SHRI DAVARA UNIVERSITY NAYA RAIPUR (C.G.)

Faculty of Science

(FOS)

Department of Biotechnology

CURRICULUM

for

Master of Science (M.Sc) in Biotechnology

PROGRAM CODE: FOSMSC2BT

Master of Science (M.Sc) in Biotechnology- 2 Years

Department of Biotechnology, Faculty of Science

Shri Davara University, Naya Raipur

SHRI DAVARA UNIVERSITY NAYA RAIPUR (C.G.)

Semester-II

(Effective Session: 2025-26)

S. No.	Course Code	Course Tittle	LTP Ratio				Assessment Marks		
			L	T	P	Credits	Formative	Summative	Total
Semester-II									
1	MSBT201T	Biotechnology V: Genetics	4	1	-	5	30	70	100
2	MSBT202T	Biotechnology VI: Advances in Molecular Biology	4	1	-	5	30	70	100
3	MSBT203T	Biotechnology VII: Biology of Immune System	4	1	-	5	30	70	100
4	MSBT204T	Biotechnology VIII: Genetic Engineering	4	1	-	5	30	70	100
5	MSBT205	Lab course: III (Combining Paper V and VI)	-	-	4	2	15	35	50
6	MSBT206	Lab course: IV (Combining Paper VII and VIII)	-	-	4	2	15	35	50
7	MSBT207	Research Methodology	2	-	-	2	15	35	50
	Total		**16**	4	8	26			**550**

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<table>
<tr><td>Title</td><td colspan="5">GENETICS</td></tr>
<tr><td>Code</td><td colspan="5">MSBT201T</td></tr>
<tr><td rowspan="2">Credit</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>4</td><td>1</td><td>-</td><td>5</td><td></td></tr>
<tr><td>Prerequisite</td><td colspan="5">Educational Background:
• Undergraduate-level knowledge of basic biology, cell biology, and genetics.
• Basic understanding of inheritance patterns.
• Familiarity with laboratory practices in biology.</td></tr>
<tr><td>Objective</td><td colspan="5">This paper will provide an understanding regarding fundamental concepts of genetics, structure of genes, mutagen, gene regulation and expression, qualitative genetics, different syndromes, and applied aspects of genetics and its role in the unification of different disciplines of biology.</td></tr>
<tr><td>Content</td><td colspan="5">UNIT 1
Introduction to genetics; Beginning of genetics as a science. Early studies involving genetics.
Mendelian inheritance, physical and chemical basis of heredity.
Non-Mendelian inheritance, Gene to Phenotype Interactions between the Alleles of one gene, interfering gene interaction
Fine structure of gene, Organization of prokaryotic and Chromatin genome, DNA supercoiling, DNA eukaryotic organization-histone and interactomes.
UNIT 2
Regulation of gene expression in prokaryotes Operon concept, Lac and Trp operon, positive and negative regulation of Lac operon. Transcriptional attenuation of Trp operon,
Regulation of gene expression in eukaryotes by chromatin structure -epigenetic modifications of chromatin. Role of DNA methylation and histone modifications in the regulation of gene expression.
Types, causes, and detection, mutant types- lethal, conditional, biochemical, loss of function, gain of function, germinal versus somatic mutants, insertional</td></tr>
</table>

	mutagenesis. Mutagens UV and chemical mutagens. Structural and numerical alterations of chromosomes: deletion, duplication, inversion, translocation, poidyand their genetic implications. dosage compensation; mutational assay system Inheritance: autosomal and sex-linked inheritance, extra chromosomal inheritance, inheritance of organelle genes. **UNIT 3** Variation; sources of variation; Selection; Heritability of variation, process of speciation; Origin of new genes. Hardy- Weinberg genetic equilibrium. Genes and Quantitative traits; Genotypes and Phenotypic distribution; heritability of quantitative character inheritance, locating genes, QTL mapping Human genetics: Pedigree analysis, lod. score for linkage testing, karyotypes, genetic disorders. **UNIT 4** Bacterial Genetic system: Transformation, Conjugation, Transduction. Bacterial genetic map with reference to E. coli. Viruses and their Genetic system: Phage I and its lifecycle; RNA viruses; Retroviruses Genetic system of Yeast and Neurospora. Gene mapping methods: Linkage maps, tetrad analysis, mapping with molecular markers, mapping by using somatic cell hybrids, development of mapping population in plants.
Outcome	• Describe Mendelian and non-Mendelian inheritance patterns. • Explain molecular mechanisms of gene regulation and mutation. • Apply quantitative methods to study gene frequencies, linkage, and genetic variation.
Text Books	1. Lindsey & Arthur Ward (2018) Textbook of Evolution and Genetics. Palala Press. 2. Benjamin Pierce (2019) Genetics: A Conceptual Approach. 7hEdition. W,. H. Freeman Co. Ltd. 3. Gardner EJ, Simmons MJ, Snust and DP &Gardner Ss (2019) Principles of Genetics. 8Edition. Wiley Publication. 4. William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael A.

	Palladino & KillianD. (2019) Essentials of Genetics. 1oth Edition. Pearson Publication.
Reference Books	1. Michael J., Bamshad Md, Lynn B., Jorde M.D.& Carey John (2020) Medical Genetics. 6Edition. Elsevier-Health Science Division. 2. Robert Brokker (2020) Loose Leaf for Genetics: Aniysis and Principle, McGraw-Hill Education Ltd. 3. Tara Rodden Robinson& Lisa Spock (2020) Genetics for Dummies. 3°Edition. Dummies. 4. Benjamin Pierce (2021) Genetics Essentials. W. H. Freeman. 5. Castle William E, Mendel G. & VersucheU (2021) Genetics and Eugenics: a Textbook for Students of Biology and a Reference Book for Animal and Plant Breeders. Legare Street Press.

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<table>
<tr><td>Title</td><td colspan="5">ADVANCES IN MOLECULAR BIOLOGY</td></tr>
<tr><td>Code</td><td colspan="5">MSBT202</td></tr>
<tr><td rowspan="2">Credit</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>4</td><td>1</td><td>-</td><td>5</td><td></td></tr>
<tr><td>Prerequisite</td><td colspan="5">Educational Background:
• Undergraduate-level knowledge of cell biology, biochemistry, and genetics.
• Familiarity with basic molecular biology techniques (DNA/RNA isolation, PCR, electrophoresis).
Skills:
• Ability to interpret scientific literature.
• Basic laboratory training in microbiology or biotechnology.</td></tr>
<tr><td>Objective</td><td colspan="5">• To provide in-depth understanding of advanced concepts in molecular biology, including gene regulation, epigenetics, and genome organization.
• To train students in modern techniques such as next-generation sequencing, transcriptomics, and proteomics.
• To explore applications of molecular biology in medicine, agriculture, and biotechnology.</td></tr>
<tr><td>Content</td><td colspan="5">UNIT I
Genome Structure and Organization: Organization of prokaryotic and eukaryotic genomes, Structure of chromatin, nucleosome, chromatin organization and remodeling, DNA re-association kinetics(Cot curves), repetitive and unique sequences, DNA melting and buoyant density, C value paradox and genome size, satellite DNA,. Gene families, clusters, Pseudogenes, superfamilies, Organelle genomes Mobile DNA elements: Transposable elements in bacteria, IS elements, composite transposons, replicative and non-replicative transposons, Mu transposition, p-elements, Controlling elements in TnA and Tn 10 transposition. SINES and LINES, retrotransposons.
UNIT II
DNA damage and Repair: Types of DNA damage, DNA repair mechanisms-nucleotide excision repair, base excision repair, mismatch repair, recombination repair, double strand break repair, transcriptional coupled repair.
Mutation: Nonsense, missense and point mutations, intragenic and intergenic suppression, frameshift mutations, physical, chemical and biological mutagens.</td></tr>
</table>

	Recombination: Homologous and site-specific recombination, models for homologous recombination- Holliday junction, NHEJ Proteins involved in recombination- RecA, RuvA, B, C, Gene conversion **UNIT III** DNA Replication and Regulation: DNA polymerases and mechanisms of DNA replication in prokaryotes and eukaryotes (initiation, elongation and termination, enzymes and accessory proteins involved in DNA replication), DNA replication models, connection of replication to cell cycle. Gene Expression and Regulation in Prokaryotes and Eukaryotes. Transcription: Basic mechanism in prokaryotes and eukaryotes, RNA Polymerases, pseudo-ORFs Chromatin remodeling in relation to gene expression, DNase hypersensitivity, DNA methylation. Regulation of transcription including transcription factors. Post-transcriptional processing and transport of RNA. Noncoding RNAs, Organization and structure-function of ribonucleoproteins (Ribonome concept) **UNIT IV** Protein Synthesis and Regulation: Components of protein synthesis, Genetic code, degeneracy of codons, wobble hypothesis codon usage, Mechanism of protein synthesis (initiation, elongation and termination, Co- and post-translational Modifications), Regulation of protein synthesis, protein turnover and degradation.
Outcome	• Explain advanced molecular mechanisms such as chromatin remodeling, RNA interference, and CRISPR-Cas systems. • Apply molecular biology techniques in experimental design and problem-solving. • Analyze data from high-throughput sequencing and molecular assays.
Text Books	1. Lewin B. (2012), Genes XI, 11th edition, Publisher - Jones and Barlett Inc. USA4. 2. Weaver R (2011) Molecular Biology, 5th Edition, McGrew Hill Science. USA 3. Tropp B. E., Jones, Bartlett (2011), Molecular Biology: genes to proteins, 4th edition Learning, USA 4. Wilson K., Walker J. (2010) Principles and Techniques of Biochemistry and Molecular Biology 7thEdition Cambridge University Press 5. Pal J.K. and Ghaskadbi S., (2009), Fundamentals of Molecular Biology, Oxford University Press

	6. Watson J. D., Baker T., Bell S. P., Gann A., Levine M., Lodwick R. (2008) Molecular Biology of the Gene, 6th Edition,. Pearson Education, Inc. and Dorling Kindersley Publishing, Inc. USA
Reference Books	1. Nadeem A., Hassan F., Javed M. (2021), Introduction to Molecular Genomics, Bentham Science Publishers 2. Craig N., Green R., Greider C., Cohen O. (2014) Molecular Biology Principles of Genome Function 2nd Edition, OUP Oxford. 3. Brown T A (1995) A practical approach, Essential molecular biology, vol. I, IRL press, Oxford.

SHRI DAVARA UNIVERSITY NAYA RAIPUR (C.G.)

Title	**BIOLOGY OF IMMUNE SYSTEM**				
Code	**MSBT203**				
Credit	**L**	**T**	**P**	**TC**	
	4	1	-	5	
Prerequisite	**Educational Background:** • Completion of higher secondary education (XII) with Biology as a subject. • For advanced courses (UG/PG), prior exposure to basic microbiology, cell biology, and genetics is expected.				
Objective	• To provide a comprehensive foundation in the structure and function of the immune system. • To explain the molecular and cellular mechanisms underlying innate and adaptive immunity. • To train students in understanding immune responses to infection, cancer, transplantation, and autoimmune diseases. • To highlight defense mechanisms of pathogens and how they evade immunity.				
Content	**UNIT I** Understanding the Immune system, Mechanisms of Innate immune system (pattern recognition receptors, complement system, ADCC) and Adaptive immune system (cells involved, Antigen recognition by B cells and T cells, Effector mechanisms) Cytokines: Properties, Classification, Receptors, Signaling, Cytokine secretion by TH1 andTH2, Cytokine related diseases, Cytokine expression. **UNIT II** B cell development, development in Bone marrow, B cell lineages (B1 and B2), Negative regulation of B cells, T dependent and independent responses, Generation of Antibody Diversity: Germ line and Somatic theory, Dreyer and Bennett model, Tonegawa's Bombshell experiment Multigene organization of Ig gene, Variable gene rearrangements, Generation of antibody diversity, Synthesis, assembly, and secretion of immunoglobulins, Antibody engineering, Chimeric				

	antibodies. **UNIT III** T cell Development: Early thymocyte development, positive and negative selection, Differentiation, maturation, Apoptosis. Transplantation: Basis of Graft rejection, clinical manifestation of graft rejection; immunosuppressive therapy; immune tolerance; clinical transplantation. ‘ Cancer immunology: Malignant transformation of cells, Cancer induction, Tumor Antigens, Immunosurveillance, tumor evasion, Cancer immunotherapy. **UNIT IV** Hypersensitivity: Classification and types Primary immunodeficiencies: Combined immunodeficiency (Reticular dysgenesis, SCID, BLS, DiGeorge syndrome, Wiskott-Aldrich syndrome, Hyper IgM, Job syndrome), B-cell immunodeficiency (CVID, X-linked agammaglobulinemia), Disruption of immune regulation (APECED, IPEX), Disruption in innate immunity (LAD, CGD, CHS) Autoimmunity: Organ Specific and Systemic autoimmune diseases
Outcome	• Analyze mechanisms of antigen recognition, antibody diversity, and T-cell receptor generation. • Evaluate immune responses in transplantation, hypersensitivity, cancer, and autoimmunity. • Apply immunological knowledge in biomedical research, diagnostics, and therapeutic development.
Text Books	1. Immunology 5th ed Janis Kuby, W.H. Freeman & Co Ltd; 5thRevised edition. 2. Kuby Immunology / Judith A. Owen, Jenni Punt, Sharon A. Stranford; 7th Edition 3. Fundamental Immunology 5th edition (August 2003): by William E. Md. Paul, Lippincott Williams& Wilkins Publishers 4. Essential Immunology, Ivan M. Roit (1994) Blackwell Scientific Pub, Oxford.
Reference Books	1. Immunology 5th ed Janis Kuby, W.H. Freeman & Co Ltd; 5thRevised edition. 2. Parham, P. (2005). The Immune System. New York: Garland Science

	3. Paul, W. E. (2012). Fundamental Immunology. New York: Raven Press. 4. Sudha Gangal and Shubhangi Sontakke, Textbook of basic and clinical immunology 1st edition (2013), University Press, India

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<table>
<tr><td>Title</td><td colspan="5">GENETIC ENGINEERING</td></tr>
<tr><td>Code</td><td colspan="5">MSCBT204</td></tr>
<tr><td rowspan="2">Credit</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>4</td><td>1</td><td>-</td><td>5</td><td></td></tr>
<tr><td>Prerequisite</td><td colspan="5">• Basic Laboratory Skills in handling biomolecules, microbial cultures, and molecular techniques.
• Eligibility: Typically offered at the postgraduate level (M.Sc), requiring a bachelor’s degree in Biotechnology, Life Sciences, or related fields.</td></tr>
<tr><td>Objective</td><td colspan="5">• To provide conceptual understanding of DNA manipulation, cloning, and recombinant DNA technology.
• To train students in modern molecular tools such as PCR, CRISPR-Cas systems, and gene transfer techniques.</td></tr>
<tr><td>Content</td><td colspan="5">UNIT I
Scope of Genetic Engineering, Cloning and patenting of life forms, Genetic engineering guidelines, Molecular tools and their application: Restriction enzymes, modification enzymes, molecular markers.
Nucleic acid purification, yield analysis, Nucleic acid amplification and its applications.
UNIT II
Gene cloning vectors: Plasmids, bacteriophages, phagemids, cosmids, Artificial chromosomes
Restriction Mapping of DNA Fragments and Map Construction, Nucleic acid sequencing.
cDNA synthesis and cloning: mRNA enrichment, reverse transcription, DNA primers, linkers, adaptors and their chemical synthesis, Library construction and screening.
Cloning interacting genes - Two and three-hybrid systems. Nucleic acid microarray assay.
UNIT III
Site - directed mutagenesis and protein engineering,</td></tr>
</table>

	DNA Transfection, Southern blot, Northern blot, Western blot, Primer extension, S1 mapping, Rase protection assay, and reporter assays. Expression Strategies for heterologous genes: Vector engineering and codon optimization. host engineering; expression in bacteria, expression in Yeast, expression in insects and insect cells, expression in mammalian cells, expression in plants Phage display: Technique and applications **UNIT IV** Processing of recombinant Proteins: Purification and refolding. characterization of recombinant proteins, stabilization of proteins T - DNA and transposon tagging: Role of gene tagging in gene analysis, t - DNA and transposon tagging. Identification and isolation of genes through T - DNA or transposon Targeted gene replacement, Chromosome engineering. Cisgenesis, intragenesis, and genome editing by CRISPR-CAS Gene therapy: Vector engineering. Strategies of' gene delivery - Viral & non-viral, gene knockout, gene augmentation, gene correction/gene editing, gene regulation and silencing
Outcome	• Explain the principles of genetic manipulation and genome editing. • Perform laboratory techniques such as cloning, vector design, and gene expression analysis. • Evaluate ethical, legal, and social implications of genetic engineering. • Apply genetic engineering methods in solving real-world problems (e.g., crop improvement, therapeutic protein production).
Text Books	1. Philip M. Gilmeritie (2005) Molecular Plus Biology. Edition Oxford University Press. 2. TA Brown (2005) Gene Cloning and DNA Analysis. 4th Edition 3. Rusell and Peter (2002) Genetics Edition. Pearson Education, Inc, San Francisco. 4. Old and Primrose (2001) Principles of Gene Manipulation. 6th Edition. 5. B.D. Singh (2004), Biotechnology: An Expanding Horizons, 1st Edition.
Reference Books	1. W.H. Elliott and D. C. Elliott (2001) Biochemistry and Molecular Biology. 2nd Edition.

	2. Eldon John Gardner, Michael J. Simmons and Peter Snustad (1991) Principles of Genetics. Eight Edition, John Wiley and Sons, INC. 3. Benjamin Lewin (2007) Genes IX, 9th Edition Pearson Education International. 4. Brown TA (2006) Genomes, 3rd ed. Garland Science.

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<table>
<tr><td>Title</td><td colspan="5">BIOTECHNOLOGY LAB COURSE: III</td></tr>
<tr><td>Code</td><td colspan="5">MSCBT205P</td></tr>
<tr><td rowspan="2">Credit</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>0</td><td>0</td><td>2</td><td>2</td><td></td></tr>
<tr><td>Prerequisite</td><td colspan="5">Educational Background:
Undergraduate-level knowledge of cell biology, genetics, and molecular biology.
Prior completion of introductory laboratory courses in biotechnology.
Skills:
Familiarity with basic lab techniques (pipetting, microscopy, electrophoresis).
Understanding of DNA/RNA structure and function.</td></tr>
<tr><td>Objective</td><td colspan="5">To provide hands-on training in genetic and molecular biology techniques.
To develop proficiency in DNA/RNA isolation, PCR, cloning, and sequencing methods.
To train students in gene expression analysis, mutagenesis, and recombinant DNA technology.</td></tr>
<tr><td>Content</td><td colspan="5">To prepare a temporary stained slide of onion bulb peel to study the structure of plant cells.
To prepare the temporary stained slide of cheek squamous epithelial cells of the mouth of Human Beings.
Preparation and study of slide of mitosis using onion root tips squash.
Schedule for the study of the mitotic index. To determine the abnormal mitotic index.
Preparation and study of slide for meiosis using young anthers of Allium cepa.
To determine the meiotic index in the flower bud of Allium cepa.
Demonstration of Mendel's experiments.
Studies of prokaryotic and eukaryotic cells.
Perform karyotype and determine the genetic abnormality of the given sheet.</td></tr>
</table>

	10. To study polyploidy in onion root tips after treatment with colchicine. 11. Isolate genetic material from Bacteria. 12. Isolation and quantification of genomic DNA and RNA from prokaryotic/eukaryotic cells. 13. Agarose gel electrophoresis for nucleic acid separation and integrity check. Spectrophotometric analysis (A260/A280) for purity. 14. PCR amplification and analysis (demonstrating replication principles). 15. RNA isolation and transcription assays. 16. SDS-PAGE and Western blotting for protein expression analysis.
Outcome	• Perform laboratory experiments in genetics and molecular biology with accuracy and safety. • Apply techniques such as PCR, gel electrophoresis, restriction digestion, and cloning. • Analyze genetic data using quantitative and computational methods. • Evaluate experimental results and troubleshoot laboratory protocols.
Text Books	1. Green, M. R., &Sambrook, J. (2012). Molecular Cloning: a Laboratory Manual. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press. 2. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology (8th Edition, Cambridge University Press).
Reference Books	1. Green, M. R., &Sambrook, J. (2012). Molecular Cloning: a Laboratory Manual. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press.

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<table>
<tr><td>Title</td><td colspan="5">BIOTECHNOLOGY LAB COURSE: IV</td></tr>
<tr><td>Code</td><td colspan="5">MSBT206P</td></tr>
<tr><td rowspan="2">Credit</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>0</td><td>0</td><td>2</td><td>2</td><td></td></tr>
<tr><td>Prerequisite</td><td colspan="5">Educational Background:
• Undergraduate-level knowledge of cell biology, microbiology, genetics, and molecular biology.
Skills:
• Familiarity with basic immunological concepts (antigen–antibody interactions, immune cells).
• Understanding of recombinant DNA technology and gene manipulation.
• Basic laboratory safety and aseptic techniques.</td></tr>
<tr><td>Objective</td><td colspan="5">• To provide hands-on training in immunological assays and genetic engineering techniques.
• To develop proficiency in ELISA, immunoblotting, flow cytometry, and hybridoma technology.
• To integrate immunology and genetic engineering for applied research in diagnostics, therapeutics, and vaccine development.
• To foster critical thinking, problem-solving, and innovation in line with NEP's emphasis on experiential and interdisciplinary learning.</td></tr>
<tr><td>Content</td><td colspan="5">1. DOT-ELISA
2. Quantification of antigen using Single Radial Immuno-Diffusion.
3. Immuno-diffusion and immune-electrophoresis
4. Serum electrophoresis
5. Western Blotting
6. In-vitro demonstration of phagocytosis and calculating phagocytic index.
8. Latex bead agglutination/precipitation test for detection of rheumatoid factor (RF)
9. Separation of lymphocytes on Ficoll-Histopaque, viability count.
10. Bioinformatics analysis of gene families, codon optimization, and</td></tr>
</table>

	vector design. 11. Isolation and purification of DNA/RNA from prokaryotic and eukaryotic sources. 12. Yield analysis and purity check (spectrophotometry, gel electrophoresis). 13. PCR amplification and quantitative PCR applications. 14. Purification of recombinant proteins (affinity chromatography). 15. SDS-PAGE and Western blotting for protein characterization. 16. Protein refolding and stability assays.
Outcome	• Perform immunological techniques such as ELISA, immunoprecipitation, and Western blotting. • Apply genetic engineering methods, including cloning, transformation, and gene expression analysis. • Analyze immune responses and genetic modifications using quantitative and computational tools. • Integrate immunological and genetic engineering approaches for applications in biotechnology, medicine, and agriculture.
Text Books	1. Green, M. R., &Sambrook, J. (2012). Molecular Cloning: a Laboratory Manual. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press. 2. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology (8th Edition, Cambridge University Press).
Reference Books	1. Green, M. R., &Sambrook, J. (2012). Molecular Cloning: a Laboratory Manual. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press.

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<table>
<tr><td>Title</td><td colspan="5">RESEARCH METHODOLOGY</td></tr>
<tr><td>Code</td><td colspan="5">MSCSE207</td></tr>
<tr><td rowspan="2">Credit</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>2</td><td>-</td><td>-</td><td>2</td><td></td></tr>
<tr><td>Prerequisite</td><td colspan="5">Students must appears in end semester examination of M.Sc. Chemistry</td></tr>
<tr><td>Objective</td><td colspan="5">Research Methodology for Chemistry in advance and establish foundation to research in the respective domain.</td></tr>
<tr><td>Content</td><td colspan="5">UNIT I Research: An Introduction
a) Types of Scientific Methods: Hypothetic-Deductive and Inductive Research
b) Types of Research: Basic vs. Applied, Quantitative vs. Qualitative Research
c) Principles of a Good Research
UNIT II The Research Process
a) Stages of conducting a Research
b) Problem and Hypothesis: Definition, Types
c) Variables: Types, Operational definition
. UNIT III Behavioural Research I
a) Control of Extraneous Variables
b) Laboratory experiments, Field Experiments
c) Field study, Survey
UNIT IV Behavioural Research II
a) Research: Causality and It’s criteria
b) Threats to Internal and External Validity
c) Non-Experimental Research: Co-relational Research, Survey
d) Sampling Issues: Representativeness and Adequacy
e) Sampling Strategies: Probability and Non-probability Sampling, Sampling Errors
f) Demand Characteristics and Ethical issues in Research</td></tr>
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Course Objectives	The course aims to enable the students learn the concepts of Research techniques and it's applicability in the various minor and major researches. Fundamentals of research with specific reference to quantitative research methods would facilitate the students towards exploring the area of their interest.
Outcome	The course aims to enable the students learn the concepts of Research techniques and it's applicability in the various minor and major researches. Fundamentals of research with specific reference to quantitative research methods would facilitate the students towards exploring the area of their interest.
Books Recommended:	Aronson, E. and Ellsworth D.C., Carlsmith, J.M., Gonzales, M.I