FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF CHEMISTRY
COURSE CURRICULUM

PART-A: Introduction				
Program: Bachelor in Science *(Diploma/Degree/Honors)*			**Semester - IV**	Session: **2024-2025**
1	**Course Code**	**CHSC-04T**		
2	**Course Title**	**ORGANIC AND PHYSICAL CHEMISTRY-I**		
3	**Course Type**	**DSC**		
4	**Pre-requisite**(if,any)	-		
5	**Course Learning. Outcomes(CLO)**	➢ ***Master the synthesis, properties, and reactivity of various functional groups and apply this knowledge to understand their significance in organic chemistry.*** ➢ ***Employ the principles of chemical/ionic equilibria, their influencing factors and applications*** ➢ ***Interpret phase diagrams for one and two-component systems, determine degrees of freedom, and identify the triple point.*** ➢ ***Master the principles and applications of liquid-liquid mixtures using Raoult's law, Henry's law, and Nernst distribution law.***		
6	**Credit Value**	**3 Credits**	***Credit = 15 Hours -learning & Observation***	
7	**Total Marks**	**Max.Marks: 100**		**Min Passing Marks:40**

PART -B: Content of the Course

Total No.of Teaching–learning Periods(01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics(Course contents)	No.of Period
I	**A. Halides (5 hrs)** **(i) Alkyl Halides**: Preparation: from alkenes and alcohols. Reactions: Nucleophilic substitution reactions of alkyl halides (alcohol, ester, nitrile & isonitrile formation, Williamson's ether synthesis), mechanism and stereochemistry of nucleophilic substitution reactions (SN1 and SN2), factors affecting SN1 and SN2 reactions. **(ii) Aryl Halides:** Chlorobenzene: Preparation by aromatic halogenation and Sandmeyer reaction. Aromatic nucleophilic substitution involving Benzyne Mechanism: KNH_2/NH_3 (or $NaNH_2/NH_3$). Reactivity and Relative strength of C-Halogen bond in alkyl and aryl/ Vinyl halides. **B. Alcohols & Phenols (7hrs)** **(i)Alcohols** **(a)Monohydric**-nomenclature, methods of formation, Properties & chemical reactions distinction between primary, secondary & tertiary alcohols. **(b)Dihydric alcohols:** Nomenclature, methods of formation of ethylene glycol (from ethylene, epoxide, ethylene dibromide and ethylene diamine). Chemical reactions of vicinal glycols: with carbonyl compounds, dehydration, oxidative cleavage with Pb(OAc)4 and HIO4 and Pinacol–Pinacolone rearrangement (with mechanism). **(c) Trihydric alcohols:** Nomenclature and methods of formation (from hydrolysis of fats and oils, propene and acrolein), chemical reactions of glycerol (with PCl5, HI, oxidation, and dehydration) and uses/applications. **(ii)Phenols** Nomenclature and methods of formation, physical properties, and acidic character. Resonance stabilization of phenoxide ion. Comparative acidic strength of alcohols and phenols. Electrophilic aromatic substitution, acetylation, and carboxylation. Mechanism of Fries rearrangement, Claisen rearrangement, and Reimer-Tiemann reaction.	12

II	**Aldehydes/Ketones and acid/its derivatives** **A. Aldehydes and Ketones (6 hrs)** Nomenclature and structure of the carbonyl group, synthesis of aldehydes and ketones. Acidity of alpha hydrogens and formation of enolate, Concept of reactive methylene group, Keto-enol tautomerism in Acetoacetic ester. Oxidation of aldehydes by $KMnO_4$, and Tollen's reagent, Reduction of aldehydes by $LiAlH_4$ and $NaBH_4$. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on aldol, Perkin, and Knoevenagel reactions. Wittig and Mannich reaction (without mechanism), Baeyer-Villiger oxidation of Ketones (without mechanism), Cannizaro reaction (with mechanism), MPV, Clemmensen, and Wolf-Kishner reaction. **B. Acid & its derivatives (5 hrs)** **(i) Carboxylic Acids** Nomenclature, structure, physical properties, acidity of carboxylic acids, effect of substituent on acid strength, method of preparation and chemical reaction. Hell-Volhard –Zeilinsky (HVZ) reaction, Reduction of carboxylic acids, Mechanism of decarboxylation. Di carboxylic acids: - Methods of formation and chemical reactions, effect of heat and Dehydrating agents. **(ii) Carboxylic Acid Derivatives** Structure, method of preparation & physical properties of acid chlorides, esters, amides (Urea) and acid anhydrides. Relative stability of acyl derivatives.	**11**
III	**Equilibrium** **A. Chemical equilibria (3 hrs)** Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constants and their quantitative dependence on temperature, pressure, and concentration, factors affecting equilibrium – Le Chatelier's principle. **B. Ionic Equilibria (5 Hrs)** Ionization of acids and bases, Strong and weak electrolytes, degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect and solubility product (with illustrative examples), Salt hydrolysis - calculation of hydrolysis constant and degree of hydrolysis for salt of strong acid and weak base, Buffer solutions – Introduction, Henderson-Hasselbalch equations for acidic and basic buffer. **(C). Phase Equilibrium (3 hrs)** **(A)**Gibbs phase (no derivation), phase, component and degree of freedom, Application of phase rule to one component system (water system and Sulphur systems), Reduced phase rule. Application of phase rule to two component systems: Pb-Ag system. Congruent-Ferric chloride system.	**11**
IV	**Photochemistry and liquid-liquid mixtures** **A) Photochemistry (8 hrs)** Interaction of radiation with matter, difference between thermal and photochemical reactions, Laws governing absorption of light, laws of photochemistry, Jablonski diagram depicting various processes, quantum yield, determination of quantum yield of reactions, reasons for low and high quantum yields. Some examples of photochemical reactions (e.g. Photochemical decomposition of Hydrogen iodide, Photosynthesis of HBr from H_2 and Br_2 and photosynthesis of HCI from H_2 and Cl_2). Photosensitization and Quenching, Photosensitized reactions. **B)Liquid-Liquid mixtures(3 hrs)** Ideal liquid mixtures, Raoult's law of ideal solutions, Henry's law and its applications, Nernst distribution law, limitations, and applications (association and dissociation - No derivation).	**11**
Keywords	***Halides (alkyl & aryl halides), Alcohols, Phenols, Aldehydes & Ketones, Carboxylic acids & their derivatives, Equilibrium (Chemical, Ionic, and Phase equilibria), Photochemistry, Liquid-liquid mixtures.***	

Signature of Convener &Members (CBoS) :

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. *Bahl, A. (2010). Advanced organic chemistry. S. Chand publishing.*
2. *Singh, J & Yadav, L. D. S. (2016) Advanced organic chemistry. Pragati Prakashan Meerut.*
3. *Puri, L. B., Sharma, L. R., & Pathania, M. S. (2013). Principles of physical chemistry. Vishal Publishing Co.*
4. *Kapoor, K. L. (2019). A Textbook of Physical Chemistry, Thermodynamics and Chemical Equilibrium (SI Units) - Vol. 2, 6th Edition.*

Reference Books recommended-

1. *Boyd, R. N., & Morrison, R. T. (1983). Organic Chemistry:(uden title). Allyn and Bacon.*
2. *Physical Chemistry*
3. *Atkins, P. W., De Paula, J., & Keeler, J. (2023). Atkins' physical chemistry. Oxford university press.*
4. *McQuarrie, D. A., & Simon, J. D. (2004). Molecular Thermodynamics Viva Books Pvt. Ltd.: New Delhi.*

Online Resources–

- **e-Resources / e-books and e-learning portals**
- **https://ncert.nic.in/ncerts/l/lech202.pdf**
- **https://unacademy.com/content/wp-content/uploads/sites/2/2022/10/30.-Aldehydes-Ketones-and-Carboxylic-Acid.pdf**
- **https://egyankosh.ac.in/bitstream/123456789/68232/3/Unit-3.pdf**
- **https://magadhmahilacollege.org/wp-content/uploads/2020/04/photochemistry_and_jablonski_diagram_M.sc_II_Sem.pdf**

Online Resources–

- **e-Resources / e-books and e-learning portals**

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 100 Marks
Continuous Internal Assessment(CIA):30 Marks
End Semester Exam(ESE): 70 Marks

Continuous Internal Assessment(CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20**→**20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF CHEMISTRY
COURSE CURRICULUM

PART-A: Introduction				
Program: Bachelor in Science *(Diploma / Degree/Honors)*			**Semester - IV**	Session: **2024-2025**
1	**Course Code**	**CHSC-04P**		
2	**Course Title**	**CHEMISTRY LAB. COURSE-IV**		
3	**Course Type**	**DSC**		
4	**Pre-requisite**(if, any)	*As per Program*		
5	**Course Learning. Outcomes(CLO)**	➢ *Understand the fundamentals of organic compounds analysis including preparation of sodium extract and detection of elements.* ➢ *Identify functional groups and prepare derivatives.* ➢ *Determine the pH of various samples like water/acid/base/soil etc.* ➢ *Apply the concepts of phase equilibria to determine critical solution temperature and study concepts of Nernst distribution law and determine equilibrium constant of various reactions.*		
6	**Credit Value**	**1 Credits**	*Credit =30 Hours Laboratory or Field learning/Training*	
7	**Total Marks**	**Max.Marks:50**		**Min Passing Marks:20**

PART -B: Content of the Course		
Total No. of learning-Training/performancePeriods:30 Periods (30 Hours)		
Module	**Topics (Course contents)**	**No. of Periods**
Lab./Field Training/ Experiment Contents of Course	**Organic Analysis** ***Systematic identification of organic compounds:*** a. Test for aliphatic and aromatic nature of substances. b. Test for saturation and unsaturation. c. Detection of elements (N, S, and halogens) in organic compounds. d. Identification of functional groups: i) Carboxylic acids ii) Phenols iii) Aldehydes iv) Ketones, v) Esters vi) Carbohydrates vii) Amines viii) Amides, ix) Halogen compounds e. Determination of melting and boiling points. f. Preparation of solid derivatives. **pH determination** Determination of pH of soil, water. To measure the pH of various solutions using pH indicators and pH meter. To determine the value of Ka for an unknown acid. To prepare and study the properties of buffer solutions. **Phase Equilibrium:** 1) To determine the critical solution temperature of two partially miscible liquids (phenol-water systems). 2) To study the effect of solute such as (i) sodium chloride (NaCl), (ii) succinic acid ($HOOC-CH_2-CH_2-COOH$) on the critical solution temperature of two partially miscible liquids (e.g. phenol – water system). 3) To construct the phase diagram of two components (e. g. diphenylamine-benzophenone system) by cooling curve method. **Nernst Distribution Law** 1) To determine the partition coefficient of Iodine between water and carbon tetrachloride/Kerosene. 2) To determine the partition coefficient of benzoic acid between water and benzene.	**30**

	3) To determine the equilibrium constant of the reaction, $KI + I_2 = KI_3$ by distribution method.	
Keywords	***Organic analysis, Aromatic/Aliphatic compounds, Saturated/unsaturated compounds, Element detection, Functional groups, Derivatives for functional groups, pH, Phase equilibria, Nernst distribution law.***	

Signature of Convener & Members (CBoS) :

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. *Sahu, D. P.& Bapat, K. N. (2022) Unified Practical Chemistry, Navbodh Prakashan.*
2. *Yadav, J. B. (2006). Advanced Practical Physical Chemistry. Krishna Prakashan Media.*
3. *Pandey, O. P., Bajpai, D. N., Giri, S. (2010). Practical Chemistry. S. Chand Publisher.*

Reference Books Recommended:

1. *Moudgil, H. K. (2010). Textbook of Physical Chemistry. PHI Learning Pvt. Ltd.*
2. *Adamson, A. (2012). A Textbook Of Physical Chemistry. Elsevier.*
3. *Findlay, A. (1923). Practical Physical Chemistry. Longmans, Green.*
4. *Leonard. J, Lygo. B & Procter, G. (2013). Advanced Organic Practical Chemistry, CRC Press.*

Online Resources–

- **e-Resources / e-books and e-learning portals**
- **https://faculty.ksu.edu.sa/sites/default/files/vogel_-_practical_organic_chemistry_5th_edition.pdf**
- **https://tech.chemistrydocs.com/Books/Physical/Advanced-Physical-Chemistry-Experiments-by-J-N-Gurtu-&-Amit-Gurtu.pdf**
- **https://byjus.com/chemistry/conductometric-titration/**
- **https://chem.libretexts.org/Courses/University_of_California_Davis/Chem_4B_Lab%3A_General_Chemistry_for_Majors_II/1%3A_Thermochemistry_(Experiment)**
- **https://www.ulm.edu/chemistry/courses/manuals/chem1010/experiment_10.pdf**
- **https://www.masterjeeclasses.com/wp-content/uploads/2019/02/11.Practical-Organic-ChemistryTheory.pdf**

Online Resources–

- **e-Resources / e-books and e-learning portals**

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **50 Marks**

Continuous Internal Assessment(CIA): **15 Marks**

End Semester Exam(ESE): **35 Marks**

Continuous Internal Assessment(CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz +obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance: On spot Assessment** **J. Performed the Task based on lab. work - 20 Marks** **K. Spotting based on tools & technology (written) – 10 Marks** **L. Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS:

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF CHEMISTRY
COURSE CURRICULUM

PART-A: Introduction				
Program: Bachelors in Science *(Diploma /Degree/Honors)*			**Semester–IV**	Session: **2024-2025**
1	**Course Code**	**CHSE-02T**		
2	**Course Title**	**ENVIRONMENTAL CHEMISTRY**		
3	**Course Type**	**DSE**		
4	**Pre-requisite(if, any)**	***As per Program***		
5	**Course Learning Outcomes(CLO)**	➢ ***To explore the environment through the lens of chemistry, examining interactions between the biosphere, lithosphere, hydrosphere, and atmosphere.*** ➢ ***To delve into ecological principles, biogeochemical cycles, and the challenges of thermal and noise pollution.*** ➢ ***To develop concept of water quality, water management, and the multifaceted issue of water pollution take center stage.*** ➢ ***To investigate air pollution, soil composition, radiation chemistry, and potential solutions for environmental challenges.***		
6	**Credit Value**	**03 Credits**	***Credit = 15 Hours - learning & Observation***	
7	**Total Marks**	**Max.Marks:100**		**Min. PassingMarks:40**

PART-B: Content of the Course

Total No.of Teaching–learning Periods(01 Hr. per period) - 45 Periods (45 Hours)

Module /Unit	Topics(Course contents)	No.of Period
I	**Introduction to Environmental Chemistry** Biosphere, Lithosphere, Hydrosphere and Atmosphere, Ecological principles- aspects of ecology, classification, types of ecosystems. Biogeochemical cycles- carbon, nitrogen, phosphorous, oxygen, hydrogen. Thermal pollution: sources, harmful effects, and prevention of thermal pollution. Noise pollution: sources, effects, and control of noise pollution.	**12**
II	**Water** Origin, physico-chemical properties of water, sources of water, hydrological cycle, criteria of water quality, Water management- water shed management, rainwater harvesting, water pollution- sources, consequences and harmful effects of water pollution, strategies for water pollution control.	**11**
III	**Air** Major regions of the atmosphere, composition of the atmosphere, temperature inversion and air pollution episodes, photochemistry of the atmosphere, depletion of the stratospheric ozone, greenhouse effect, greenhouse gases, remedial measures for reversion of greenhouse effect, acid rain, photochemical smog, particulate matter.	**11**
IV	**Soil and radiation pollution** Chemical and mineralogical composition of soil, classification of soil, types of soil-saline and alkaline, physical properties – texture, bulk density, permeability, chemical properties—Ion exchange capacity, soil pH and micro and macro nutrient availability. Introduction to radiation chemistry, sources of radioactive pollution, effects of radioactive pollution, protection from radiation, control of radiation.	**11**
Keywords	***Environment, Chemistry, Atmosphere, Hydrosphere/Biosphere/lithosphere, Biogeochemical cycles, water, water management, Air, Acid rain, Photochemical smog, Greenhouse gases,***	

	Particulate matter, Soil and radiation pollution, Radiation Chemistry.

Signature of Convener & Members (CBoS) :

PART–C

Learning Resources: Text books, Reference Books and Others

Textbooks Recommended–

1. *Dara, S. S. (2002). Environmental chemistry. New Delhi: S Chand & Company Ltd.*
2. *De, A. K. (2003). Environmental chemistry. New Delhi: New Age International.*
3. *Mahajan, (2010). Environmental chemistry. New Delhi: S Chand & Company Ltd.*
4. *Kudesia, V. P. (1985). Water pollution. Pragati Prakashan.*

Reference Books Recommended–

1. *Chiras, D. D. (1994). Environmental science (4th ed.). Jones & Bartlett Learning.*
2. *Bockris, J. O. M. (1977). Environmental chemistry. Academic Press.*
3. *Lodge, J. P. (1994). Methods of air sampling and analysis. Publications, Jaipur.*
4. *Moore, W., & Moore, J. (2010). Environmental chemistry. CRC Press.*

OnlineResources–e-Resources/e-booksande-learningportals

- https://ncert.nic.in/textbook/pdf/kech207.pdf
- https://archive.nptel.ac.in/courses/122/106/122106030/
- https://scienceinfo.com/environmental-chemistry-definition-importance-application-and-careers/
- https://www.ncbi.nlm.nih.gov/books/NBK83730/
- https://ebooks.inflibnet.ac.in/esp16/chapter/water-pollution/#:~:text=The%20amount%20of%20dissolved%20oxygen,dissolved%20oxygen%20than%20saline%20water.
- https://chem.libretexts.org/Bookshelves/General_Chemistry/Map%3A_Chemistry_-_The_Central_Science_(Brown_et_al.)/18%3A_Chemistry_of_the_Environment
- https://byjus.com/chemistry/environmental-chemistry/
- https://www.nrdc.org/stories/water-pollution-everything-you-need-know#whatis

Part-D:AssessmentandEvaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment(CIA):	**30 Marks**
EndSemester Exam(ESE):	**70 Marks**

Continuous InternalAssessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 &20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam(ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit-**4x10=40 Marks.**	

Name and Signature of Convener and Members of CBoS

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF CHEMISTRY
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science *(Diploma / Degree/Honors)*			**Semester - IV**	Session: **2024-2025**
1	**Course Code**	**CHSE-02P**		
2	**Course Title**	**ENVIRONMENTAL CHEMISTRY LAB. COURSE**		
3	**Course Type**	**DSE**		
4	**Pre-requisite** (if, any)	-		
5	**Course Learning Outcomes (CLO)**	➢ *To know the basic idea on techniques of water analysis and acidity alkalinity* ➢ *To get experience with the calculations of BOD and COD* ➢ *To understand the basics of soil analysis viz. pH, Conductivity.* ➢ *To have an experience on the determination of heavy metals in soil and Colorimetric estimation of iron and manganese.* ➢ *To familiarize with interpretation of data*		
6	**Credit Value**	**01Credit**	*Credit =30 Hours Laboratory or Field learning/Training*	
7	**Total Marks**	**Max.Marks:50**	**Min. Passing Marks:20**	

PART-B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics(Course contents)	No. of Period
Lab./Field Training/ Experiment Contents of Course.	**Water Analysis** a. Alkalinity b. Acidity c. Temporary, Permanent and total hardness d. Sulphate e. Phosphorus	**30**
	Water analysis e. Nitrites f. Chlorides g. D.O, BOD and COD h. Insecticides i. Pesticides Analysis of chemicals used in water and waste water treatment-Alum, bleaching powder, activated carbon. Determination and comparison of chlorine content in tap water, storage tank and swimming pool.	
	Soil Analysis Determination of: a. pH b. Conductivity c. Ca d. Mg e. Heavy metals like Cr, Pb, Cd, Zn.	
	Miscellaneous Analysis of nutrients – Nitrogen (total, ammonia,nitrite, and nitrate), Phosphate Determination of N,P,K of soil	

	Determination of macro and micro nutrients in soil. Sampling of water- tap water, well water, overhead storage tank water pond water and lake water. Physicochemical and organoleptic characteristics of the above water samples. Statistical evaluation of the data obtained for optimization of results. Determination of Total solids, Total dissolved solids and total suspended solids and its significance. Determination of noise pollution in a particular area with noise dosimeter. Study of particulate matter. Study of atmospheric chemistry. Air Monitoring Gas detection.
Keywords	***Sampling, Water, soil, N/P/K, pH, Conductivity, acidity & alkalinity, Heavy metals.***

Signature of Convener & Members (CBoS) :

PART–C

Learning Resources: Text Books, Reference Books andOthers

Textbooks Recommended–

1. *Dara, S. S., & Asole, B. G. (2017). Environmental chemistry: Practical approach (2nd ed.). New Age International (India) Publishers.*
2. *Trivedi, R. K., Goyal, P., & Trisal, B. S. (2018). Manual of water and wastewater analysis (2nd ed.). ABD Publishers & Distributors.*
3. *Sehgal, H. S. (2010). A textbook of soil chemical analysis (2nd ed.). Kalyani*

Reference Books Recommended–

1. *Vogel, A. I. (1955). A text-book of quantitative inorganic analysis: theory and practice. Longmans,*
2. *Green and Company.*
3. *Sandell, E. B. (1945). Colorimetric determination of traces of metals (Vol. 59, No. 6, p. 481). LWW.*
4. *Boubel, R. W., Vallero, D., Fox, D. L., Turner, B., & Stern, A. C. (2013). Fundamentals of air*
5. *pollution. Elsevier.*
6. *Clesceri, L. S. (1998). Standard methods for examination of water and wastewater. American public*
7. *health association, 9.*
8. *Rump, H. H. (1999). Laboratory manual for the examination of water, waste water and soil (No. Ed. 3). Wiley-VCH Verlag GmbH.*

OnlineResources– e-Resources/e-booksande-learningportals

- https://ncert.nic.in/textbook/pdf/kech207.pdf
- https://archive.nptel.ac.in/courses/122/106/122106030/
- https://scienceinfo.com/environmental-chemistry-definition-importance-application-and-careers/
- https://www.ncbi.nlm.nih.gov/books/NBK83730/
- https://ebooks.inflibnet.ac.in/esp16/chapter/water-pollution/#:~:text=The%20amount%20of%20dissolved%20oxygen,dissolved%20oxygen%20than%20saline%20water.
- https://chem.libretexts.org/Bookshelves/General_Chemistry/Map%3A_Chemistry_-_The_Central_Science_(Brown_et_al.)/18%3A_Chemistry_of_the_Environment
- https://byjus.com/chemistry/environmental-chemistry/
- https://www.nrdc.org/stories/water-pollution-everything-you-need-know#whatis
- https://www.envirotech-online.com/news/gas-analyser/157/envea/portable-multi-gas-analyser-gains-qal1-certification-for-so2/60799.

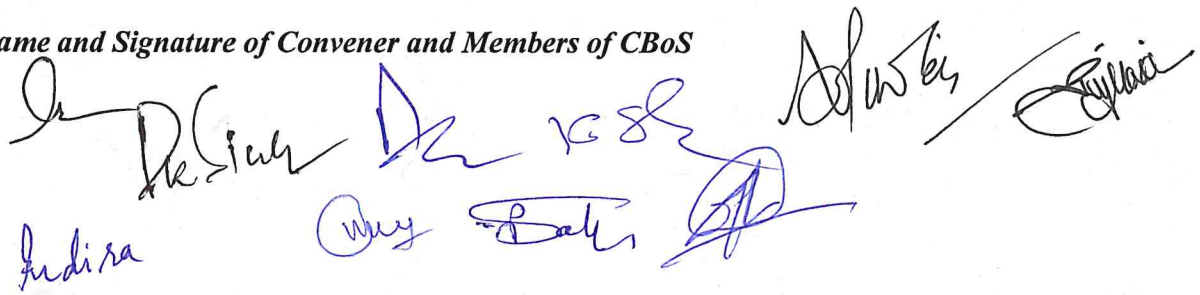
PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance: On spot Assessment** **D. Performed the Task based on lab. work - 20 Marks** **E. Spotting based on tools & technology (written) – 10 Marks** **F. Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener and Members of CBoS



FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF BOTANY
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life sciences *(Diploma / Degree/Honors)*		**Semester - IV**	Session: **2024-2025**
1	Course Code	**BOSC-04 T**	
2	Course Title	**Angiosperms**	
3	Course Type	**Discipline Specific course (DSC)**	
4	Pre-requisite (if, any)	***As per program***	
5	Course Learning. Outcomes (CLO)	At the end of the course, the students will be able *:* ➢ Understand basics of plant identification, classification and nomenclature ➢ Understand the concept, diversity and evolution of Angiosperm plants. ➢ Become familiar with the internal structure of plants and concept of plant tissues with its revolutionary concept. ➢ Understand the reproductive system in flowering plants.	
6	Credit Value	**3 Credits**	***Credit = 15 Hours - learning & Observation***
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Plant taxonomy**: Types of classification-artificial, natural and phylogenetic Bentham & Hooke (upto series), Engler & Prantl (upto series) and Hutchinson system of classification with its merit and demerits,Modern trends of taxonomy and Numerical taxonomy.Binomial nomenclatur system. . Principles and rules (ICBN/ICN)Ranks and names, Typification, author citation, vali publication, principle of priority and its limitations;. Herbarium technique, important herbaria, e herbarium and Botanical gardens of India .	12
II	**Taxonomic Description:** Characteristics, systematics and economic importance of Dicotyledonous families- Brassicaceae, Malvaceae, Fabaceae (subfamily), Apiaceae, Rutaceae, Euphorbiaceae, Lamiaceae, Asteraceae. Monocotyledonous families -Orchidaceae, Liliaceae, Cyperaceae, Musaceae and Poaceae. (Floral features, Floral formulaand floral diagram are essential]	11
III	**Anatomy:**Tissue system features, functions of different types of meristematic and permanent tissues. Internal Structure of dicot and monocot root stem and leaf.Root and shoot apex organization: Structure and function of cambium and secondary growth in root and stem. Wood (heartwood and sapwood, annual rings) Abnormal Secondary Growth (*Dracaena Achyranthes, Nyctanthes, Boerhavia*)	11
IV	**Embryology**: Structure of anther and pollen. Structure and types of ovules, Embryo sacs-types , Pollination and Fertilization, Double fertilization, Endosperm types, structure and functions Development of embryo-Dicot and monocot embryo. Concept of Apomixes and Polyembryony, Seed structure; appendages and dispersal mechanisms.	11
Keywords	***Taxonomy, Herbarium,Tissue,Fertilization***	

Signature of Convener & Members (CBoS) :

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Simpson, M.G. (2006) Plant Systematics. Elsevier Academic Press, San Diego, CA, USA
2. Beck, C.B. (2010). An Introduction to Plant Structure and Development, II edition.
3. Johri, B.M. (1984). Embryology of Angiosperms. Springer-Verlag, Berlin
4. Singh, G. (2012) Plant Systematics. Theory and Practice. Oxford & IBH Pvt. Ltd, New Delhi.
5. Bhojwani, SS. & Bhatnagar, SP (2011). Embryology of Angiosperms. Vikas Publication House Pvt.Lid. New Delhi 5 edition
6. Mauseth. 1.1) (1988) Plant Anatomy. The Benjamin Cummings Publisher. USA
7. Pandey, B. P. (LatesEdt), Plant Anatomy

Reference Books Recommended –

1. Simpson, M.G. (2006) Plant Systematics. Elsevier Academic Press, San Diego, CA, USA
2. Beck, C.B. (2010). An Introduction to Plant Structure and Development, II edition.
3. Mauseth. 1.1) (1988) Plant Anatomy. The Benjamin Cummings Publisher. USA
4. Jeffrey, C. (1982). An Introduction to Plant Taxonomy. Cambridge University Press,Cambridge
5. Judd, W.S., Campbell, C.S., Kellogg, E.A., Stevens, P.F. (2002). Plant Systematics-A Phylogenetic Approach. Sinauer Associates Inc., U.S.A. 2 nd edition.
6. Maheshwari, J.K. (1963). Flora of Delhi. CSIR, New Delhi.
7. Radford, A.E. (1986). Fundamentals of Plant Systematics. Harper and Row, New York
8. Saxena N.B. and Saxena S. (2012). Plant Taxonomy Pragati Prakashan.
9. Sharma O.P. (2013). Plant Taxonomy. MC GRAW HILL INDIA.
10. Sharma, M.K. (2013) Plant Structures (An Introduction to Plant Anatomy). VayuEducation of India.
11. Chopra G.L. (2005) Angiosperm, Pradeep Publication, Jalandhar.

Online Resources–

- **e-Resources / e-books and e-learning portals**
- **www.swayam.ac.in**
- **www.ignou.ac.in**
- **www.egyankosh.ac.in**
- **www.iitm.ac.in**
- **www.eskillindia.org**
- **www.eshiksha.mp.gov.in**
- **www.vlab.co.in**
- **www.internshala.com**
- **www.ndl.iitkgp.ac.in**

Online Resources–

- **e-Resources / e-books and e-learning portals**

https://www.fs.usda.gov/managing-land/wildflowers/pollinators/what-ispollinationhttps://www.pw.live/exams/neet/embryo/#:~:text=Dicot%20and%20monocot%20embryos%20develop,one%20that%20is%20significantly%20smaller.

https://byjus.com/biology/apomixis/

https://examupdates.in/plant-anatomy-and-embryology-book

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **100 Marks**

Continuous Internal Assessment (CIA): **30 Marks**

End Semester Exam (ESE): **70 Marks**

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz **+** obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE): 35	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF BOTANY
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Life Sciences *(Diploma / Degree/ Honors)*			**Semester - IV**	Session: **2024-2025**
1	**Course Code**	**BOSC-04**		
2	**Course Title**	**Lab. Course – 04 (Angiosperms)**		
3	**Course Type**	**Laboratory Course**		
4	**Pre-requisite** (if, any)	***As per program***		
5	**Course Learning. Outcomes (CLO)**	At the end of this course, students will be able to: ➢ Understand the systematic status of flowering plants. ➢ Learn collection of local flora , identification and herbarium preparation. ➢ Understand internal structure of different plant parts. ➢ Understand the pollination and seed dispersal mechanism. ➢ Understand about reproduction system in flowering plants.		
6	**Credit Value**	**1 Credits**	***Credit =30 Hours Laboratory or Field learning/Training***	
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks: 20**	

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
Lab./Field Training/ Experiment Contents of Course	• Description of local plants of the syllabus in semitechnical language, floral formula and floral diagrams should be drawn. • Prepration of herbarium of local flora. • Anatomy of primary and secondary growth in monocuts and dicots stem using hand sections or permanent slides. • Anatomy of root, primary and secondary structure. • Study of placentation. • Study of types of ovule in permanent slide. • Isolation of globular, heart shape and torpedo embryo. • Study of pollination by insects.	**30**
Keywords	Herbarium, Monocot, Placentation, Pollination	

Signature of Convener & Members (CBoS) :

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8.
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10.

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Pandey, B.P. (2014). Modern Practical Botany Vol. II. S. Chand and Company Ltd., NewDelhi.
2. Bendre, A.M. and Kumar A. (2003). Manual of Practical Botany Vol. II. RastogiPublications, Meerut.
3. Santra S.C. and Chatterjee (2005). College Botany Practical Vol. II New Central Book Agency Pvt. Ltd

Online Resources–

- **e-Resources / e-books and e-learning portals**
- **www.swayam.ac.in**
- **www.ignou.ac.in**
- **www.egyankosh.ac.in**
- **www.iitm.ac.in**
- **www.eskillindia.org**
- **www.eshiksha.mp.gov.in**
- **www.vlab.co.in**
- **www.internshala.com**
- **www.ndl.iitkgp.ac.in**

Online Resources–

- **e-Resources / e-books and e-learning portals**

https://visiblebody.com/learn/biology/monocot-dicot/roots

https://www.toppr.com/guides/biology/differences-between/monocot-and-dicot-stem/

https://examupdates.in/plant-anatomy-and-embryology-book/

https://jrs.ac.in/working folder/DOWNLOAD-D-12-180- 618C09F700115.pdf

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA):15 **(By Course Teacher)**	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE): 35	**Laboratory / Field Skill Performance: On spot Assessment** **A. Performed the Task based on lab. work - 20 Marks** **B. Spotting based on tools & technology (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS:

(1) RS[illegible]
(2) [illegible]
(3) [illegible]
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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Life Science *(Diploma / Degree/Honors)*		**Semester - IV**	Session: **2024-2025**	
1	**Course Code**	**BOSE- 02 T**		
2	**Course Title**	**Microbiology and Phytopathology**		
3	**Course Type**	**Discipline specific Elective (DSE)**		
4	**Pre-requisite** (if, any)	***As per program***		
5	**Course Learning. Outcomes (CLO)**	At the end of this course, the students will be able to get ➢ Basic idea of different microbes present in biotic and abiotic environment. ➢ Knowledge of principle concept and methods in the field of Microbiology and Phytopathology ➢ Idea of living, non living and environmental causes of plant diseases. ➢ Knowledge of different technique to isolate microbes study their cultural characteristics,. ➢ How disease occurs by microbes, their identification and control measures.		
6	**Credit Value**	**3 Credits**	***Credit = 15 Hours - learning & Observation***	
7	**Total Marks**	**Max. Marks: 100**	**Min Passing Marks: 40**	

PART -B: Content of the Course

Total No. of Teaching–learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Microbiology:** ❖ General account, distribution and classification of microorganism. ❖ Major microbes of air soil water and food ❖ Isolation and cultivation of microorganism ❖ Important tools and techniques used in microbiological studies.	12
II	**Plant pathology:** ❖ Nature and concept of diseases in plants, ❖ History and development of plant pathology, contribution of Indian plant pathologist in India and abroad, pathology and trends in 21st century ❖ Symptom of parasitic and non-parasitic diseases, ❖ Classification of plant diseases. ❖ Important plant diseases caused by different Pathogens ❖ Plant quarantine ❖ HR and hypersensitivity	11
III	**Techniques of Studying Plant Diseases:** ❖ Field Studies, Collection of samples and its preservation. ❖ **Sterilization technique**- Standard Methods of sterilization - Physical methods, Chemical methods, Radiation methods, ❖ **Isolation technique:** Preparation of different media for growth of pathogen by using standard inoculation techniques like- plate streak, serial dilution and pour plate methods to obtain a pure culture. ❖ **Staining Technique:** Nature and Types of stains, ❖ **Preservation** : methods of preservation of culture	11
IV	**Host Parasite Relation:** ❖ Terms and concept ❖ Disease cycle and environmental relations ❖ Plant disease dissemination ❖ Role of enzymes and toxins in pathogenesis and mode of infection, ❖ Inoculums and inoculums potential ❖ Koch's postulates ❖ Defense mechanism in plant against pathogens, ❖ Prevention and control of plant diseases	11
Key words	Microorganism, Disease, Pathogens , Culture	

Signature of Convener & Members (CBoS) :

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –.

1. Bridges, P. (1998) Molecular Variability Of Fungal Pathogens. CAB
2. Bilgrami, K. S. and Dubey, H. C. (1985) Plant Pathology, Vikas Publ. House, Sahibabad U.P.
3. Ali, s. s. and Kulshereshta, p. (1986) plant pathology, adeeb educational, Raipur.
4. Singh, R. S. (1980) Plant Pathology, Oxford IBH Publ. Co, New Delhi.
5. Malhotra R. Plant Pathology Publisher: McGraw Hill Education India

REference Books Recommended-

1. Agrios, G. N. (1997) Plant Pathology, Academic Press, London

Online Resources–

- **e-Resources / e-books and e-learning portals**
- **www.swayam.ac.in**
- **www.ignou.ac.in**
- **www.egyankosh.ac.in**
- **www.iitm.ac.in**
- **www.eskillindia.org**
- **www.eshiksha.mp.gov.in**
- **www.vlab.co.in**
- **www.internshala.com**
- **www.ndl.iitkgp.ac.in**

Online Resources–

- **e-Resources / e-books and e-learning portals**

1. **https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/plant-pathology#:~:text=Plant%20pathology%20is%20a%20science,parasitic%20microorganisms%20that%20cause%20disease.**
2. **https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4600171/**
3. **https://bnrc.springeropen.com/articles/10.1186/s42269-021-00627-6**
4. **https://www.sciencedirect.com/science/article/abs/pii/S0065308X08604339**
5. **https://www.researchgate.net/publication/371501301 Fundamentals of Plant Pathology**

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): 30 **(By Course Teacher)**	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE): 70	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science *(Diploma / Degree/ Honors)*			**Semester - IV**	Session: **2024-2025**
1	**Course Code**	**BOSE-02 P**		
2	**Course Title**	**Lab course 02 (Microbiology and Phytopathology)**		
3	**Course Type**	**Discipline specific Elective (DSE)**		
4	**Pre-requisite** (if, any)	***As per program***		
5	**Course Learning. Outcomes (CLO)**	At the end of this course, the students will be able to get ➢ Basic idea of microbes. ➢ Culture of microbes in the laboratory ➢ How disease occurs by microbes ➢ Basic idea of host parasite interrelationship ➢ Control measure of pathogen by different biological sources.		
6	**Credit Value**	**1 Credits**	***Credit =30 Hours Laboratory or Field learning/Training***	
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks: 20**	

PART -B: Content of the Course		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)		
Module	**Topics (Course contents)**	**No. of Period**
Lab./Field Training/ Experiment Contents of Course	❖ Calibration of microscope. ❖ Study of symptoms of various plants disease caused by viruses, bacteria and fungi. ❖ Sterilization of glass wares by detergent, chromic acid and dry sterilization ❖ Preparation and sterilization of culture media NAM, PDA, to culture bacteria and fungi respectively. ❖ Isolation of micro-organism from soil, water and air by using standard inoculation technique. ❖ Identification of the isolated fungi by slide preparation. ❖ Micrometry – measurement of length and width of spore/ conidia of the isolated /given fungi. ❖ Preparation of camera lucida diagram of the isolated / given fungi. ❖ Cultural charecteristics the the cultured bacteria. ❖ Gram staining of Bacteria ❖ Host parasite relationship- slide preparation of infected / diseased portion of the host to study host parasite relationship by smearing and section cutting methods isolated from local field. ❖ Demonstration of the effect of various bio-pesticides (essential oils, neem, turmeric and garlic) against microbe/pathogens ❖ Preparation of herbarium of different plant diseases of local area	**30**
Keywords	Disease. symptoms, medium, pathogenesis	

Signature of Convener & Members (CBoS) :

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Experiments In Microbiology, Plant Pathology And Biotechnology By K. R. Aneja. Publisher New Age International

Online Resources–

- **e-Resources / e-books and e-learning portals**

1. **https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/plant-pathology#:~:text=Plant%20pathology%20is%20a%20science,parasitic%20microorganisms%20that%20cause%20disease.**
2. **https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4600171/**
3. **https://bnrc.springeropen.com/articles/10.1186/s42269-021-00627-6**
4. **https://www.sciencedirect.com/science/article/abs/pii/S0065308X08604339**

1) **https://www.researchgate.net/publication/371501301_Fundamentals_of_Plant_Pathology**

Online Resources–

- **e-Resources / e-books and e-learning portals**
- **https://efaidnbmnnnibpcajpcglclefindmkaj/https://mis.alagappauniversity.ac.in/siteAdmin/dde-**
- **https://admin/uploads/3/PG_M.Sc._Botony_34631%20MICROBIOLOGY%20AND%20PLANT%20PATHOLOGY.pdf**

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **50 Marks**

Continuous Internal Assessment (CIA): **15 Marks**

End Semester Exam (ESE): **35 Marks**

Continuous Internal Assessment (CIA): 15 **(By Course Teacher)**	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE): 35	**Laboratory / Field Skill Performance: On spot Assessment** **A. Performed the Task based on lab. work - 20 Marks** **B. Spotting based on tools & technology (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS:

1) 2) 3) 4) 5) 6) 7) 8) 9) 10)

Four Year Undergraduate Program (2024-28)
Department of Biotechnology
Course Curriculum

Part A: Introduction			
Program: Bachelor in Life Sciences (Diploma/Degree/Honors)		Semester: **IV Sem**	Session:**2024-2025**
1	Course Code	**BTSC-04-T**	
2	Course Title	**Recombinant DNA technology**	
3	Course Type	Discipline Specific Course (DSC)	
4	Pre-requisite (if any)	As per program	
6	Course Learning Outcomes (CLO)	After completing this course, the students will be able to - • Understand various tools of genetic engineering. • Develop competency in genetic exploitation for human welfare. • Understand the practical application of recombinant DNA technology. • Understand the use of information technology in the field of genome and proteome analysis.	
6	Credit Value	03 Credits (Credit = 15 Hours - learning & observation)	
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

Part B: Content of Course (Theory)		
Total No. of Teaching–learning Periods (01 Hr. per period)- 45 Periods (45 Hours)		
Unit	Topic (Course content)	No. of Period
I	**Prerequisites of rDNA technology** 1. Recombinant DNA technology: General concept. Steps and application. 2. Host controlled Restriction Modification System, Ligases and Polymerases, Klenow fragment, Taq, Pfu polymerase. 3. Nuclease (Endo, Exo, and restriction endonuclease). 4. Modification Enzyme (Kinase, Phosphates and terminal deoxynucleotidyltransferase), Reverse Transcriptase.	12 (12 Hrs)
II	**Gene transfer** 1. Vectors: Based on Plasmid, Bacteriophages, Cosmid. 2. High capacity vectors. 3. The basic concept of Gene Transfer Methods: Microinjection, Electroporation, Lipofection, and Microprojectile. 4. Selection and Screening of Recombinants: Genetic and Hybridization methods.	11 (11 Hrs)
III	**Genomic validation** 1. PCR: Types of PCR, Steps, Applications, Advantages and Limitations of PCR. 2. Molecular Marker-RFLP, RAPD, and Microarray. 3. Human Genome Project. 4. Gene Library: Genomic and cDNA library, Chromosome walking and jumping.	11 (11 Hrs)
IV	**Application of genetic technology** 1. Gene Therapy: *In vivo* and *Ex vivo*, germline and somatic gene therapy. 2. Basic idea of stem cell technology: Types of stem cell cultures and their	11 (11 Hrs)

	Significance. 3. Introduction to Genomics, DNA sequencing methods – manual & automated: Maxam & Gilbert and Sangers method. 4. Introduction to protein structure, Chemical properties of proteins, physical interactions that determine the property of proteins, short-range interactions, electrostatic forces, van der Waal interactions, hydrogen bonds, and Hydrophobic interactions.	
Keywords	Recombinant DNA, Vectors, PCR, cDNA library.	

• Part C - **Learning Resource**
Text Books, Reference Books, Other Resources -
Text Book- ➢ **P S Verma and A K Agrawal** ➢ **An introduction to genetic engineering- S T Tischoll**
• Molecular Biology; Watson. • Gene VIII; Benjamin Lewin. • The Cell, A molecular Approach; Geoffrey M. Cooper. • Molecular Biology of the Cell; Alberts • Modern Biotechnology, 2nd Edition, S.B. Primrose, Blackwell Publishing, 1987. • Molecular Biotechnology: Principles and Applications of Recombinant DNA, 4th Edition, B.R. Glick, J.J. Pasternak and C.L. Patten, 2010. • Molecular Cloning: A Laboratory Manual (3rd Edition) Sambrook and Russell Vol. I to III, 1989. • Principles of Gene Manipulation 6th Edition, S.B.Primrose, R.M.Twyman and R.W. Old. Blackwell Science, 2001.
• Online resources- https://onlinecourses.swayam2.ac.in/cec21_bt05/preview • https://archive.nptel.ac.in/courses/102/104/102104052/ •

Part D: **Assessment and Evaluation**		
Suggested Continuous Evaluation Methods: **Maximum Marks: 100 Marks** **Continuous Internal Assessment (CIA): 30 Marks** **End Semester Exam (ESE): 70 Marks**		
Continuous Internal Assessment (CIA) (By course teacher):	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: Q1. Objective – **10 x1= 10** Mark; **Q2.** Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1 out of 2** from each unit- **4x10=40 Marks**	

Name and Signature of Convener and Members of CBoS:

(Dr. Amit Kr. Kashyap)

(Keshav Kant Sahu)

(Amrita Pande)

(Dr. Neha Behal)

(Dr Shubhra Diwan)

Dr Shivani Sharma

Dr. Ujjwala Supe

(Dr. Sanjana Bhagat)

Dr Pramod Mahish

Four Year Undergraduate Program (2024-28)
Department of Biotechnology
Course Curriculum

Part A: Introduction			
Program: Bachelor in Life Sciences (Diploma/Degree/Honors)		Semester: **IV Sem**	Session:**2024-2025**
1	Course Code	**BTSC-04-P**	
2	Course Title	**Recombinant DNA technology**	
3	Course Type	Discipline Specific Course (DSC) - Practical	
4	Pre-requisite (if any)	As per program	
6	Course Learning Outcomes (CLO)	After completing this course, the students will be able to - • Isolate nucleic acid from biological cells. • Estimate and manipulate nucleic acid. • Amplify nucleic acid. • Analyse nucleic acid on the basis of database.	
6	Credit Value	01 Credits Credit =30 Hours Laboratory or Field learning/Training	
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

Part B: Content of Course		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)		
Module	Topic (Course content)	No. of Period
Lab./Field Training/ Experiment Contents of Course	1. Isolation of chromosomal DNA from plant cells 2. Isolation of chromosomal DNA from *E.coli* 3. Qualitative and quantitative analysis of DNA using spectrophotometer 4. Plasmid DNA isolation 5. Restriction digestion of DNA. 6. Ligation of DNA. 7. Transformation of competent cells. 8. Demonstration of PCR. 9. Use of SNP databases at NCBI and other sites. 10. Use of OMIM database 11. Detection of Open Reading Frames using ORF Finder	30
Keywords	Recombinant DNA, Vectors, PCR, cDNA library.	

• Part C - **Learning Resource**
Text Books, Reference Books, Other Resources -
Text Book- ➢ **P S Verma and A K Agrawal** ➢ **An introduction to genetic engineering- S T Tischoll**
• Molecular Biology; Watson. • Gene VIII; Benjamin Lewin. • The Cell, A molecular Approach; Geoffrey M. Cooper. • Molecular Biology of the Cell; Alberts

• Modern Biotechnology, 2nd Edition, S.B. Primrose, Blackwell Publishing, 1987. • Molecular Biotechnology: Principles and Applications of Recombinant DNA, 4th Edition, B.R. Glick, J.J. Pasternak and C.L. Patten, 2010. • Molecular Cloning: A Laboratory Manual (3rd Edition) Sambrook and Russell Vol. I to III, 1989. • Principles of Gene Manipulation 6th Edition, S.B.Primrose, R.M.Twyman and R.W. Old. Blackwell Science, 2001.
• Online resources- https://onlinecourses.swayam2.ac.in/cec21_bt05/preview • https://archive.nptel.ac.in/courses/102/104/102104052/ •

Part D: Assessment and Evaluation			
Suggested Continuous Evaluation Methods: **Maximum Marks:** **50 Marks** **Continuous Internal Assessment (CIA):** **15 Marks** **End Semester Exam (ESE):** **35 Marks**			
Continuous Internal Assessment (CIA) (By course teacher):	Internal Test / Quiz-(2): 10 +10 Assignment / Seminar + Attendance- 05 Total Marks - **15**		Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** **A. On spot Assessment - 20 Marks** **B. Spotting based on tools & technology (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**		Managed by course teacher as per lab status

Name and Signature of Convener and Members of CBoS:

(Keshaw Kant Sahu)

(Amrita Pande)

(Dr. Neha Behal)

(Dr. Shubha Diwan)

Dr. Ujjwal Jaiswal

(Dr. Sanjana Bhagat)

Dr. Pramod Malviya

Dr. Shivani Sharma

(Dr. Amit Kr. Kashyap)

Four Year Undergraduate Program (2024-28)
Department of Biotechnology
Course Curriculum

Part A: Introduction			
Program: Bachelor in Life Sciences (Degree/Honors)		Semester: **IV Sem**	Session:**2024-2025**
1	Course Code	**BTSE-02-T**	
2	Course Title	**Bioprocess Engineering**	
3	Course Type	Discipline Specific Elective course (DSE)	
4	Pre-requisite (if any)	As per program	
5	Course Learning Outcomes (CLO)	After completing this course, the students will be able to - • Understand the prerequisite of bioprocess engineering. • Develop skills for the operation of bioreactors. • Develop skills for industrial production. • Understand the geological exploitation by the process of bioprocess engineering.	
6	Credit Value	03 Credits (Credit = 15 Hours - learning & observation)	
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

Part B: Content of Course (Theory)		
Total No. of Teaching–learning Periods (01 Hr. per period)- 45 Periods (45 Hours)		
Unit	Topic (Course content)	No. of Period
I	**Concept of bioprocess engineering** 1. Introduction to bioprocess engineering. 2. Isolation, preservation, and maintenance of industrial microorganisms. 3. Media for industrial fermentation. 4. Kinetics of microbial fermentation.	12 (12 Hrs)
II	**Bioreactors** 1. Types of fermentation processes. 2. Operations of bioreactors. 3. Measurement and control of bioprocess parameters. 4. Downstream processing.	11 (11 hrs)
III	**Bioproducts** 1. Production of alcohol, acids and solvents. 2. Production of antibiotics. 3. Production of amino acids. 4. Whole cell immobilization for industrial application.	11 (11 hrs)
IV	**Microbial role and regulation** 1. Application of microbes in mineral beneficiation. 2. Application of microbes for oil recovery. 3. Quality control, quality assurance and standard operating procedures of fermenter. 4. Good manufacturing practices.	11 (11 hrs)

Keywords	Fermentation, bioreactors, fermentation-based production, mineral beneficiation.	

• Part C - **Learning Resource**
Text Books, Reference Books, Other Resources -
Text book- Industrial Biotechnology- D Das • Industrial Microbiology- A.H. Patel.
Reference Book- • Wastewater Engineering- Treatment, Disposal & Reuse. Metall and Eddy, Inc., Tata Mcgraw Hill, N. Delhi. • Microbiology- Pelczar&Pelczar. • Environmental Biotechnology, PrathamVashishith. Dominant Publishers And Distributors, N.Delhi. • Principles of Fermentation Technology; Stanburry. • Industrial Microbiology; Casida.
Online resources- https://archive.nptel.ac.in/courses/102/105/102105058/ http://www.ndl.gov.in/he_document/nptel/downloads_new_lecturenotes_102105058_102105058

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: **Maximum Marks: 100 Marks** **Continuous Internal Assessment (CIA): 30 Marks** **End Semester Exam (ESE): 70 Marks**		
Continuous Internal Assessment (CIA) (By course teacher):	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener and Members of CBoS:

Four Year Undergraduate Program (2024-28)
Department of Biotechnology
Course Curriculum

Part A: Introduction			
.Program: Bachelor in Life Sciences (Diploma/Degree/Honors)		Semester: **IV Sem**	Session:**2024-2025**
1	Course Code	**BTSE-02-P**	
2	Course Title	**Bioprocess Engineering**	
3	Course Type	Discipline-Specific Elective (DSE)--Practical	
4	Pre-requisite (if any)	As per program	
5	Course Learning Outcomes (CLO)	After completing this practical course, the students will be able to - • Isolate and maintain industrially significant microbes. • Develop skills for alcoholic production. • Develop skills for acid production. • Develop skills for antibiotic and enzyme production.	
6	Credit Value	01 Credits Credit =30 Hours Laboratory or Field learning/Training	
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

Part B: Content of Course (Theory)		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)		
Module	Topic (Course content)	No. of Period
Lab./Field Training/ Experiment Contents of Course	1. Isolation of industrially important microorganisms for microbial process. 2. Determination of thermal death point (TDP) and thermal death time (TDT) of microorganisms. 3. Comparative studies of ethanol production using different substrates. 4. Microbial production of citric acid using *Aspergillus niger.* 5. Microbial production of antibiotics *(Penicillin)* 6. Production and estimation of alkaline protease.	30
Keywords	Fermentation, bioreactors, fermentation-based production, mineral beneficiation.	

• Part C - **Learning Resource**
Text Books, Reference Books, Other Resources -
Text book- Industrial Biotechnology- D Das • Industrial Microbiology- A.H. Patel.
Reference Book- • Wastewater Engineering- Treatment, Disposal & Reuse. Metall and Eddy, Inc., Tata Mcgraw Hill, N. Delhi. • Microbiology- Pelczar&Pelczar. • Environmental Biotechnology, PrathamVashishith. Dominant Publishers And Distributors, N.Delhi. • Principles of Fermentation Technology; Stanburry. • Industrial Microbiology; Casida.
Online resources- https://archive.nptel.ac.in/courses/102/105/102105058/ http://www.ndl.gov.in/he_document/nptel/downloads_new_lecturenotes_102105058_102105058

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: **Maximum Marks: 50 Marks** **Continuous Internal Assessment (CIA): 15 Marks** **End Semester Exam (ESE): 35 Marks**		
Continuous Internal Assessment (CIA) (By course teacher):	Internal Test / Quiz-(2): 10 +10 Assignment / Seminar + Attendance- 05 Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** **A. On spot Assessment - 20** **B. Spotting based on tools & technology (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**	Managed by course teacher as per lab status

Name and Signature of Convener and Members of CBoS:

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF CHEMISTRY
COURSE CURRICULUM

PART-A: Introduction				
Program: Bachelor in Science *(Certificate / Diploma / Degree)*			**Semester - II/IV/V/VI**	Session: **2024-2025**
1	**Course Code**	**CHSEC**		
2	**Course Title**	**GREEN CHEMISTRY**		
3	**Course Type**	**SEC**		
4	**Pre-requisite**(if, any)	***As per Program***		
5	**Course Learning. Outcomes(CLO)**	➢ *Understand needs, goals, and obstacles in green chemistry.* ➢ *Understand and application of twelve principles of chemistry.* ➢ *Design green solvents and green reactions.* ➢ *To interpret and execute case study, survey, and projects on Green Chemistry.*		
6	**Credit Value**	**2 Credits (1C + 1C)**	***Credit = 15 Hours –Theoretical learning and = 30 Hours Laboratory or Field learning/Training***	
7	**Total Marks**	**Max.Marks:50**		**Min Passing Marks:20**

PART -B: Content of the Course		
Total No.of Teaching–learning Periods: **Theory–15 Periods (15 Hrs.) and Lab. or Field learning/Training 30Periods (30 Hours)**		
Module	**Topics (Course contents)**	**No. of Period**
Theory Contents	**Introduction to Green Chemistry:** What is Green Chemistry? Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry. **Principles of Green Chemistry and Designing a Chemical synthesis:** Twelve principles of Green Chemistry with their explanations and examples and special emphasis on the following: • Designing a Green Synthesis using these principles; Prevention of Waste/ by products; maximum incorporation of the materials used in the process into the final products, Atom Economy, addition, substitution, and elimination reactions. • Prevention/ minimization of hazardous/ toxic products reducing toxicity, and risks (hazard × exposure); waste or pollution prevention hierarchy. • Green solvents– supercritical fluids, water as a solvent for organic reactions, ionic liquids, fluorous biphasic solvent, PEG, solventless processes, immobilized solvents and how to compare greenness of solvents. **Future Trends in Green Chemistry:** Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions; Green chemistry in sustainable development.	**15**
Lab./Field Training Contents	• Green Synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis). • Microwave assisted reactions in water: Hofmann elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols; microwave assisted reactions in organic solvents Diels-Alder reaction and Decarboxylation reaction. • Right fit pigment: synthetic azo pigments to replace toxic organic and inorganic pigments. • An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.	**30**

	Case study/Project Case study/Project on Green chemistry, Role of green chemistry in lab safety, and implications of green chemistry.	
Keywords	***Green chemistry, Green synthesis, Green solvents, Green reactions, principles of Green chemistry, Hofmann elimination, Diels-Alder reaction, oxidation, and reduction.***	

Signature of Convener &Members (CBoS):

PART–C:Learning Resources

Text Books, Reference Books and Others

Textbooks Recommended–

1. *Ahluwalia, V.K. (2013). Green chemistry: A textbook.Alpha Science International.*
2. *Shukla, S., Gulati, S., & Batra, S.K. (2020). A textbook of green chemistry: benign by design. Shree kala Prakashan.*
3. *Kumar, V. (2013). An introduction to green chemistry. Vishal publishing Co.*
4. *Lancaster, M. (2020). Green chemistry: an introductory text. Royal society of chemistry.*

Reference books Recommended:

1. *Perosa, A., & Zecchini, F. (2007). Methods and reagents for green chemistry: an introduction. John Wiley & Sons.*
2. *Clark, J. H., & Macquarrie, D. J. (Eds.). (2008). Handbook of green chemistry and technology. John Wiley & Sons.*
3. *Ameta, S. C., & Ameta, R. (Eds.). (2023). Green Chemistry: Fundamentals and Applications. CRC press.*
4. *Anastas, P. T. (Ed.). (2013). Handbook of green chemistry (Vol. 1). Wiley-VCH.*

Online Resources- e-Resources / e-books and e-learning portals

- https://www.mygreenlab.org/uploads/2/1/9/4/21945752/gc_-_green_chem_guide-_beyond_benign___my_green_lab.pdf
- https://www.organic-chemistry.org/topics/green-chemistry.shtm
- https://royalsocietypublishing.org/doi/10.1098/rsos.191378
- https://www.gvsu.edu/labsafety/green-chemistry-99.htm

PART-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment(CIA):15 Marks
End Semester Exam(ESE): 35Marks

Continuous Internal Assessment(CIA): (By Course Coordinator)	Internal Test / Quiz-(2): **10 &10** Assignment/Seminar +Attendance- 05 Total Marks -**15**	Better marks out of the two Test / Quiz +obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance: On spot Assessment** **A. Performed the Task based on learned skill - 20 Marks** **B. Spotting based on tools (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Coordinator as per skilling**

Name and Signature of Convener & Members of CBoS:

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM

PART – A: Introduction			
Program: Bachelor in Life Science (Certificate/Diploma/Degree)		**Semester - II/ IV/V/VI**	**Session: 2024-25**
1	**Course Code**	**MBSEC-01**	
2	**Course Title**	**Mushroom Cultivation**	
3	**Course Type**	**Skill Enhancement Course (SEC)**	
4	**Prerequisite (If Any)**	**As per Program**	
5	**Course Learning Outcomes (CLO)**	**At the end of this course, the students will be able to –** ➢ explain nutritional and medicinal values of mushroom ➢ relate the types of mushrooms and their spawn preparation ➢ examine the methods of cultivation and economic aspects ➢ attain expertise using different Agro-residues for cultivation of mushrooms ➢ observe post-harvest management of mushrooms	
6	**Credit Value**	**02 Credits (1C + 1C)**	***Credit = 15 Hrs. Theoretical Learning and = 30 Hrs. Laboratory or field learning/ Training***
7	**Total Marks**	**Max. Marks: 50**	**Minimum Passing marks: 20**

PART – B: Content of the Course		
Total No. of Teaching-Learning Periods: **Theory – 15 Periods (15 Hrs.) and Lab. or Field Learning / Training 30 Periods (30 Hours)**		
Module	**Topics (Course Contents)**	**No. of Period**
Theory Contents	**Introduction and Life cycle:** Classification and identification of edible and nonedible mushrooms. Nutritional and medicinal value of mushroom, Scope of mushroom cultivation. Taxonomic position and Life cycle of mushroom. Types of mushrooms; Button mushroom (Agaricus biporus), Milky mushroom (*Calocybe indica*), Oyster mushroom (*Pleurotus sajor kaju*) and paddy straw mushroom (*Volvariella volvacea*). (Observation). **Principles and Requisites:** Sterilization and disinfection of substrates, growth medium, isolation, spawn production and maintenance. (Observation) **Techniques of Cultivation:** Structure and construction of low-cost mushroom huts, layout of Traditional and Green house method. Maintenance of proper condition in mushroom huts, Composting, bed and polythene bag preparation, Spawning-casing-cropping. (Observation).	**15**
Lab./Field Training Contents	1.Preparation of laboratory Glassware (Chemical washing, cleaning and drying). 2.Basic information about autoclave, hot air oven, laminar air flow 3.Sterilization and sanitation of mushroom house, instruments etc. 4.Identification of edible and poisonous mushrooms. 5.Preparation of Mother Culture. Spawn- media preparation, Inoculation, and incubation. 6.Preparation of different types of bed for cultivation. 7.Cultivation of Mushroom using compost/ paddy straw/agricultural wastes. 10.Harvesting and post-harvest management of crops. (Observation & Practice)	**30**
Key Words	**Mushroom, Spawning, Compost, Harvesting**	

Name and Signature of Convener and Members of CBoS

10/6/24 10/6/24 10.6.24 Roshni 10-6-24 10.6.24 Dr. Nethra Dr. Swetha

Part – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. Nita Bhal. (2000). Hand book on Mushrooms. 2nded. Vol. I and II. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Tewari, S. C., Pankaj Kapoor, (1988). Mushroom Cultivation. Mittal Publication, New Delhi.
3. Biotechnology, V. Kumaresan.

Reference Books:

1. Stamets, Paul, and J.S. Chilton. 1983. The Mushroom Cultivator. Agarikon Press, Olympia, WA. 415 p.

Online Resources – e-Resources/ e-Books and e- learning portals

- **https://nios.ac.in/media/documents/vocational/mushroom_production_(revised)(618)/Lesson-01.pdf**
- **https://agriportal.cg.nic.in/horticulture/PDF/Download/Mushroom%20Project_Part%201.pdf**
- **http://nhb.gov.in/pdf/Cultivation.pdf**

PART: D ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 15 Marks
End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	**Internal Test/ Quiz – (2): 10 & 10** **Assignment/ Seminar + Attendance: 05** **Total Marks: 15**	Better Marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against **15** Marks

End Semester Exam (ESE):	**Laboratory/ Field Skill Performance: On spot Assessment** **A. Performed the Task based on lab. work – 20 Marks** **B. Spotting based on tools & technology (written) - 10 Marks** **C. Viva-voce (based on principle/ technology) – 05 Marks**	**Managed by Coordinator as per skilling**

Name and Signature of Convener and Members of CBoS

10.6.24 10.6.24 10.6.24 Dr. Nelson Xess

10/6/24 10-6-24 Dr. Swetha Nag. J

10/6/24

FOUR YEAR UNDERGRADUATE PROGRAM (2024 –28)
DEPARTMENT OF English
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in-Arts/Science/Commerce (Diploma)		Semester -IV	Session: 2024-2025
1	**Course Code**	**AEC- 04**	
2	**Course Title**	Communicative English and Soft Skills	
3	**Course Type**	AEC [Ability Enhancement Course]	
4	**Pre-requisite** (if, any)	As per program	
5	**Course Learning. Outcomes (CLO)**	After completion of this course, the students will be able to: ➢ Learn deviant use of English both in written and spoken forms. ➢ Understand the importance of communication in English. ➢ Apply the ability to improve competence in using English language. ➢ Analyze the importance of reading skills. ➢ Develop language for speaking with confidence.	
6	**Credit Value**	**2 Credits**	***Credit = 15 Hours - learning & Observation***
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of Teaching–learning Periods (01 Hr. per period) - 30 Periods (30 Hours)

Unit	Topics (Course contents)	No. of Period
I	**What is communication?** • Purpose of Communication, • Types of Communication (Verbal and Non- Verbal), • The motivating factors (Intrinsic and Extrinsic) • Barriers of Communication (Internal and External).	08
II	**Building Vocabulary** • Use of Dictionary, • Building Vocabulary through synonyms and antonyms, • Use of Phrasal Verbs, Idioms and Phrases • Unseen passage	07
III	**Conversation in English** (Performance Based) A) **Reading**: Very short stories (Gift of Magi, Cinderella, The Selfish Giant, Stories from Panchatantra), Newspaper reports / Fact- based articles, Diction and tone, Identifying topic sentences, Reading aloud: Reading an article/report. B) **Spoken English for the Real world and Situational Dialogues) (any four)** • Call Center: Talking to service Providers, Professional Enquiries, Talking with peers/ seniors. • Bank: for opening an account (seeking information on loans/FDs/other schemes. • Office: (seeking information regarding job vacancy) • Market (asking for price of an object, discount etc), • Restaurant: (asking for the special dish, offerings in the menu and ordering for food)	08

	• At the Railway Station/ Bus Station enquiry: (Arrival and departure of buses/ trains) • Hotel: Booking a room, asking tariff rate • Travel agency: (Asking to book tickets fares, finding vacancies in hotels) C) **Greetings and Common Etiquettes**: Introducing oneself; Invitation; Making Requests; Expressing Gratitude; Complimenting and Congratulating; Expressing Sympathy; Apologizing; Complaining and Expressing Regret	
IV	**Presentation skills** (Performance Based): Effective oral presentation, Characteristics of good oral presentation. Use of quotations and anecdotes. Ways of Oral Presentation (Seminar, Viva -voce, Interview, Power Point etc.) Gestures/ Mannerism during oral presentation. Media methods used for effective oral presentation, Body Language, Attire.	**08**
Key words	Communication, Vocabulary, Conversation, Reading, Presentation.	

Signature of Convener & Members (CBoS) :

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended **- Suggested Reading:**

- Fluency in English - Part II, Oxford University Press, 2006.
- Enrich Your English, OUP, SR Inthira and V. Saraswathi, CIEFL,1997
- Oxford A-Z of English Usage, ed. Jeremy Butterfield, OUP, 2007.
- Longman Dictionary of Common Errors, N.D. Turton and J.B. Heaton, Longman, 1998
- Contemporary Communicative English, S Chand
- Malhotra Prerna, Deb Dulal Halder, (2019) Communication Skills: Theory and Practice, Eighth Edition, BookAge Publications, New Delhi.

Online Resources–

- Applying Communication Theory for Professional Life: A Practical Introduction. Dainton and Zelley,
http://tsime.uz.ac.zw/claroline/backends/download.php?url=L0ludHJvX3RvX2NvbW11bmljYXRpb25f
- **https://web.sol.du.ac.in/my_modules/type/cbcs-41-2/data/root/B.Com/Semester%202/ABILITY-ENHANCEMENT%20COMPULSORY%20COURSE-AECC/English%20Communication%20A-B-C/Unit%201-5.pdf**
- **https://archive.org/details/personality-development-book/mode/1up**
- **https://www.coursera.org/articles/presentation-skills**
- **https://www.cbs.de/en/blog/15-effective-presentation-tips-to-improve-presentation-skills/**
- **https://benjaminball.com/blog/good-body-language-best-visual-aid-talks/**
- **https://blog.moderngov.com/importance-of-body-language-in-presentations-good-bad-examples**

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Q1**. Objective/ MCQs to be asked only from Unit I (**1 x5= 05** Mark) **Q2**. I Vocabulary: (5Marks) II Unseen Passage (5 Marks) **Q3**. Particles from Unit 3 & 4 consisting of 20 marks.	

Name and Signature of Convener & Members of CBoS: