem (Nil)	Internal (Nil)	Total
		-	-	-			Min: 20 (D Grade)			(Nil)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: 50	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: 50
Practical Internal Max Marks: Nil	Lab Performance/Attendance /Quiz - Max. Marks: Nil	

Pre-Requisite	Nil
Course Objective	The program's framework was inspired by the realization that an integrated systems approach is the best way to address the set of competencies needed to address societal problems. Numerous opportunities in the business world, the social sector, and government will arise as a result of this integrated programme.
Course Outcomes	Student will be able to learn: <ol style="list-style-type: none"> 1. Function effectively in teams to accomplish a common goal. 2. An understanding of professional and ethical responsibility. 3. Ability to self-learn and engage in life-long learning. 4. Understanding of the impact of solutions in an economic, societal, and environmental context. 5. manipulation and human behaviour of students into performing actions or divulging confidential information.

Unit	Contents (Theory)	Marks Weightage
I	<p>Social engineering is one of the most prolific and effective means of gaining access to secure systems and obtaining sensitive information yet requires minimal technical knowledge. Social engineering works by manipulating normal human behavioral traits and as such there are only limited technical solutions to guard against it. As a result, the best defence is to educate users on the techniques used by social engineers and raise awareness as to how both humans and computer systems can be manipulated to create a false level of trust. This can be complemented by an organizational attitude towards security that promotes the sharing of concerns, enforces information security rules and supports users in adhering to them.</p> <p>Contents are as follows: Introduction of Social Engineering: Definition; Types; Psychology in Social Engineering; The Social Engineering Life Cycle; Human Behavior; Weapons of a Social Engineer; Defense against Social Engineering; Social Engineering Attacks; Examples of Social Engineering Attacks; guidelines to Stay Protected Against Social Engineering Attacks; Reverse Social Engineering.</p>	50

Text Book/References Books/ Websites:

1. Kevin Mitnick; The book of the Art of Deception.
2. www.socialengineer.com/wpcontent/uploads/2017/02/AdvancedPracticalSocialEngineering-Syllabus.pdf.
3. <https://www.exploit-db.com/docs/english/18135-social-engineering--the-human-factor.pdf>.
4. <https://www.jigsawacademy.com/blogs/cyber-security/what-is-social-engineering/>

Suggested List of Laboratory Practical (Expandable): Nil

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PEOPLE'S UNIVERSITY, BHOPAL***(Applicable for Admitted from Academic Session 2021-22 onwards)***

Programme: Bachelor of Technology

Semester –IV

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (70)	Internal (30)	Total (100) Min: 40 (D Grade)	End Sem (Nil)	Internal (Nil)	Total (Nil)
CBTE-401	Entrepreneurship and IPR	3	-	-						

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance – Max. Marks: 10
Practical Internal Max Marks: Nil	Lab Performance/Attendance /Quiz - Max. Marks: Nil	

Pre-Requisite	Nil
Course Objective	The course's major objectives are to educate students with various concepts that are essential to comprehend the processes involved in entrepreneurship, grow small and medium-sized businesses, and promote the entrepreneurial spirit of self-employment. To recognize the importance of IP and to educate the students on basic concepts of Intellectual Property Rights.
Course Outcomes	Students will be able to learn: 1. Create and exploit innovative business ideas and market opportunities. 2. Turn market opportunities into a business plan. 3. Demonstrate and present successful work, collaboration and division of tasks in a multidisciplinary and multicultural team. 4. Entrepreneurship and Innovation minors will be able to find problems worth solving. Students advance their skills in customer development, customer validation, competitive marketing and financial analyses, and iteration. 5. Enhanced capability to secure new intellectual properties through Patents and Copyrights.

Unit	Contents (Theory)	Marks Weightage
I	Entrepreneurship: Definition and Functions of an Entrepreneur, Qualities of a good entrepreneur; Role of Entrepreneur in Economic Development; Theories of entrepreneur, Socio, Economic, Cultural and Psychological; Entrepreneur Traits and Behavior, Roles in economic growth, employment, social stability, export promotion and indigenization, Creating A Venture, Opportunity Analysis Competitive and Technical Factors, Sources of Fund. Forms of Business Organizations/Ownership – Formation of a Company – procedures and formalities for setting up of New Industry-Sources of information to contact for what and where.	14
II	Management: Importance, Definition and functions; Dimensions of Organizations, Size/Specialization, Behavior Formalization, Authority Centralization, Departmentalization, Span and Line of Control, Technology and Minzberg Organization Typology, Line, Staff & Matrix Organization. Motivation Theories – Maslow, Mc Cullen – Motivation model – need, want, motive and Behavior-Attitude Towards work – Self Assessment and Goal Setting – Achievement, Motivation and Behavior Measurement, SWOT analysis and TA analysis – Stress and Conflict Management; with uncertainty; Creativity and Innovation.	14
III	Marketing: Importance, Definition, Core Concepts of need want and Demand, Project identification and formulation: Sources of Information – Opportunity Guidance – Choice of Technology and its evaluation; Consumer Behavior; Market Survey and research; Preliminary Project Report, Detailed Project Report, Assessing Viability and feasibility of a report. Exchange & Relationships, Product Value, Cost and satisfaction (goods and services) Marketing Environment; Selling, Marketing and Societal Marketing Concepts; Four P's, Product, Price,	14

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Semester –IV

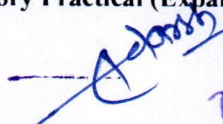
	Placement, Promotion. Finance: Nature and Scope, Forms of Business Ownerships, Balance Sheet, Profit and loss Account, Fund Flow and Cash Flow Statements, Breakeven Point (BEP) and Financial Ratio analysis, pay-back period, NPV and capital budgeting. Subsidies and concessions for SSI – role of State and Central Government Agencies in Promotion of Small-Scale Industry	
IV	Concept of Property: Theories of Property, Types of Intellectual Property- Origin and Development, Theories of Intellectual Property Rights, Need for Protecting Intellectual Property, Commercialization of Intellectual Property Rights by Licensing, Determining Financial Value of Intellectual Property Rights, Negotiating Payments Terms in Intellectual Property Transaction.	14
V	Introduction to Patent Law, (a) Paris Convention, (b) Patent Cooperation Treaty, (c) WTO-TRIPS, Indian Patent Law, The Patents Act, 1970, Patentable Subject Matter, Patentability Criteria, Procedure for Filing Patent Applications, Patent Granting Procedure, Revocation, Patent Infringement and Remedies, Relevant Provisions of the Biological Diversity Act, 2002, Access and Benefit Sharing Issues.	14

Text Book/References Books/ Websites:

1. Arvindrai N. Desai; Environment and Entrepreneur; Ashish Publishing House, New Delhi.
2. Dr. P. Saravanavel; Entrepreneurial Development; Learntech Press, Trichy.
3. P Narendra Singh.; Emerging Trends in Entrepreneurship Development Theories & Practices – Entrepreneurship.
4. Dr. S.R.Myneni; Law of Intellectual Property; 9th Ed, Asia law House, 2019.
5. Dr.G.B Reddy; Intellectual Property Rights and Law; Gogia Law Agency.

Suggested List of Laboratory Practical (Expandable): Nil


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PEOPLE'S UNIVERSITY, BHOPAL*(Applicable for Admitted from Academic Session 2021-22 onwards)*Programme: **Bachelor of Technology**

Semester –IV

Subject Code	Subject Title	Credit			Theory			Practical		
CBBT-402	Immunology and Immunotechnology	L	T	P	End Sem (70)	Internal (30)	Total (100)	End Sem (35)	Internal (15)	Total (50)
		3	-	1			Min: 40 (D Grade)			Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: 15	Lab Performance/ Quiz/Attendance - Max. Marks: 15	

Pre-Requisite	Nil
Course Objective	To facilitate the students to understand the basics of immunology and become familiar with immunization practices and their importance.
Course Outcomes	Students will be able to learn: <ol style="list-style-type: none"> 1. The history and scope of Immunology 2. Understand the types of Immunity and the cells and organs of immune responses and their functions. 3. Properties of different types of antigens and determinants of antigenicity 4. The humoral and cell mediated immune response and complement system 5. Vaccines and Immunodiagnostics

Unit	Contents (Theory)	Marks Weightage
I	Introduction: History and scope of immunology, Overview of the immune system – Immunity, types, factors, mechanisms and Immune response: Innate immunity and characteristics of adaptive immune responses, Hematopoiesis.	14
II	Anatomical organization of Immune System: Primary Lymphoid Organs, Secondary Lymphoid Organs, Cell of immune system: Mononuclear cells and granulocyte, Antigen presenting cells, lymphocytes and their subsets, Lymphocyte surface molecule.	14
III	Antigen: Properties, types and determinants of antigenicity, what makes a good antigen, foreignness. Heptane's: Factor affecting immunogenicity, Super antigen. Antibody: Nature, Types and Structure of Immunoglobulin and Their Functions. Antigen-Antibody interaction avidity and affinity. Development and differentiation of B and T lymphocytes – antigen recognition of B & T cells.	14
IV	Humoral and cell mediated immune response: Structure of MHC class I, II & III antigens and their mode of antigen presentation, MHC restriction; Dendritic cell and antigen processing, cytokines. Complement system: Components, Classical and alternate pathways of complement activation.	14
V	Vaccines and Immunodiagnostics: Adjuvants, DNA vaccines, recombinant vaccines, bacterial vaccines, viral vaccines, vaccines to other infectious agents, passive & active immunization. Introduction to immunodiagnostics – RIA, ELISA.	14

Text Book/References Books/ Websites:

1. Kuby Immunology, Richard A.Goldsby, Thomas J.Kindt, Barbara A Osborne, 2000, 4th Edi. W.H. Freeman & Co.
2. Immunology: An Introduction, Ian Tizard, 1995, Thomson Learning.
3. Hybridoma technology in the Biosciences and Medicine – Timothy Springer (1985) Plenum Press.

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Semester –IV

4. Essentials of Infectious Diseases by Lionel A. Mandell, Edward D. Ralph (1985) Black Well Science Inc.
Vaccines 86: New approaches to immunization : Developing vaccines against Parasitic, bacterial & viral diseases, Robert M. Chanock, Fred Brown, Richard A. Lerner, 1986, Cold Spring Lab. Press

Suggested List of Laboratory Practical (Expandable):

1. Immune cells –observation by staining and cell counting
2. Separation of immune cells from lymphoid organs of lab animals / blood.
3. Blood grouping –Determination of blood groups
4. Agglutination tests and immunological precipitation
5. Neutralization and complement fixation reaction
6. Demonstration of Radio immunoassay and ELISA.
7. Demonstration of Immuno-electrophoresis.

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Programme: Bachelor of Technology

Semester –IV

Subject Code	Subject Title	Credit			Theory			Practical		
CBBT-403	Bioenergetics & Metabolism	L	T	P	End Sem (70)	Internal (30)	Total (100)	End Sem (35)	Internal (15)	Total (50)
		3	1	1			Min: 40 (D Grade)			Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance Max. Marks: 10
Practical Internal Max Marks: 15	Lab Performance /Attendance / Quiz - Max. Marks: 15	

Pre-Requisite	Nil
Course Objectives	To develop the understanding of carbohydrate metabolism, significance of glycolysis and ETC, untreated diabetes, lipid metabolism and production of ketone bodies, protein metabolism, role of urea cycle and errors of protein metabolism, biosynthesis and degradation of purine and pyrimidine.
Course Outcome	Students will be able to learn: <ol style="list-style-type: none"> 1. The basics of carbohydrate metabolism, significance of glycolysis and ETC, untreated diabetes. 2. The basics of lipid metabolism and production of ketone bodies. 3. The basics of protein metabolism, the role of urea cycle and errors of protein metabolism. 4. The basics of biosynthesis and degradation of purine and pyrimidine. 5. The basics of integration of metabolism.

Unit	Contents (Theory)	Marks Weightage
I	Carbohydrate Metabolism: Transport of glucose into cell, glycolysis, feeder pathways, tricarboxylic acid cycle, gluconeogenesis and glycogen metabolism. Pentose phosphate pathway, uronic acid pathway, metabolism of other sugars, sorbitol pathway and regulation of blood glucose level. Electron transport chain, oxidative phosphorylation, mitochondrial membrane transporters, enzymes participating in biological oxidation and mitochondrial myopathies.	14
II	Amino Acid Metabolism: Nitrogen metabolism, catabolism of amino group nitrogen, catabolism of carbon skeleton of amino acids, biosynthesis of amino acids, Amino acids as precursors of specialized products	14
III	Lipid Metabolism: β -oxidation, other oxidative pathways, ketone body production and metabolism, de novo synthesis of fatty acids, chain elongation and desaturase systems, metabolism of triacylglycerol, adipose tissue metabolism, metabolism of complex lipids. Lipoproteins, metabolism of cholesterol atherosclerosis, prostaglandins.	14
IV	Nucleotide Metabolism: nucleotide: chemistry and biological significance, purine metabolism, pyrimidine metabolism.	14
V	Integration of Metabolism: Hormonal regulation of major metabolic pathways, metabolic interconnections and organ specialization, metabolic adaptation in three fasting starvation stages, diabetes mellitus, metabolism of xenobiotics, alcohol metabolism.	14

Text Book/References Books/ Websites:

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PEOPLE'S UNIVERSITY, BHOPAL***(Applicable for Admitted from Academic Session 2021-22 onwards)*****Programme: Bachelor of Technology****Semester –IV**

1. Lehninger Principles of Biochemistry, 4th Edition by David L. Nelson David L. Nelson Michael M. Cox
Publisher: W. H. Freeman; Fourth Edition
2. Biochemistry – Lubert stryer Freeman International Edition.
3. Biochemistry – Keshav Trehan Wiley Eastern Publications
4. Fundamentals of Biochemistry-J.L.JainS.Chand and Company
5. Fundamental of Biochemistry – Dr.A.C.Deb
6. The Biochemistry of Nucleic acid – Tenth Edition-Roger L.P.Adams, John T. Knowler and David P.Leader, Chapman and Hall Publications
7. Standard Methods of Biochemical Analysis, S. K. Thimmaiah (Ed), Kalyani Publishers, Ludhiana.

Suggested List of Laboratory Practical (Expandable):

1. To study activity of any enzyme under optimum conditions.
2. To study the effect of pH, temperature on the activity of salivary amylase enzyme.
3. Determination of - pH optima, temperature optima, Km value, Vmax value, Effect of inhibitor (Inorganic phosphate) on the enzyme activity.
4. Estimation of blood glucose by glucose oxidase method.
5. Principles of Colorimetry: (i) Verification of Beer's law, estimation of protein. (ii) To study relation between absorbance and % transmission.
6. Preparation of buffers.
7. Separation of Amino acids by paper chromatography.
8. Qualitative tests for Carbohydrates, lipids and proteins


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Programme: Bachelor of Technology

Semester –IV

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (70)	Internal (30)	Total (100) Min: 40 (D Grade)	End Sem (35)	Internal (15)	Total (50) Min: 20 (D Grade)
CBBT-404	Enzymology and Enzyme Technology	3	1	1						

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance - Max. Marks: 10
Practical Internal Max Marks: 15	Lab Performance/ Quiz/Attendance - Max. Marks: 15	

Pre-Requisite	Biology
Course Objective	The purpose of the design of the course is to understand the biological catalyst that operates and catalyzes the molecular and chemical reactions in the body. The reactions help to carry out daily energy-yielding, inflammation and wound-healing processes in the body.
Course Outcomes	Students will be able to learn: <ol style="list-style-type: none"> 1. Enzyme classification 2. The details of catalysis by the enzymes. 3. The subtle and vital role of these enzymes in normal and disease condition. 4. Mechanism of enzyme action 5. Regulation of enzyme activity

Unit	Contents (Theory)	Marks Weightage
I	Introduction : IUBMB enzyme classification (specific examples), enzyme specificity, methods for isolation, purification and characterization of enzymes, tests for homogeneity of enzyme preparation.	14
II	Kinetics of enzyme action: Concept of ES complex, active site, specificity, derivation of Michaelis-Menten equation for uni- substrate reactions. Different plots for the determination of K_m & V_{max} and their physiological significances. Importance of K_{cat}/K_m . Kinetics of zero & first order reactions. Significance and evaluation of energy of activation. Michaelis – pH functions and their significance	14
III	Enzyme Inhibition: Competitive, non-competitive & uncompetitive inhibitions; Lineveaver-Burk V_{max} and K_m and K_{cat} values. Reversible and irreversible inhibition. Competitive, non-competitive, uncompetitive, linear-mixed type inhibitions. Suicide inhibitor.	14
IV	Mechanism of Enzyme Action: Acid-base catalysis, covalent catalysis, proximity, orientation effect. Strain and distortion theory. Mechanism of action of chymotrypsin, lysozyme, glyceraldehyde 3-phosphate dehydrogenase. Role of co-factors and co-enzymes.	14
V	Enzyme Regulation: General mechanisms of enzyme regulation, product inhibition. Reversible (glutamine synthase & phosphorylase) and irreversible (proteases) covalent modification of enzymes Feedback inhibition and feed forward stimulation. Allosteric enzymes, qualitative description of “concerted” & “sequential” models for allosteric enzymes, Hill and Scatchard plots.	14

Text Book/References Books/ Websites:

1. Biochemistry, Lubert Stryer, 6th Edition, WH Freeman, 2006.
2. Harper's illustrated Biochemistry by Robert K. Murray, David A Bender, Kathleen
3. M.Botham, Peter J. Kennelly, Victor W. Rodwell, P. Anthony Weil. 28th Edition, McGrawHill, 2009.
4. Biochemistry, Donald Voet and Judith Voet, 2nd Edition, Publisher: John Wiley and Sons, 1995.
5. Structure and Mechansim in protein Science. A guide enzyme catalysis and protein folding Allan Fersht.
6. Biochemistry by Mary K.Campbell& Shawn O.Farrell, 5th Edition, Cenage Learning, 2005.

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Semester –IV

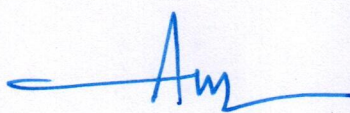
7. Fundamentals of Enzymology Nicholas Price and Lewis Stevens Oxford University Press 1999
8. Fundamentals of Enzyme Kinetics Athel Cornish-Bowden Portland Press 2004
9. Practical Enzymology Hans Bisswanger Wiley-VCH 2004

Suggested List of Laboratory Practical (Expandable):

1. To study activity of any enzyme under optimum conditions.
2. To study the effect of pH, temperature on the activity of salivary amylase enzyme.
3. Determination of - pH optima, temperature optima, K_m value, V_{max} value, Effect of inhibitor (Inorganic phosphate) on the enzyme activity.
4. Estimation of blood glucose by glucose oxidase method.
5. Principles of Colorimetry: (i) Verification of Beer's law, estimation of protein. (ii) To study relation between absorbance and % transmission.
6. Preparation of buffers.
7. Separation of Amino acids by paper chromatography.
8. Qualitative tests for Carbohydrates, lipids and proteins


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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (35)	Internal (15)	Total (50) Min: 20 (D Grade)	End Sem (35)	Internal (15)	Total (50) Min: 20 (D Grade)
CBBT-405	Pharmaceutics	2	-	1						

Duration of Theory (Externals): 2 Hours

Theory Internal- Max Marks: 15	Best of Two Mid Semester Test – Max Marks: 10	Assignment/Quiz/Attendance- Max. Marks: 5
Practical Internal Max Marks: 15	Lab Performance/Attendance /Quiz - Max. Marks: 15	

Pre-Requisite	Basic Chemistry
Course Objective	To develop an understanding of the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations, to understand the professional way of handling the prescription, preparation of various conventional dosage forms
Course Outcome	Students will be able to learn: <ol style="list-style-type: none"> 1. Know the history of the profession of pharmacy 2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations 3. Understand the professional way of handling the prescription. 4. Suppositories and pharmaceutical incompatibilities. 5. Preparation of various conventional dosage forms

Unit	Contents (Theory)	Marks Weightage
I	Historical background and development of the profession of pharmacy: History of the profession of Pharmacy in India about pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia. Dosage forms: Introduction to dosage forms, classification and definitions. Prescription: Definition, Parts of prescription, handling of Prescription and Errors in prescription. Posology: Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.	07
II	Pharmaceutical calculations: Weights and measures: Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight. Powders: Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions. Liquid dosage forms: Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques	07
III	Monophasic liquids: Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions. Biphasic liquids: Suspensions: Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to	07

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	overcome. Emulsions: Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.	
IV	Suppositories: Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories. Pharmaceutical incompatibilities: Definition, classification, physical, chemical and therapeutic incompatibilities with examples.	07
V	Semisolid dosage forms: Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms.	07

Text Book/References Books/ Websites:

1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Wilkins, New Delhi.
 2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
 3. M.E. Aulton, Pharmaceuticals, The Science & Dosage Form Design, Churchill Livingstone, Edinburgh.
 4. Indian pharmacopoeia.
 5. British pharmacopoeia.
 6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea & Febiger Publisher, The University of Michigan.
 7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
 8. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
 9. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
 10. Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
 11. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
- Francoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.

Suggested List of Laboratory Practical (Expandable):

1. Syrups
2. a) Syrup IP'66
3. b) Compound syrup of Ferrous Phosphate BPC'68
4. Elixirs
 - a) Piperazine citrate elixir
 - b) Paracetamol pediatric elixir
5. Linctus
 - a) Terpin Hydrate Linctus IP'66
 - b) Iodine Throat Paint (Mandles Paint)
6. Solutions
 - a) Strong solution of ammonium acetate
 - b) Cresol with soap solution
 - c) Lugol's solution
7. Suspensions
 - a) Calamine lotion
 - b) Magnesium Hydroxide mixture
 - c) Aluminium Hydroxide gel
8. Emulsions
 - a) Turpentine Liniment
 - b) Liquid paraffin emulsion
9. Powders and Granules
 - a) ORS powder (WHO)

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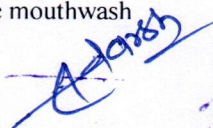
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- b) Effervescent granules
- c) Dusting powder
- d) Divded powders
- 10. Suppositories
 - a) Glycero gelatin suppository
 - b) Coca butter suppository
 - c) Zinc Oxide suppository
- 11. Semisolids
 - a) Sulphur ointment
 - b) Non staining-iodine ointment with methyl salicylate
 - c) Carbopal gel
- 12. Gargles and Mouthwashes
 - a) Iodine gargle
 - b) Chlorhexidine mouthwash


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Semester –IV

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (Nil)	Internal (Nil)	Total	End Sem (Nil)	Internal (50)	Total (50) Min: 20 (D Grade)
CBBT-406	Bioinstrumentation	-	-	1			Nil			

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: 50	Lab Performance/ Quiz/Attendance - Max. Marks: 50	

Pre-Requisite	Nil
Course Objective	To familiarize the methods and techniques used in biotechnology and their contribution in the various experiments of biotechnology.
Course Outcomes	After the completion of the course the students will be able 1. To understand the fundamentals of bioinstrumentation and will have knowledge of the general instrumental techniques used in biotechnology.

Unit	Contents (Theory)	Marks Weightage
I	In this lab, students will get an opportunity to learn about types of equipment required for biotechnology experiments, along with hands-on working experience	50

Text Book/References Books/ Websites:

1. Wilson, K. and Walker, J. 1994. Principles and Techniques Practical Biochemistry, Cambridge University Press, Cambridge.
2. Willard, H.H., Meritt, L.L., Dean, J.A. and Settle, F.A. 1986. Instrumental method of analysis (7th eds.). Wadsworth Pub. Co., USA.
3. Rana, S.V.S. 2006 and 07. Biotechniques– Theory and Practice (2nd eds.). Rastogi Publications.
4. Chatwal, G.R. and Anand, S.K. 2008. Instrumental methods of chemical analysis (5th eds.). Himalaya Publishing House.
5. Skoog, D.A., Holler, F.J. and Crouch, S.R. 2007. Instrumental analysis. Brooks/Cole Cengage Learning.
6. Upadhyay, A. and Upadhyay, K. 2008. Biophysical chemistry (4th eds.). Himalaya Publishing House.

Suggested List of Laboratory Practical (Expandable):

1. Familiarization with basic laboratory instruments in biotechnology laboratory.
2. Preparation Phosphate buffers and determination of pH.
3. Spectrophotometer – Familiarization of the working of the instrument
4. Electrophoresis –
 - a. PAGE
 - b. Agarose Gel Electrophoresis
 - c. Native gel electrophoresis
5. Separation of amino acids by paper chromatography.
6. To identify lipids in a given sample by TLC

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Subject Code	Subject Title	Credit			Theory			Practical		
CBTE -407	NCC-IV	L	T	P	End Sem (35)	Internal (15)	Total (50)	End Sem (35)	Internal (15)	Total (50)
		2	-	1			Min: 20 (D Grade)			Min: 20 (D Grade)

Duration of Theory (Externals): 2 Hours

Theory Internal- Max Marks: 15	Best of Two Mid Semester Test – Max Marks: 10	Assignment/Quiz/Attendance - Max. Marks: 05
Practical Internal Max Marks: 15	Lab Performance/ Quiz/Attendance - Max. Marks: 15	

Pre-Requisite	Nil
Course Objective	<ol style="list-style-type: none"> 1. Develop a sense of time management and social skills. 2. Understand the life history & leadership qualities of personalities who have contributed in Nation Building and Literature. 3. Understand the role of NCC cadets as 2nd line Defence in 1965 War. 4. Develop awareness about various types of Natural and manmade disasters. 5. Know about life saving tips during disasters. 6. Acquainted about Fire Services. 7. Understand importance of Environmental Awareness & conservation. 8. Understand importance of General Awareness. 9. Know about Armed Forces.
Course Outcomes	Student will be able to learn: <ol style="list-style-type: none"> 1. Effectively manage time. 2. Develop the qualities of social skills. 3. Imbibe leadership qualities. 4. Do group discussion effectively. 5. Be motivated to serve the nation by joining Armed forces. 6. Contribute in environmental awareness and conservation activities. 7. Keep abreast of current affairs & general awareness. 8. Effectively contribute in managing disaster relief tasks.

Unit	Contents (Theory)	Marks Weightage
I	Personality Development: Group Discussions–Social Skills & Time management	07
II	Leadership Development: Case Studies–Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war.	07
III	Disaster Management: (i) Initiative Trg, Organising Skills. (ii) Do's and Don'ts. (iii) Natural Disasters. (iv) Man Made Disasters. (v) Fire Services and Fire Fighting.	07
IV	Environmental Awareness: Adventure Environmental Awareness and Conservation. General Awareness: General Awareness.	07
V	Armed Forces: Army, Navy, Air Force and Central Armed Police Forces.	07

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Text Book/References Books/ Websites:

1. Cadet's handbook, NCC Directorate, MP, CG.
2. Supplementary cadet's handbook, NCC Directorate, MP, CG.

Suggested List of Laboratory Practical (Expandable):**1. Drill**

- Arm Drill.
- Salami Shastra.
- Squad Drill with Arms

2. Weapon Training: Short Range firing**3. Map Reading**

- Map to Ground.
- Ground to Map.

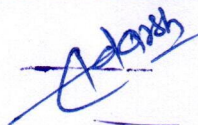
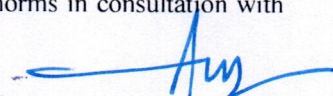
4. Field Craft & Battle Craft

- Fire and Move Capsule.
- Field signal-with hand, with Weapons, Signal with Whistle.
- Field signals as means of giving orders.
- Field signals by day, Field signals by night.
- Section Formation.

5. Social Service and Community Development: Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level**6. Health & Hygiene**

- Hygiene & Sanitation (Hygiene-Personal & Camp Hygiene).
- First Aid in common medical emergencies.
- Treatment & Care of Wounds

Note: Examination of this NCC course will be conducted as per NCC head quarter norms in consultation with office of COE, PU.


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Subject Code	Subject Title	Credit			Theory			Practical		
CBTE-408	Research Methodology	L	T	P	End Sem (Nil)	Internal (50)	Total (50)	End Sem (Nil)	Internal (Nil)	Total
		1	-	-			Min: 20 (D Grade)			(Nil)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: 50	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: 50
Practical Internal Max Marks: Nil	Lab Performance/Attendance /Quiz - Max. Marks: Nil	

Pre-Requisite	Nil
Course Objective	To get to know about research and its analysis.
Course Outcomes	Students will be able to learn: <ol style="list-style-type: none"> 1. To understand the objective and types of research. 2. To understand basic concepts of research formulations. 3. About various design methods. 4. To know about how data is collected for analyzing process & thesis writing. 5. To understand report and thesis writing.

Unit	Contents (Theory)	Marks Weightage
I	Objectives and Types of Research: Motivation and objectives – Research methods vs. Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical.	10
II	Research Formulation: Defining and formulating the research problem - Selecting the problem - Necessity of defining the problem - Importance of literature review in defining a problem.	10
III	Research Design and Methods: Research design – Basic Principles- Need of research design, Features of good design – Important concepts relating to research design – Observation and Facts. Developing a research plan - Exploration, Description, Diagnosis, and Experimentation.	10
IV	Data Collection and Analysis: Execution of the research - Observation and Collection of data - Methods of data collection – Sampling Methods- Data Processing and Analysis strategies - Data Analysis with Statistical Packages - Hypothesis-testing, Generalization and Interpretation.	10
V	Reporting and Thesis Writing: Structure and components of scientific reports - Types of report – Technical reports and thesis – Significance – Different steps in the preparation – Layout, structure and Language of typical reports – Illustrations and tables - Bibliography, referencing and footnotes.	10

Text Book/References Books/ Websites:

1. B. L. Garg., Karadia, R. Agarwal ; An introduction to Research Methodology; RBSA Publishers.
2. C. R. Kothari; Research Methodology: Methods and Techniques; New Age International.
3. S. C. Sinha and Dhiman; Research Methodology; Ess Publications.

Suggested List of Laboratory Practical (Expandable): Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
CBTE-409	Environmental Science	L	T	P	End Sem (Nil)	Internal (100)	Total (100)	End Sem (Nil)	Internal (Nil)	Total (Nil)
		1	-	-			Min: 40 (D Grade)			

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: 100	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: 100
Practical Internal Max Marks: Nil	Lab Performance / Quiz/Attendance -Max. Marks: Nil	

Pre-Requisite	Nil
Course Objective	Imparting basic knowledge about the environment and its allied problems and developing an attitude of concern for the environment.
Course Outcomes	Student will be able to learn: <ol style="list-style-type: none"> 1. Conceptual knowledge of energy resources with its applications. 2. To understand the ecosystems and value of these ecosystems to humans and to animals and plants. 3. Developing awareness of biodiversity and its conservation. 4. Categorize different types of pollutions and their control measures. Discover effective methods of waste Management. Analyze global environmental problems and come out with best possible solutions. 5. Understand environmental laws and sustainable development.

Unit	Contents (Theory)	Marks Weightage
I	Energy Resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. The multidisciplinary nature of environmental studies Definition, scope and importance, Need for public awareness.	20
II	Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries).	20
III	Biodiversity and its Conservation: Introduction – Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values. Biodiversity at global, national and local level. India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. In-situ and Ex-situ conservation of biodiversity.	20
IV	Environmental Pollution: Definition, Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear pollution. Solid waste management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Disaster management: floods, earthquake, cyclone and landslides.	20
V	Environmental Policy, Legislation, Rules and Regulations : National Environmental Policy Environmental Protection act, Legal aspects Air (Prevention and Control of pollution) Act1981, Water (Prevention and Control of pollution) Act-1974, Water pollution Act-1977,	20

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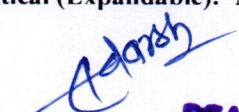
	Forest Conservation Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules .	
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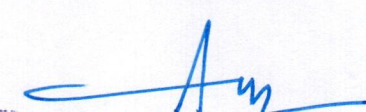
Text Book/References Books/ Websites

1. Dr. S. S. Dara and Dr. D. D. Mishra; A textbook of Environmental Chemistry and Pollution Control, S. Chand & Company Ltd.
2. Dr. Suresh K. Dhameja; Environmental studies; S K Kataria and Sons.
3. A. Ristinen and Jack J. Kraushaar; Energy and the Environment, 2nd Edition: Robert; Shree Sai Publication
4. Anindita Basak ; Environmental Studies; Pearson Publications.
5. Gilbert M. Masters; Introduction to Environmental Engineering and Science; Prentice-Hall Publications.

Suggested List of Laboratory Practical (Expandable): Nil


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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	End Sem (Nil)	Internal (Nil)	Total (Nil)	End Sem (Nil)	Internal (50)	Total (50) Min: 20 (D Grade)
CBTE-410	Massive Open Online Courses (MOOCs)-I	-	-	1						

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: Nil
Practical Internal Max Marks: 50	Lab Performance/Attendance /Quiz - Max. Marks: 50	

Pre-Requisite	Nil
Course Objective	MOOCs build on the engagement of learners who self-organize their participation according to learning goals, prior knowledge and skills, and common interests. Objective of this course is to improve the technical skills of students and its gives an opportunity to explore themselves beyond class room teaching.
Course Outcomes	Student will be able to learn: New interesting courses of their own curiosity and improve their knowledge and skills. MOOCs give an opportunity to connect openly on a global scale, with global learners. The ability to experiment with pedagogical methods on a vast scale.

Unit	Contents (Theory)	Marks Weightage
I	<p>Massive Open Online Courses (MOOCs) are online courses that allow participants free access and unrestricted participation in any course of their choice. Besides the conventional modes of teaching such as lectures, videos and reading material, MOOCs also provide a platform for interactive forums.</p> <p>After the III semester End Sem Examination, all students are instructed to register themselves in a minimum IV (Four weeks) MOOC/NPTEL/SWAYAM Certification course in their Engineering discipline.</p> <p>Students must appear in the certification examination conducted by NPTEL/ SWAYAM and submit his/her assignment/assessment sheets to their respective assigned faculty of the department before the end of the semester. A student should give an effective PowerPoint presentation of a chosen course in the class seminars and receive feedback from each other. This effort will help them to communicate their ideas more clearly.</p> <p>The final evaluation of this course will base on a PowerPoint Presentation and Certification during the academic session by the assigned faculty.</p>	50

Text Book/References Books/ Websites:

1. <https://swayam.gov.in/>
2. <http://nptel.ac.in>
3. <https://onlinecourses-archive.nptel.ac.in>

Suggested List of Laboratory Practical (Expandable): Nil


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PEOPLE'S UNIVERSITY, BHOPAL*(Applicable for Admitted from Academic Session 2021-22 onwards)*

Programme: Bachelor of Technology

Semester –IV

Subject Code	Subject Title	Credit			Theory			Practical		
CBTE-411	Sociology	L	T	P	End Sem (Nil)	Internal (50)	Total (50)	End Sem (Nil)	Internal (Nil)	Total (Nil)
		1	-	-			Min: 20 (D Grade)			

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: 50	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance - Max. Marks: 50
Practical Internal Max Marks: Nil	Lab Performance/Attendance /Quiz - Max. Marks: Nil	

Pre-Requisite	Nil
Course Objective	The objective of this course is to provide students a basic understanding of sociological concepts.
Course Outcomes	Student will be able to learn: <ol style="list-style-type: none"> 1. The meaning of Sociology and its importance. 2. The basic concepts involved in sociology. 3. About the social changes 4. About the Basic Social structure. 5. Understand the social law and its control.

Unit	Contents (Theory)	Marks Weightage
I	Introduction: Sociology: definitions, aim and objective; Relation with other social sciences – law and history; Important theoretical approaches: evolutionism, functionalism, conflict theory, interactionist theory; Law as a tool of social engineering: Durkheim, Weber, Pound and Bentham.	10
II	Basic Concepts: Social Groups: Cooley and Sumner; Community; Association; Tribes; Social Groups; Status and Role.	10
III	Social Change: Social Reform Movements in India – Raja Ram Mohan Roy, Jyotiba Phule, Naicker, etc.; Modernization and Post Modernization; Liberalization and Globalization; Fordism and McDonaldization.	10
IV	Social Structure: Culture: Culture Relativism, Racism, Ethnicity and Ethnocentrism; Socialization; Status and Role.	10
V	Social Control: Custom as an Agency of Control; Law as an Agency of Control; Media as an Agency of Control; Public Opinion as an Agency of Control.	10

Text Book/References Books/ Websites:

1. Vidya Bhushan and D.R. Sachdeva; An Introduction to Sociology; KitabMahal Publisher; New Delhi
2. Desai, N. and M. Krishnaraj Women and Society in India; AjantaPublications; 1987.
3. Myneni Sociology; Allahabad Law Agency, Faridabad; 2004Goode, W.J.and P.K. Hatt Methods in Social Research; McGraw- Hills; NewYork; 1952.
4. Giddens; A. Sociology; Polity Press, UK; 1993.

Suggested List of Laboratory Practical (Expandable): Nil

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Programme: Bachelor of Technology

Semester –IV

Subject Code	Subject Title	Credit			Theory			Practical		
CBTE-412	Fine Arts-II	L	T	P	End Sem (Nil)	Internal (Nil)	Total	End Sem (Nil)	Internal (50)	Total (50)
		-	-	1			Nil			Min: 20 (D Grade)

Duration of Theory (Externals): -Nil

Theory Internal- Max Marks: -Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: 50	Lab Performance/Attendance / Quiz - Max. Marks:50	

Pre-Requisite	Basic knowledge of art and drawing.
Course Objective	To teach the core competencies of critical and conceptual thinking through the continual observation and analysis of the visual and social world also provide a strong philosophical and historical foundation of the visual arts and its impact
Course Outcome	Student will be able to learn: <ol style="list-style-type: none"> 1. Increase ability to communicate with people. 2. Learn to sketch and take field dimensions. 3. Skillfully create artistic form using techniques and methods appropriate to the intended result. 4. Learn to take data and transform it into graphic drawings.


Unit	Contents (Theory)	Marks Weightage
I	History of Indian Painting II :Cave Paintings of India- Ajanta, Bagh, Jain, Pal (Apabhransh), Mughal Painting- Akbar and Jahangir Rajasthani painting- Mewar, Kishangarh, Jaipur	50

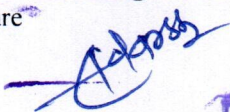
Text Book/References Books/ Websites:

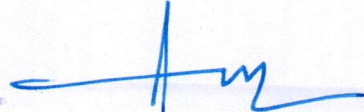
1. Lokesh Chandra Sharma; A Brief History of Indian Painting.
2. R.A. Agrawal; Roop Prad Kala KemooolAdhar.

Suggested List of Laboratory Experiments :- (Expandable):

1. Composition :- Human Figure with Background Poster Colour
2. Copy work :- Indian Miniature


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