



M.Sc. Botany Program Outcome Matrix

Required Courses and Course Outcomes	M.Sc. Botany Course Program Outcomes Semester: I											
	Foundational Knowledge	Research and Analytical Skills	Problem-Solving and Critical Thinking	Practical and Technical Proficiency	Communication Skills	Ethical and Social Responsibility	Teamwork and Collaboration	Entrepreneurship and Innovation	Lifelong Learning	Global and Indian Perspectives	Application of Botany	Career Readiness
Semester: I												
SAD265001T												
Cell and Molecular Biology												
CO1: Comprehensive Understanding of Cell Structure and Membrane Dynamics	✓	✓		✓				✓	✓		✓	
CO2: In-Depth Knowledge of Cellular Organelles and Their Functions	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
CO3: Proficiency in Cell Cycle Regulation and Cytoskeletal Functions	✓		✓		✓	✓		✓	✓	✓		✓
SAD265011T												
Biology & Diversity of Algae and Bryophytes												
CO1: Comprehensive Knowledge of Algal Diversity and Classification	✓					✓						
CO2: In-Depth Understanding of Algal Structure, Reproduction, and Economic Importance	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
CO3: Proficiency in Bryophyte Biology, Morphology, and Bioprospecting	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
SAD265021T												
Taxonomy of Angiosperms												
CO1: Mastery of Angiosperm Classification and Phylogeny	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO2: Proficiency in Botanical Nomenclature and Taxonomic Evidence	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO3: Practical Skills in Taxonomy and Herbarium Techniques	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SAD265001P												
Practical - Cell and Molecular Biology												
CO1: Proficiency in Cytological Techniques	✓			✓	✓	✓			✓		✓	
CO2: Expertise in Molecular and Biochemical Analysis	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓

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Crop Genetics and Plant Breeding – I												
CO1: Proficiency in Floral Biology and Hybridization Techniques	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO2: Competence in Analyzing Pollen Characteristics and Plant Sterility	✓	✓	✓	✓	✓	✓	✓	✓		✓		
CO3: Expertise in Chromosomal Analysis for Genetic Studies	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
SBD265051T												
Mycology and Plant Pathology-I												
CO1: Understanding of Plant Pathology and Disease Classification	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
CO2: Knowledge of Plant Diseases Caused by Parasites and Nematodes	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
CO3: Proficiency in Identifying and Managing Specific Plant Diseases	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SBD265051P												
Mycology and Plant Pathology-I												
CO1: Proficiency in Specimen Collection and Preservation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO2: Skillful Application of Diagnostic Techniques and Instrumentation	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	
CO3: Competence in Disease Identification and Field Studies	✓	✓	✓	✓	✓	✓		✓	✓			✓
SBD265061T												
Taxonomy of Angiosperms – I												
CO1: Comprehensive Understanding of Angiosperm Characteristics and Taxonomy Principles	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO2: Critical Analysis of Angiosperm Phylogeny and Classification Systems	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
CO3: Application of Taxonomic Concepts and Phylogenetic Relationships	✓	✓	✓	✓	✓	✓		✓	✓		✓	
SBD265061P												
Practical - Taxonomy of Angiosperms – I												
CO1: Skillful Analysis of Morphological and Evolutionary Trends	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO2: Proficient Identification and	✓	✓	✓	✓		✓	✓	✓	✓		✓	

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Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, CHHATRAPATI SAMBHAJINAGAR.
DEPARTMENT OF BOTANY

M.Sc. Botany Program Outcome Matrix

Required Courses and Course Outcomes	M.Sc. Botany Course Program Outcomes Semester: II											
	Foundational Knowledge	Research and Analytical Skills	Problem-Solving and Critical Thinking	Practical and Technical Proficiency	Communication Skills	Ethical and Social Responsibility	Teamwork and Collaboration	Entrepreneurship and Innovation	Lifelong Learning	Global and Indian Perspectives	Application of Botany	Career Readiness
Semester: II												
SAD265502T Cytology and Genetics												
CO1: Mastery of Chromatin and Chromosome Organization	✓				✓	✓	✓		✓			
CO2: Understanding Chromosomal Alterations and Their Implications	✓	✓	✓	✓	✓	✓	✓	✓	✓			
CO3: Exploration of Mutation Mechanisms and Applications	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
SAD265512T Plant Development and Reproduction												
CO1: Understanding Plant Development Mechanisms	✓	✓	✓	✓	✓	✓	✓	✓	✓			
CO2: Mastery of Vascular Tissues and Organ Growth	✓	✓	✓	✓	✓	✓			✓		✓	✓
CO3: Proficiency in Plant Reproduction Processes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SAD265522T Biology and Diversity in Fungi and Microbes												
CO1: Comprehensive Understanding of Fungal Biology and Economic Importance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO2: In-depth Knowledge of Plant Pathogenic Fungi and Bacteria	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO3: Proficiency in Phytoplasmas and Viruses	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SAD265502P Practical - Cytology and Genetics												
CO1: Mastery in Inducing and Analyzing Mutations	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CO2: Expertise in Chromosomal Analysis and Karyotype Evaluation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO3: Proficiency in Chromosomal Behavior Studies and Mutation Effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SAD265512P Practical - Plant Development and Reproduction												
CO1: Proficiency in Plant Tissue and Anatomy Analysis	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
CO2: Skill in Reproductive Structures and Pollen Analysis	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓

CO3: Competence in Ovule, Embryo Sac, and Field Studies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SAD265522P Practical - Biology and Diversity in Fungi and Microbes												
CO1: Mastery of Laboratory Techniques and Instrumentation	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
CO2: Expertise in Microbial Morphology, Taxonomy, and Growth	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO3: Competence in Diagnosing Plant Diseases Caused by Microbes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SAD265532P Practical - Botanical Techniques												
CO1: Proficiency in Microscopy and Biological Sample Preparation	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	
CO2: Expertise in Botanical Staining, Sectioning, and Plant Preservation	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
CO3: Competence in Laboratory Techniques and Biostatistics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SBD2655542T Crop Genetics and Plant Breeding – II												
CO1: Mastery of Heterosis Breeding and Mutation Breeding Techniques	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO2: Expertise in Resistance Breeding for Disease, Insect, and Drought Resistance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO3: Proficiency in Distant Hybridization and Seed Production Management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SBD2655542P Practical - Crop Genetics and Plant Breeding – II												
CO1: Application of Polyploidy and Mutagenesis Techniques	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO2: Analysis and Interpretation of Seed and Leaf Proteins	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO3: Designing Field Experiments and Data Analysis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SBD265552T Mycology and Plant Pathology – II												
CO1: Understanding Fungal Diversity and Applications	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
CO2: Application of Fungi in Biofertilizers and Biopesticides	✓	✓	✓	✓	✓	✓		✓		✓	✓	
CO3: Fungal Biotechnology and Mushroom Cultivation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SBD265552P Practical - Mycology and Plant Pathology – II												
CO1: Practical Skills in Fungal Diversity and Pathology	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓
CO2: Expertise in Industrial and Biotechnological Applications	✓	✓	✓	✓	✓		✓		✓	✓	✓	

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DEPARTMENT OF BOTANY

M.Sc. Botany Program Outcome Matrix

Required Courses and Course Outcomes	M.Sc. Botany Course Program Outcomes Semester: III											
	Foundational Knowledge	Research and Analytical Skills	Problem-Solving and Critical Thinking	Practical and Technical Proficiency	Communication Skills	Ethical and Social Responsibility	Teamwork and Collaboration	Entrepreneurship and Innovation	Lifelong Learning	Global and Indian Perspectives	Application of Botany	Career Readiness
Semester: III												
SAD266003T Biology & Diversity of Pteridophytes & Gymnosperms												
CO1: Understanding of Evolutionary Relationships andMorphological Diversity	✓											
CO2: Analysis of Reproductive Strategies and EvolutionaryAdaptations	✓			✓	✓		✓			✓	✓	✓
CO3: Exploration of Gymnosperm Diversity and PaleobotanicalInsights	✓	✓			✓	✓		✓	✓	✓		✓
SAD266013T Plant Ecology and Conservation												
CO1: Comprehensive Understanding of Ecosystem Dynamics	✓											
CO2: Critical Analysis of Biogeography and Environmental Challenges	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
CO3: Application of Conservation Strategies and Legal Frameworks	✓		✓	✓		✓		✓			✓	✓
SAD266023T Plant Biotechnology												
CO1: Mastery of Plant Tissue Culture Techniques and Principles	✓											✓
CO2: Application of Cellular Totipotency and Somaclonal Variation	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
CO3: Proficiency in Advanced Plant Biotechnology and GeneticEngineering	✓		✓	✓			✓	✓	✓	✓	✓	✓
SAD266003P Biology and Diversity of Pteridophytes and Gymnosperms,												
CO1: Proficiency in Morphological and Anatomical Analysis ofPteridophytes	✓				✓	✓			✓			
CO2: Competence in Gymnosperm Structural and ReproductiveStudies	✓	✓		✓		✓	✓	✓		✓	✓	✓
CO3: Understanding of Fossilization Processes and PaleobotanicalSpecimens	✓	✓	✓						✓		✓	

SAD266013P Plant Ecology and Conservation												
CO1: Proficiency in Ecological Data Analysis and Statistical Techniques	✓					✓					✓	✓
CO2: Competence in Field-Based Ecological Assessments	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓
CO3: Understanding of Soil and Water Quality Assessment Techniques	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
SAD266023P Plant Biotechnology												
CO1: Mastery of Plant Tissue Culture Techniques and Principles	✓					✓			✓			
CO2: Application of Cellular Totipotency and Somaclonal Variation	✓	✓		✓		✓	✓	✓		✓	✓	✓
CO3: Proficiency in Advanced Plant Biotechnology and GeneticEngineering	✓	✓	✓						✓		✓	
SAD266033P Industrial Technology												
CO1: Mastery of Industrial Fermentation Techniques and Equipment	✓			✓					✓			✓
CO2: Proficiency in Food Biotechnology and Preservation Methods	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO3: Application of Biotechnological Processes in Commercial Production	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
SBD266043T ADVANCED GENETICS – I												
CO1: Proficiency in Microbial Genetics and Gene Mapping Techniques	✓	✓										
CO2: Mastery of Genetic Engineering and Genomic Techniques	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
CO3: Understanding of Cancer Genetics and Genomic Analysis	✓			✓		✓	✓		✓			✓
SBD266043P ADVANCED GENETICS – I												
CO1: Proficiency in Microbial Genetics and Gene Mapping Techniques	✓			✓					✓			✓
CO2: Mastery of Genetic Engineering and Genomic Techniques	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO3: Understanding of Cancer Genetics and Genomic Analysis	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
SBD266053T Mycology and Plant Pathology - III												
CO1: Expertise in Plant Disease Diagnosis and Preservation Techniques	✓			✓								
CO2: Understanding of Pathogen Dispersal, Pathogenesis, and Disease Resistance	✓	✓		✓	✓	✓						

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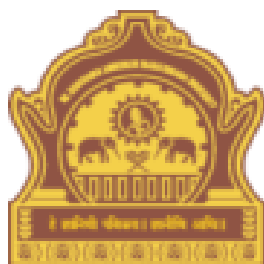
Bioprospecting and Plant Resource Utilization												
CO1: Proficient Identification and Analysis of Plant Resources	✓			✓		✓						
CO2: Competence in Phytochemical and Biological Assays	✓	✓			✓					✓		
CO3: Practical Experience and Application of Plant Resources in Industry and Research	✓		✓	✓			✓	✓	✓		✓	✓
SAD266514P Pharmacognosy												
CO1: Proficient in Phytochemical Analysis and Testing	✓		✓		✓			✓				✓
CO2: Expertise in Pharmacognostic Procedures for Plant Drug Standardization	✓	✓		✓		✓	✓			✓		
CO3: Competence in Extraction and Quality Assessment of Plant Materials				✓								
SAD266524P Plant Physiology and Metabolism												
CO1: Proficiency in Protein and Amino Acid Analysis	✓											
CO2: Expertise in Enzyme Activity and Immobilization Techniques	✓			✓	✓	✓			✓	✓		✓
CO3: Competence in Extraction, Estimation, and Analysis of Plant Metabolites	✓	✓	✓	✓			✓	✓	✓		✓	✓
SAD266534P Genetic Engineering and Bioinformatics - II												
CO1: Mastery of Bioinformatics Databases and File Formats	✓	✓					✓					
CO2: Proficiency in Sequence Analysis and Structural Prediction	✓	✓			✓	✓		✓		✓		✓
CO3: Competence in Literature and Database Searches	✓		✓	✓					✓	✓	✓	
SBD266544T Advanced Genetics - II					✓							

CO1: Comprehensive Understanding of Molecular Genetic Processes	✓								✓			
CO2: Proficiency in Gene Regulation and Human Genetics						✓				✓		✓
CO3: Insight into Population Genetics and Cell Communication	✓		✓	✓			✓	✓			✓	
SBD266544P Advanced Genetics - II												
CO1: Comprehensive Understanding of Molecular Genetic Processes	✓		✓							✓		
CO2: Proficiency in Gene Regulation and Human Genetics	✓	✓	✓	✓	✓		✓			✓		
CO3: Insight into Population Genetics and Cell Communication	✓			✓		✓		✓	✓		✓	✓
SBD266554T Mycology and Plant Pathology - IV												
CO1: Expertise in Seed Pathology and Seed Health Management	✓				✓							
CO2: Proficiency in Mycotoxins and Plant Defense Mechanisms		✓		✓		✓			✓	✓		
CO3: Understanding and Application of Integrated Pest Management (IPM)	✓		✓	✓	✓		✓	✓			✓	✓
SBD266554P Mycology and Plant Pathology - IV												
CO1: Proficiency in Fungal Isolation and Identification	✓		✓							✓		
CO2: Expertise in Mycotoxin Production and Bioassay	✓	✓	✓	✓	✓		✓			✓		
CO3: Application of Endophytic Fungi and Field Experience	✓			✓		✓		✓	✓		✓	✓
SBD266564T Taxonomy of Angiosperms – IV												
CO1: Competence in Taxonomic Character Assessment and Feature Study	✓				✓							
CO2: Skills in Numerical Taxonomy		✓		✓		✓			✓	✓		

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**DR. BABASAHEB AMBEDKAR MARATHWADA
UNIVERSITY,
AURANGABAD.**

DEPARTMENT OF CHEMISTRY



OUTCOME BASED CURRICULUM

Faculty of Science & Technology

M. Sc. Chemistry

(Semester I to IV)

Choice Based Credit and Grading System

Effective from : June 2017

PREFACE

Outcome Based Education (OBE) is the educational approach which focuses on student centric education in the context of development of personal, social, professional and knowledge (KSA) requirements in one's career and life. It is the decade ago curriculum development methodology. The educational triangle of LEARNING-ASSESSMENT-TEACHING is the unique nature of the OBE approach. The curriculum practices such as Competency Based Curriculum, Taylor's Model of Curriculum Development, Spadys' Curriculum principles, Blooms taxonomy and further use of assessment methodologies like, Norm-reference testing and Criterion reference testing, etc is being practiced since decades. It is also interesting to know that, globally, different countries and universities adopts the curriculum development models/approaches such as, CDIO (Conceive-Design-Implement-Operate), Evidenced Based Education, Systems' Approach, etc as the scientific and systematic approaches in curriculum design.

The authorities of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M.S.) in-lieu of accreditation standards of National Assessment and Accreditation Council, decided to opt for Outcomes Based Education (OBE). As the part of the decision, different meetings, workshops and presentations were held at the campus of university.

This document is the outcome of different meetings and workshops held at university level and department level. The detailed document is designed and the existing curriculum of the department is transformed in to the framework of OBE. This is the first step towards the implementation of OBE in the department. The document will serve all stakeholders in the effective implementation of the curriculum. The OBE is continuous process for quality enhancement and it will go a long way in order to enhance the competencies and employability of the graduates/Post-graduates of the university department.

Head of the Department

INDEX

Sr. No.	Contents	Page No.
1.	Preface	01
2.	Mission	02
3.	Vision	02
4.	Title of the Program	03
5.	Program Educational Objectives	03
6.	Program Outcomes	03
7.	Course- Program outcome Matrix	04
8.	Semester wise CO-PO MATRIX	04
9.	Course Outcomes for all courses	07
10.	Set Target levels for Attainment of Course Outcomes	07
11.	Set Target level for Attainment of Program Outcomes	07
12.	Course Attainment Level	08
13.	Program attainment Level	08
14.	Results of CO Attainment	08
15.	Table No. 1.0: CO Attainment Level	14
16.	Results of PO Attainment	14
17.	Table No. 2.0 PO Attainment Level	14
18.	Planned Actions for Course Attainment	15
19.	Annexure-B : Course attainment & PO attainment level	15
20.	Annexure-C : Course outcomes	18-35
21.	Curriculum	37-193

1.	Mission: Mission Statement To develop the researcher and scientist in chemical science through post-graduate education and research programme. To develop the competent manpower with technology based experimentation methodologies and value based practices for business and industries. To undertake projects to solve field base problems. To provide student centric learning facilities for the development of overall personality of learner.
2.	Vision: Vision Statement A respectable teaching – learning and research organization nationally and internationally in the area of chemical sciences. By providing competitive trained chemists which will assist the chemical world, industries and stake holders The mission and vision of the organization help in preparation of strategic plan.
3.	Title of the Program (s): Master Science - Chemistry
4.	Program Educational Objectives: The program educational objectives (PEO) are the statement that describes the career and professional achievement after the program of studies (graduation/ post-graduation). The PEO s are driven form question no. (ii) of the Mission statement (What is the purpose of organization). The PEOs can be minimum three and maximum five. PEO1:To have advance knowledge of chemistry domain. PEO2:To provide the professional services to industry, Research organization, institutes. PEO3:To provide the professional consultancy and research support for therelevant organization in the domain of super specialization. PEO4: To opt for higher education, disciplinary & multi-disciplinary research and to be a life-long learner. PEO5: To provide, value based and ethical leadership in the professional and social life.
5.	Program Outcomes: The program outcomes (PO) are the statement of competencies/ abilities. POs are the statement that describes the knowledge and the abilities the post-graduate will have by the end of program studies. - In-depth and detailed functional knowledge of the fundamental theoretical concepts and experimental methods of chemistry. - Apply/implement interface between on the one hand, the history of chemistry and natural science and, on the other hand, issues pertaining to the areas of modern technology, health, and environment. - Skills in planning and conducting advanced chemical experiments and applying structural-chemical characterization techniques. - Skill in examining specific phenomena theoretically and/or experimentally.

	e. Generation of new scientific insights or to the innovation of new applications of chemical research.
6.	Course- Program outcome Matrix: The Program Outcomes are developed through the curriculum (curricular/co-curricular-extra-curricular activities). The program outcomes are attained through the course implementation. As an educator, one must know, <u>“to which POs his/her course in contributing?”</u>. So that one can design the learning experiences, select teaching method and design the tool for assessment. Hence, establishing the Course-PO matrix is essential step in the OBE. The course-program outcomes matrix indicates the co-relation between the courses and program outcomes. The CO-PO matrix is the map of list of courses contributing to the development of respective POs.

Semester wise CO-PO MATRIX

M. Sc. Chemistry programme								
Paper No.	Course Title	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
Semester- I (Core and Foundation Courses)								
CHEC-101	Inorganic chemistry	*	*					
CHEC-102	Organic chemistry	*	*					
CHEC-103	Physical chemistry	*	*					
CHEF-104	Analytical chemistry	*	*					
CHELI-105	Laboratory course	*	*	*				
CHELO-106	Laboratory course	*	*	*				
CHELP-107	Laboratory course	*	*	*				
Semester- II (Core and Foundation Courses)								
CHEC-201	Inorganic chemistry	*	*					
CHEC-202	Organic chemistry	*	*					
CHEC-203	Physical chemistry	*	*					
CHEF-204	Analytical chemistry	*	*					
CHEF-205	Research methodology	*	*					
CHER-206	Review of literature	*	*	*				
CHELI-207	Laboratory course	*	*	*				
CHELO-208	Laboratory course	*	*	*				
CHELP-209	Laboratory course	*	*	*				
Semester- III (Core and Elective Courses) Inorganic Chemistry								
CHESC-301	Structural elucidation by spectral methods	*	*					
CHECI-302	Bioinorganic and supramolecular chemistry			*	*	*		
CHECI-303	Applied inorganic chemistry			*	*	*		
CHEEI-304	Chemistry of materials			*	*	*		
CHEEI-305	Environmental chemistry			*	*	*		
CHEEI-306	Solid state chemistry			*	*	*		
CHEEI-310	Instrumental methods of			*	*	*		

	chemical analysis							
CHELI-307	Laboratory course			*	*	*		
CHELI-308	Laboratory course			*	*	*		
CHELI-309	Laboratory course			*	*	*		
Semester- IV (Core and Elective Courses) Inorganic Chemistry								
CHECI-401	Nuclear chemistry			*	*	*		
CHECI-402	Photoinorganic chemistry			*	*	*		
CHECI-403	Therapeutic bioinorganic and forensic chemistry			*	*	*		
CHEEI-404	Organo transition metal chemistry			*	*	*		
CHEEI-405	Polymer chemistry			*	*	*		
CHEEI-406	Theoretical and structural inorganic chemistry			*	*	*		
CHEEI-409	Technology for converting waste agriculture biomass to energy			*	*	*		
CHEIR-407	Research project (Experimental)	*	*	*	*	*		
CHEIR-408	Research project (Dissertation, presentation and Seminars)	*	*	*	*	*		
Semester- III (Core and Elective Courses) Organic Chemistry								
CHESC-301	Structural elucidation by spectral methods	*	*					
CHECO- 302	Organic synthesis			*	*	*		
CHECO- 303	Photochemistry, free radicals and pericyclic reactions			*	*	*		
CHEEO-304	Advanced organic chemistry			*	*	*		
CHEEO -305	Environmental chemistry			*	*	*		
CHEEO- 306	Green chemistry			*	*	*		
CHEEO- 310	Novel materials and green industrial catalysis			*	*	*		
CHELO- 307	Laboratory course			*	*	*		
CHELO- 308	Laboratory course			*	*	*		
CHELO- 309	Laboratory course			*	*	*		
Semester- IV (Core and Elective Courses) Organic Chemistry								
CHECO -401	Heterocyclic chemistry			*	*	*		
CHECO -402	Organic synthesis: Retrosynthetic approach			*	*	*		
CHECO -403	Chemistry of natural products			*	*	*		
CHEEO -404	Medicinal chemistry			*	*	*		
CHEEO -405	Organic high polymers			*	*	*		
CHEEO -406	Drug design and drug discovery			*	*	*		
CHEEO-409	Chemoinformatics			*	*	*		
CHEOR- 407	Research project	*	*	*	*	*		

	(Experimental)							
CHEOR- 408	Research project (Dissertation, Presentation and Seminars)	*	*	*	*	*		
Semester- III (Core and Elective Courses) Physical Chemistry								
CHESC-301	Structural elucidation by spectral methods	*	*					
CHECP- 302	Solid state chemistry			*	*	*		
CHECP-303	Thermodynamics			*	*	*		
CHEEP -304	Advanced electrochemistry			*	*	*		
CHEEP -305	Environmental chemistry			*	*	*		
CHEEP-306	Nuclear chemistry			*	*	*		
CHEEP-310	Chemical mathematics and computer programming			*	*	*		
CHELP-307	Laboratory course			*	*	*		
CHELP-308	Laboratory course			*	*	*		
CHEPR-309	Laboratory course			*	*	*		
Semester- IV (Core and Elective Courses) Physical Chemistry								
CHECP-401	Surface and magnetochemistry			*	*	*		
CHECP -402	Polymer chemistry			*	*	*		
CHECP -403	Chemical dynamics and catalysis			*	*	*		
CHEEP -404	Nano chemistry			*	*	*		
CHEEP -405	Instrumental methods of chemical analysis,			*	*	*		
CHEEP-406	Biophysical chemistry			*	*	*		
CHEEP-409	Advance quantum chemistry			*	*	*		
CHEPR -407	Research Project (Experimental)	*	*	*	*	*		
CHEPR - 08	Research Project (Dissertation Presentation and Seminars)	*	*	*	*	*		
Semester- III (Core and Elective Courses) Analytical Chemistry								
CHESC-301	Structural elucidation by spectral methods	*	*					
CHECA-302	Advanced analytical techniques-I			*	*	*		
CHECA-303	Quality assurance and accreditation			*	*	*		
CHEEA-304	Electro analytical technique			*	*	*		
CHEEA-305	Advanced analytical Techniques-II			*	*	*		
CHEEA-306	Polymer & petrochemical analysis			*	*	*		
CHEEA-310	Synthetic Organic Chemistry-I			*	*	*		

CHELA-307	Laboratory course			*	*	*		
CHELA-308	Laboratory course			*	*	*		
CHELA- 09	Laboratory course			*	*	*		
Semester- IV (Core and Elective Courses) Analytical Chemistry								
CHECA -401	Analytical Method Development and validation			*	*	*		
CHECA -402	Pharmaceutical and forensic analysis			*	*	*		
CHECA -403	Environmental analysis and monitoring			*	*	*		
CHEEA -404	Food, fertilizer &pesticides analysis			*	*	*		
CHEEA -405	Ores, alloys &cosmetics Analysis			*	*	*		
CHEEA -406	Microbial and clinical analysis			*	*	*		
CHEEA-409	Synthetic organic chemistry-II			*	*	*		
CHEAR- 407	Research project (Experimental)	*	*	*	*	*		
CHEAR- 408	Research project (Dissertation, Presentation and Seminars)	*	*	*	*	*		

7.	Course Outcomes (for all courses): The course outcomes are the statement that describes the knowledge & abilities developed in the student by the end of course (subject) teaching. The focus is on development of abilities rather than mere content. There can be 5 to 7 course outcomes of any course. These are to be written in the specific terms and not in general. The list of course outcomes is the part of <u>Annexure-C</u> attached herewith.
8.	Set Target levels for Attainment of Course Outcomes: The course outcome attainment is assessed in order to track the graduates' performance w.r.t target level of performance. The CO-PO attainment is the tool used for continuous improvement in the graduates' abilities through appropriate learning & teaching strategies. In order to assess students' performance with respect to abilities (at the end of course teaching/by the end of program) the course outcome attainment are measured/calculated. In order to calculate the program outcome attainment, the course outcome attainment is calculated. Prior to that, the course-program outcome mapping is done.
9.	Set Target level for Attainment of Program Outcomes: The program outcome attainment is assessed in order to track the graduates' performance w.r.t target level of performance. The CO-PO attainment is the tool used for continuous improvement in the graduates' abilities through appropriate learning & teaching strategies. In order to assess students' performance with respect to abilities (at the end of course teaching/by the end of program) the course outcome attainment and program outcome attainment is measured/calculated. The program outcome attainment is governed by curricular, co-curricular and extra-curricular activities including the stakeholders'

	participation. The direct method and indirect method is adopted to calculate the PO attainment. The direct method implies the attainment by course outcomes contributing to respective program outcomes. And indirect method is the satisfaction/feed-back survey of stakeholders. In order to calculate the program outcome attainment, the course outcome attainment is calculated. Prior to that, the course-program outcome mapping is done. The set target level is the set benchmark to ensure the continuous improvements in the learners/ graduates' performance.
10.	Course Attainment Levels: - a). CO attainment is defined/set at three levels; - b). The CO attainment is based on end term examination assessment and internal assessment; - c). The Co attainment is defined at three levels in ascending order- d). Course Levels: - i). Level-1: 40% students score greater than or equal to class average - ii). Level-2: 50%students score greater than or equal to class average - iii). Level-3: 60%students score greater than or equal to class average Target Level: Level - 2 - e). The target level is set (e.g. Level-2). It indicates that, the current target is level-2; 50% students score more than class average. The CO attainment is measured and the results are obtained. Based on the results of attainment, the corrective measures/remedial action are taken. - f). CO Attainment= 80% (Attainment level in end term examination) + 20% (Attainment level in internal examination). <u>g). The example of calculating CO attainment is provided for one of the course from Inorganic Chemistry in Point No. 12.</u>
11.	Program attainment Level: - a). PO attainment is defined at five levels in ascending order; - b). The PO attainment is based on the average attainment level of corresponding courses (Direct Method) and feed-back survey (Indirect method); - c). The PO attainment levels are defined / set as stated below; - i). Level-1: Greater than 0.5 and less than 1.0 (0.5>1)- Poor - ii). Level-2: 1.0>1.5-Average - iii). Level-3: 1.5>2.0-Good - iv). Level-4: 2.0>2.5-Very Good - v). Level-5: 2.5>3.0 -Excellent - d). The PO attainment target level is set/defined (say, Level-4). It implies that, the department is aiming at minimum level-4 (very good) in the performance of abilities by the graduates. Based upon the results of attainment, the remedial measures are taken; - e). PO Attainment= 80% (Average attainment level by direct method) + 20% (Average attainment level by indirect method). <u>f). The example of calculating PO attainment is provided for one of the PO from Inorganic Chemistry in Point No. 13.</u>

**DR. BABASAHEB AMBEDKAR MARATHWADA
UNIVERSITY, AURANGABAD**



NAAC Reaccredited A Grade

FACULTY OF SCIENCE & TECHNOLOGY

2 Years / 1 Year M.Sc. Computer Science

Course Structure

For University Department

(Effective from 2023-24)

COURSE STRUCTURE AS PER GUIDELINES OF NEP 2020

Illustrative Credit distribution structure for two/ one year **M.Sc. Computer Science** Programme with Multiple Entry and Exit options for Discipline Specific Course in Computer Science

A) Eligibility for the course:

- i) B.Sc. Computer Science (OR) B.Sc. Information Technology (OR) B. Sc. Computer Application (Science & Technology) (OR) B.E/B. Tech. in Computer Science and Engineering/IT. (OR) ii) Any Science Graduate with at least one Optional Subject as Computer Science.

B) Credits and Degrees:

- i) A candidate who has successfully completed all the core courses, Elective / Specialized courses and, seminars and project prescribed and or optional service courses approved by the University for the program with prescribed CGPA shall be eligible to receive the degree.
- ii) One Credit shall mean one teaching period of one hour per week for one semester (of 15 weeks) for theory courses and two practical / laboratory / field / demonstration hours / week for one semester.
- iii) Every student will have to complete at least 88 credits to obtain the master's degree of M. Sc. Computer Science (Post graduate degree)

C) Courses Inclusions:

(i) **Core Course / Mandatory Courses / Discipline Specific Core Courses (DSC):** - A core course is a course that a student admitted to M. Sc. Computer Science program must successfully completed to receive the degree. Normally no theory course shall have more than 4 credits.

(ii) **Discipline Specific Elective Course (DSE):** Means Elective course from the basic subject or specialization. The elective course defined for 4 credits and dedicated for choice of specialization that student want to perceive. The horizontal learning path is to be followed by the student for selection of elective course..

(iii) **Skill Courses (SC):** The service courses will be offered as per the structure of the NEP. This course will be conducted to impart special technology skills to the students. This course is defined for 2 Credits and completely engaged in practical form.

(iv) **On Job Training (OJT):** The student is required to complete 30 hours on job training in the summer of semester 2 examination.

(iv) Each Course shall include lectures / tutorials / laboratory or field work / Seminar / Practical training / Assignments / midterm and term end examinations/ paper / Report writing or review of literature and any other innovative practice etc., to meet effective teaching and learning needs.

Provision of ONLINE Courses and Credit Transfer

The student(s) is encouraged to undertake equivalence courses from SWAYAM / NPTEL / MICROSOFT PRIME or any other platform. Upon successful completion of the such approved course, in order to get the credit transfer to the academic bank of credit as well as exception of equivalent credit course from the list of

academic courses offered by the student, student is required to submit the course completion certificate to the university through college.

D) Multiple entry / Multiple Exits

The course is allowing students for multiple exits as per the guidelines of NEP 2020 and as per the provisions made by the University for the Award of degree. However, these guidelines are updated time to time and the governance related to entry and exit procedure are as per the standard operating procedures of defined by the university.

PROGRAM OBJECTIVES (PO) for M.Sc. COMPUTER SCIENCE

Program objectives for an M.Sc. (Master of Science) in Computer Science course typically aim to provide students with a comprehensive understanding of computer science concepts and practical skills. Following are some broad program objectives earmarked by the department:

1. To equip students with an in-depth understanding of advanced topics in computer science, including algorithms, data structures, artificial intelligence, machine learning, internet of things, and more (**Advanced Knowledge**).
2. To foster the ability to critically analyse complex problems in computer science and conduct independent research to propose innovative solutions (**Research and Analysis**).
3. To develop strong programming skills in multiple languages (wide array of programming basket) and paradigms, enabling students to design and implement software systems and applications (**Programming Proficiency**).
4. To enhance problem-solving and logical thinking skills to tackle real-world challenges in computer science and related interdisciplinary domains (**Problem-Solving Abilities**).
5. To cultivate a sense of ethical responsibility and professionalism among students, emphasizing the importance of adhering to legal and ethical standards in computing (**Ethical and Professional Awareness**).
6. To promote effective teamwork, communication, and leadership skills to work collaboratively in diverse, multidisciplinary projects (**Collaboration and Communication**).
7. To keep students abreast of the latest developments and emerging technologies in the field of computer science, such as cloud computing, cybersecurity, internet of things (IoT), and blockchain (**Emerging Technologies**).
8. To provide opportunities for hands-on experience through case studies, projects, internships, and practical assignments, ensuring students can apply theoretical knowledge to real-world scenarios (**Practical Experience**).
9. To encourage an entrepreneurial mindset and foster innovation, allowing students to develop novel solutions and potentially start their ventures in the technology industry (**Innovation and Entrepreneurship**).
10. To teach students how to critically evaluate existing research, publications, and technological advancements in computer science (**Critical Evaluation**).
11. To in-still the value of continuous learning and adaptability in an ever-evolving field like computer science (**Adaptability and Lifelong Learning**).

PROGRAM SPECIFIC OBJECTIVES (PSO) for M.Sc. COMPUTER SCIENCE

Program Specific Objectives (PSOs) are more focused and concrete statements that describe the specific outcomes expected from a Master of Science (M.Sc.) in Computer Science program. These objectives should align with the broader program objectives mentioned earlier.

PSO 1: Advanced Problem Solving and Analysis Skills: Students of the program will be able to identify, analyse, and solve complex problems in computer science using theoretical knowledge and practical skills gained during the course.

PSO 2: Proficiency in Software Development: Students will demonstrate expertise in designing, implementing, testing, and maintaining software systems and applications using various programming languages and development methodologies.

PSO 3: Research and Innovation Capabilities: Students will develop the ability to conduct independent research, contribute to existing knowledge in computer science, and propose innovative solutions in specialized areas.

PSO 4: Specialization Expertise: Students will acquire in-depth knowledge and expertise in their chosen specialization, such as artificial intelligence, data science, cybersecurity, software engineering, etc.

PSO 5: Effective Communication and Collaboration: Students will cultivate strong communication, teamwork, and leadership skills to work effectively in multidisciplinary teams and convey technical concepts to diverse audiences.

PSO 6: Ethical and Professional Practices: Students will understand the ethical and legal implications of computer science applications and adhere to professional standards in their roles as computer scientists.

PSO 7: Adaptability and Lifelong Learning: Graduates will embrace a growth mindset and exhibit the ability to adapt to emerging technologies and continue their learning beyond the program.

PSO 8: Software Development Lifecycle Proficiency: Students will gain hands-on experience in each phase of the software development lifecycle, including requirements gathering, design, implementation, testing, deployment, and maintenance.



CIRCULAR NO.SU/Sci. & Tech./University Deptt./NEP/15/2023

It is hereby inform to all concerned that, the syllabi prepared by the Departmental Committee and recommended by the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor has accepted **the following curriculum of All Post Graduate Degree Courses as per Norms of National Education Policy - 2020 under the Faculty of Science & Technology run at University Department, Dr.Babasaheb Ambedkar Marathwada University, Aurangabad** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

Sr.No.	Syllabi of Department of BAMU, Aurangabad.	Semester
1.	M.Sc.Chemistry specialization Inorganic Chemistry, Organic Chemistry, Physical Chemistry and self supported Analytical Chemistry	Ist and IInd Semester
2.	M.Sc.Statistics	Ist and IInd Semester
3.	M.Sc.Mathematics	Ist and IInd Semester
4.	M.Sc.Physics	Ist Semester
5.	M.Sc.Food Technology	Ist and IInd Semester
6.	M.Sc.Drug Intermediates Technology	Ist and IInd Semester
7.	M.Sc. Information Technology	Ist to IVth Semester
8.	M.Sc.Computer Science	Ist to IVth Semester
9.	M.Sc.Botany	Ist and IInd Semester
10.	M.Sc.Environmental Science	Ist and IInd Semester
11.	M.Sc.Artificial Intelligence.	Ist to IVth Semester
12.	M.Sc.Biochemistry	Ist and IInd Semester

This is effective from the Academic Year 2023-24 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.

REF.NO.SU/NEP/2023/ 8743-57

Date:- 08.08.2023.

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*Deputy Registrar,
Academic Section*

Copy forwarded with compliments to :-

- 1] **Head of the Department, All Departments, Dr.Babasaheb Ambedkar Marathwada University, Aurangabad.**
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

- 1] **The Director, Board of Examinations & Evaluation, Dr.BAMU,A'bad.**
- 2] The Section Officer,[M.Sc.Unit] Examination Branch,Dr.BAMU,A'bad.
- 3] The Programmer [Computer Unit-1] Examinations, Dr.BAMU,A'bad.
- 4] The Programmer [Computer Unit-2] Examinations, Dr.BAMU,A'bad.
- 5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.BAMU,A'bad.
- 6] The Public Relation Officer, Dr.BAMU,A'bad.
- 7] The Record Keeper, Dr.BAMU,A'bad.

DR. BABASAHEB AMBEDKAR MARATHWADA

UNIVERSITY, AURANGABAD- 431004.



NAAC Re-Accredited 'A' Grade

FACULTY OF SCIENCE & TECHNOLOGY

2 Years P.G. Programme

As Per National Education Policy-2020

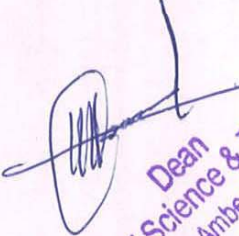
SUBJECT: MATHEMATICS

(Out Come Based Credit System)

Effective from Academic Year 2023-24

DEPARTMENT OF MATHEMATICS

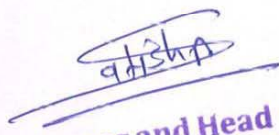
(Autonomous)


Dean
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad


Professor and Head
Department of Mathematics
Dr. Babasaheb Ambedkar
Marathwada University,
Aurangabad-431004 (M.S.) India

PREAMBLE

As per the decision and directives of UGC and Government of Maharashtra (NEP-2020) the Post Graduate program in Mathematics that is 2 Year/1 Year Post Graduate program is designed which will be implemented in the department of Mathematics, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad from the academic year 2023-24. While preparing this program the discussion with all the stake holders, resource persons and experts is taken into account. The program is aimed to develop knowledgeable and skillful human resources for local, national and international needs. The program caters the abstractness as well as the applicability of Mathematics to the learners.


Professor and Head
Department of Mathematics
Dr. Babasaheb Ambedkar
Marathwada University,
Aurangabad-431004 (M.S.) India

After Successful completion of this post graduate programme in
Mathematics of 88 credits

Programme Outcomes (POs):

The student will:

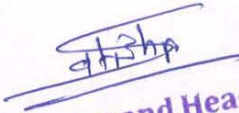
- PO 1:- enter in the areas of current and advanced fields of Mathematics
- PO 2:- develop analytical, scientific and critical thinking.
- PO 3:- be able to apply Mathematical techniques to solve real life problems
- PO 4:- be able to undertake research in mathematics and allied disciplines.
- PO 5:- be employable in government, Scientific & Academic Institutions
private sector autonomous bodies and industries.

Programme Educational Objectives (PEOs):-

- PEO 1:- To introduce a core and advanced branches of Mathematics
- PEO 2:- To inculcate computational and numerical skills.
- PEO 3:- To undertake advance research.
- PEO 4:- To develop soft skills related to the subject

Programme Specific Objectives (PSOs):-

- PSO 1:- To understand and develop the skills in various mathematical analysis techniques.
- PSO 2:- To develop mathematical modeling skill
- PSO 3:- To equip students with latest mathematical software's.
- PSO 4:- To develop problem solving and numerical skills.


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Department of Mathematics
Dr. Babasaheb Ambedkar
Marathwada University,
Aurangabad-431004 (M.S.) India

2018

**[OBE DESIGN- LIBRARY AND
INFORMATION SCIENCE
DEPARTMENT]**

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY AURANGABAD-431 001

PREFACE

Outcome Based Education (OBE) is the educational approach which focuses on student centric education in the context of development of personal, social, professional and knowledge (KSA) requirements in one's career and life. It is the decade ago curriculum development methodology. The educational triangle of LEARNING-ASSESSMENT-TEACHING is the unique nature of the OBE approach. The curriculum practices such as Competency Based Curriculum, Taylor's Model of Curriculum Development, Spadys' Curriculum principles, Blooms taxonomy and further use of assessment methodologies like, Norm-reference testing and Criterion reference testing, etc is being practiced since decades. It is also interesting to know that, globally, different countries and universities adopts the curriculum development models/approaches such as, CDIO (Conceive-Design-Implement-Operate), Evidenced Based Education, Systems' Approach, etc as the scientific and systematic approaches in curriculum design.

The authorities of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M.S.) in-lieu of accreditation standards of National Assessment and Accreditation Council, decided to opt for Outcomes Based Education (OBE). As the part of the decision, different meetings, workshops and presentations were held at the campus of university.

This document is the outcome of different meetings and workshops held at university level and department level. The detailed document is designed and the existing curriculum of the department is transformed in to the framework of OBE. This is the first step towards the implementation of OBE in the department. The document will serve all stakeholders in the effective implementation of the curriculum. The OBE is continuous process for quality enhancement and it will go a long way in order to enhance the competencies and employability of the graduates/Post-graduates of the university department.

Head of Department

INDEX

Sr. No.	Title of OBE Element	Page No.
1	Preface	1
2	Mission	3
3	Vision	3
4	Program Educational Objectives (PEO)	4
5	Program Outcomes (PO) and Program Specific Outcomes (PSO)	4
6	Program Structure/ Curriculum Structure	15
7	Course- PO/PSO Matrix	5
8	Course Outcomes	15
9	Attainment of Course Outcomes	8
10	Attainment of Program outcomes and Program Specific Outcomes	10
11	Corrective Measures for Continuous Improvement	11
	Annexure	
	Syllabus	

OUTCOME BASED EDUCATION

Faculty of Interdisciplinary Studies

Department of Library and Information science

1. Mission:

Mission Statement

DLIS prepares professionals to exercise leadership in planning, implementing promoting the preservation, organization effective use of society's recorded information & ideas.

Mission of the DLIS is two fold:

- To educate diverse cadre of students who have the foundational knowledge and competencies for developing as their career unfold, into formal & informal leaders in library & information environment & in the library & information profession in 21 st century.
- To foster understanding of creation, organization, management, access use of knowledge information resources in libraries a multitude of settings & cultural communities.

2. Vision:

Vision Statement

- To increase its output from 22 to 200 by introducing skill and job oriented courses.
- To introduce 6 year integrated PG course with credit & cafeteria system inclusive of Distance Learning programmes.
- To design self-financed UG courses, PG Diploma, certificate/ vocational courses based on new skills. The courses will be job oriented courses.
- To provide consultancy services to school, college university, industrial or public libraries including Directorate of libraries as per their requirement. It would like to establish placement service for counseling & campus employment
- To establish excellent research center in the area of information technology, Library automation, knowledge Management Sciento-metrics internet searching, e-learning etc 'It will have links with major DLIS as well as libraries in the world DLIS plans to increase output of Ph.D. students in every year.

3. Title of the Program (s):

a. Master of Library Information System

4. Program Educational Objectives:

The program educational objectives (PEO) are the statement that describes the career and professional achievement after the program of studies (graduation/ post-graduation). The PEOs are driven from question no. (ii) of the Mission statement (What is the purpose of organization). The PEOs can be minimum three and maximum five.

PEO1: Mastery over the advance knowledge of library science and information system.

PEO2: To provide the professional services in private and public sector.

PEO3: To undertake entrepreneurial activity in the domain of publication, ICT, Information science.

PEO4: To opt for higher education, research and to be a life-long learner.

PEO5: To provide value based and ethical leadership to the profession and social life.

5. Program Outcomes:

The program outcomes (PO) are the statement of competencies/ abilities. POs are the statement that describes the knowledge and the abilities the graduate/ post-graduate will have by the end of program studies.

- a. Can apply the skills and attitudes of visioning, entrepreneurship, advocacy, planning and management to leadership in the information field.
- b. Can manage information resources and the information life-cycle through the processes of collection development, representation, organization, preservation, curation, access, and dissemination in accordance with physical, virtual, and technical infrastructure and needs.
- c. Can apply appropriate pedagogical and learning theory principles in the design, development, implementation, and assessment of library instruction and learning that contribute towards an information and technology literate society.
- d. Can design and employ policies essential for creating and providing information services and resources guided by the values of patron privacy, equitable access, intellectual freedom, and ethical use of information.

- e. Possess the skills to respect, engage and collaborate with a diverse community in order to advocate for and construct inclusive, meaningful, and participatory library services, programs and resources.
- f. Can perform and assess research based practices through the application of information literacy, inquiry, and research methods including data discovery, analytics and qualitative measures.

6. Course- Program outcome Matrix:

The Program Outcomes are developed through the curriculum (curricular/co-curricular-extra-curricular activities). The program outcomes are attained through the course implementation. As an educator, one must know, **“to which POs his/her course in contributing?”**. So that one can design the learning experiences, select teaching method and design the tool for assessment. Hence, establishing the Course-PO matrix is essential step in the OBE. The course-program outcomes matrix indicates the co-relation between the courses and program outcomes. The CO-PO matrix is the map of list of courses contributing to the development of respective POs.

The CO-PO MATRIX is provided in the below table.

Course Title	a	b	c	d	e	f		
Foundations of Information Science	*	*	*					
Knowledge Organization	*	*	*					
Information Sources and Services	*	*	*					
Information Search Strategies	*	*	*					
Practical Based on LISc45101T	*	*	*					
Practical Based on LISc45102T	*	*	*					
Practical Based on LISc45103T	*	*	*					
Practical Based on LISc45104A1T	*	*	*					
Management of Library and Information Centres		*	*	*	*			
Knowledge Processing		*	*	*	*			
Information Technology- Basics		*	*	*	*			
Technical Writing						*		
Practical Based on LISc45201T		*	*	*	*			
Practical Based on LISc45202T		*	*	*	*			
Practical Based on LISc45203T		*	*	*	*			
Practical Based on LISc45204A2T		*	*	*	*			
Research Methods & Statistical Techniques						*		
Information Technology-		*	*	*				

Applications								
Information Analysis, Repackaging and Consolidation		*	*	*				
Service Course					*	*		
Practical Based on LISc45301T		*	*	*				
Practical Based on LISc45302T		*	*	*				
Practical Based on LISc45303T		*	*	*				
Information Retrieval		*	*	*				
Project Work	*	*	*	*	*	*		
Marketing of Libraries & Information Centres		*	*	*	*			
Thesaurus Construction		*	*	*	*			
Practical Based on LISc45401T		*	*	*	*			
Practical Based on LISc45402T		*	*	*	*			
Practical Based on LISc45403A1T		*	*	*	*			
Practical Based on LISc45404A3T		*	*	*	*			

7. Course Outcomes (for all courses):

The course outcomes are the statement that describes the knowledge & abilities developed in the student by the end of course (subject) teaching. The focus is on development of abilities rather than mere content. There can be 5 to 7 course outcomes of any course. These are to be written in the specific terms and not in general. The list of Course Outcomes is the part of **Annexure-C** attached herewith.

8. Set Target levels for Attainment of Course Outcomes:

The course outcome attainment is assessed in order to track the graduates' performance w.r.t target level of performance. The CO-PO attainment is the tool used for continuous improvement in the graduates' abilities through appropriate learning & teaching strategies. In order to assess students' performance with respect to abilities (at the end of course teaching/by the end of program) the course outcome attainment are measured/calculated. In order to calculate the program outcome attainment, the course outcome attainment is calculated. Prior to that, the course-program outcome mapping is done.

9. Set Target level for Attainment of Program Outcomes:

The program outcome attainment is assessed in order to track the graduates' performance w.r.t target level of performance. The CO-PO attainment is the tool used for continuous improvement in the graduates' abilities through appropriate learning & teaching strategies. In order to assess students' performance with respect to abilities (at the end of course teaching/by the end of program) the course outcome attainment and program outcome attainment is measured/calculated. The program outcome attainment is governed by

curricular, co-curricular and extra-curricular activities including the stakeholders' participation. The direct method and indirect method is adopted to calculate the PO attainment. The direct method implies the attainment by course outcomes contributing to respective program outcomes. And indirect method is the satisfaction/feed-back survey of stakeholders. In order to calculate the program outcome attainment, the course outcome attainment is calculated. Prior to that, the course-program outcome mapping is done. The set target level is the set benchmark to ensure the continuous improvements in the learners/ graduates' performance.

10. Course Attainment Levels:

- a. CO attainment is defined/set at three levels;
- b. The CO attainment is based on end term examination assessment and internal assessment;
- c. The Co attainment is defined at three levels in ascending order-
 - i. e.g. For end term and internal examination;
 - ii. Level-1: 40% students scored more than class average
 - iii. Level-2: 50% students score more than class average;
 - iv. Level-3: 60% students score more than class average.
- d. The target level is set (e.g. Level-2). It indicates that, the current target is level-2; 50% students score more than class average. The CO attainment is measured and the results are obtained. Based on the results of attainment, the corrective measures/remedial action are taken.
- e. $\text{CO Attainment} = 80\% (\text{Attainment level in end term examination}) + 20\% (\text{Attainment level in internal examination})$.

11. Program attainment Level:

- a. PO attainment is defined at five levels in ascending order;
- b. The PO attainment is based on the average attainment level of corresponding courses (Direct Method) and feed-back survey (Indirect method);
- c. The PO attainment levels are defined / set as stated below;
 - i. Level-1: Greater than 0.5 and less than 1.0 ($0.5 > 1$)- Poor
 - ii. Level-2: $1.0 > 1.5$ -Average
 - iii. Level-3: $1.5 > 2.0$ -Good
 - iv. Level-4: $2.0 > 2.5$ -Very Good
 - v. Level-5: $2.5 > 3.0$ -Excellent
- d. The PO attainment target level is set/defined (say, Level-4). It implies that, the department is aiming at minimum level-4 (very good) in the performance of abilities by the graduates. Based upon the results of attainment, the remedial measures are taken;
- e. $\text{PO Attainment} = 80\% (\text{Average attainment level by direct method}) + 20\% (\text{Average attainment level by indirect method})$.

12. The Results of CO Attainment:

The Results of CO attainment are provided in Annexure-B

FOR EXAMPLE:

COURSE CODE/TITLE: LISc45302T

- e.g. For end term and internal examination;
- i. Level-1: 40% students scored more than class average
 - ii. Level-2: 50% students score more than class average;
 - iii. Level-3: 60% students score more than class average

Average Marks in External examination: 50

% Students score more than 50 is 62 % i.e. Level-3

Average Marks in Internal examination= 20

% Students score more than 20 is 100% Level-3

A (CO) LISc45302T = 80% (3) +20(3)

$$=2.4+0.6$$

$$=3.0$$

Hence, The attainment level is Level-3 and the set target level is Level-2 and therefore the CO is fully attained.

Table No. 1.0: CO Attainment Level

Course Title	CO Attainment Value	Target Attainment Level	Fully attained /Not attained	Remedial Measures
Foundations of Information Science	1	2	Not attained	Assignments, Tutorials, Exercise and coaching.
Knowledge Organization	2.2	2	Fully attained	
Information Sources and Services	1.4	2	Not attained	Assignments, Tutorials, Exercise and coaching.
Information Search Strategies	2.2	2	Fully attained	

Practical Based on LISc45101T	3	2	Fully attained	
Practical Based on LISc45102T	2	2	Fully attained	
Practical Based on LISc45103T	3	2	Fully attained	
Practical Based on LISc45104A1T	3	2	Fully attained	
Management of Library and Information Centres	2.2	2	Fully attained	
Knowledge Processing	2.2	2	Fully attained	
Information Technology- Basics	2.2	2	Fully attained	
Technical Writing	2	2	Fully attained	
Practical Based on LISc45201T	3	2	Fully attained	
Practical Based on LISc45202T	3	2	Fully attained	
Practical Based on LISc45203T	2.2	2	Fully attained	
Practical Based on LISc45204A2T	3	2	Fully attained	
Research Methods & Statistical Techniques	2.2	2	Fully attained	
Information Technology- Applications	3	2	Fully attained	
Information Analysis, Repackaging and Consolidation	2.2	2	Fully attained	
Service Course	3	2	Fully attained	
Practical Based on LISc45301T	3	2	Fully attained	
Practical Based on LISc45302T	3	2	Fully attained	
Practical Based on LISc45303T	3	2	Fully attained	
Information Retrieval	3	2	Fully attained	
Project Work	3	2	Fully attained	

Marketing of Libraries & Information Centres	3	2	Fully attained	
Thesaurus Construction	3	2	Fully attained	
Practical Based on LISc45401T	3	2	Fully attained	
Practical Based on LISc45402T	3	2	Fully attained	
Practical Based on LISc45403A1T	3	2	Fully attained	
Practical Based on LISc45404A3T	3	2	Fully attained	

13.The Results of PO Attainment:

The Results of PO attainment are provided in Annexure-B

FOR EXAMPLE:

PO NO.: a

(Note: Refer point No. 11 above which describes the attainment level and set target attainment level)

PO Attainment= 80% (Average attainment level by direct method) + 20% (Average attainment level by indirect method).

$$A (PO) a = 80\% (1+2.2+1.4+2.2+3+2+3)/7 + 20\% (2.31)$$

$$= 80\% (2.31) + 20\% (2.31)$$

$$= 2.31$$

$$= 2.31 \text{ i.e. Level-4. The target level is Level-4.}$$

Hence, PO attained.

Table No. 2.0 PO Attainment Level

PO/PSO number	PO Attainment Value	Target Attainment level	Fully attained/ Not Attained	Remedial Measures
a	2.31	4	Fully attained	Not Applicable
b	2.64	4	Fully attained	
c	2.61	4	Fully attained	
d	2.74	4	Fully attained	
e	2.71	4	Fully attained	
f	2.55	4	Fully attained	

14. Planned Actions for Course Attainment:

The courses having CO attainment less than Level-2 shall be addressed by planning remedial measures such as, assignments, tutorials, exercise and coaching.

15.Planned Actions for Program Outcome Attainment: NOT APPLICABLE

ANNEXURE-B
RESULTS OF CO-PO ATTAINMENT

MASTER OF LIBRARY & INFORMATION SCIENCE						
Course Title	a	b	c	d	e	f
Foundations of Information Science	1	1	1			
Knowledge Organization	2.2	2.2	2.2			
Information Sources and Services	1.4	1.4	1.4			
Information Search Strategies	2.2	2.2	2.2			
Practical Based on LISc45101T	3	3	3			
Practical Based on LISc45102T	2	2	2			
Practical Based on LISc45103T	3	3	3			
Practical Based on LISc45104A1T	3	3	3			
Management of Library and Information Centres		2.2	2.2	2.2	2.2	
Knowledge Processing		2.2	2.2	2.2	2.2	
Information Technology- Basics		2.2	2.2	2.2	2.2	
Technical Writing			2	2	2	2
Practical Based on LISc45201T		3	3	3	3	
Practical Based on LISc45202T		3	3	3	3	
Practical Based on LISc45203T		2.2	2.2	2.2	2.2	
Practical Based on LISc45204A2T		3	3	3	3	
Research Methods & Statistical Techniques				2.2	2.2	2.2
Information Technology- Applications		3	3	3		
Information Analysis, Repackaging and Consolidation		2.2	2.2	2.2		
Service Course					3	3
Practical Based on LISc45301T		3	3	3		
Practical Based on LISc45302T		3	3	3		
Practical Based on LISc45303T		3	3	3		
Information Retrieval		3	3	3		
Project Work	3	3	3	3	3	3
Marketing of Libraries & Information Centres		3	3	3	3	

Thesaurus Construction		3	3	3	3	
Practical Based on LISC45401T		3	3	3	3	
Practical Based on LISC45402T		3	3	3	3	
Practical Based on LISC45403A1T		3	3	3	3	
Practical Based on LISC45404A3T		3	3	3	3	
PO ATTAINMENT	2.31	2.64	2.61	2.74	2.71	2.55

ANNEXURE-C

COURSE OUTCOMES

LIBRARY AND INFORMATION SCIENCE

Foundation of information science

- Assess information services required in library
- Explain the history and ethics to develop a professional LIS identity
- Describe the information resources
- Apply information technologies in library
- Describe information needs and perspectives of indigenous cultures and/or diverse communities

Information Services and Resources

- Identify library services and availability of resources in order to develop a realistic overall plan for implementation.
- Use general information resources to increase familiarity amongst the users
- Identify keywords, synonyms and related terms in order to flexibly search information resources.
- Identify the range of information source types available (such as peer-reviewed journals, newspaper articles, books, reference sources, etc.), their distinguishing characteristics and intended audiences, in order to select those appropriate based on the information need.
- Develop a strategy for persisting in information seeking to the users.

Management of Library information center

- Analyze a particular institution to determine the relevant proactive information services.
- Analyze a company's organizational structure and develop an organizational chart showing the position of the library manager within its organization.
- Recognize various management styles and understand when they should be used to facilitate a particular outcome.
- Analyze the theory and application of planning, organizing and staffing a special library.
- Apply marketing services and develop effective public relations programs within an organization.
- Recognize the importance of providing the level of service needed, not the service requested or expected.
- Understand the budgeting process within the organizational setting.

Information processing

- Distinguish between format and method of access, understanding that these are separate entities
- Articulate the capabilities and constraints of various processes of information creation
- Recognize that similar content may be presented in different formats, which may affect interpretation of the content
- Select a source that best meets an information need based on the audience, context, and purpose of various formats

Information technology

- Use of Operating System
- Operate Word Processors, Spread Sheets
- Create and maintain databases by using excel/ library automation software.
- Operate the library automation software.

Electronic information system

- Design, provide, and assess information services
- Apply history and ethics to develop a professional LIS identity
- Create, organize, manage and discover information resources
- Evaluate and apply information technologies
- Analyze and apply knowledge about information needs and perspectives of indigenous cultures and/or diverse communities
- Demonstrate skills necessary to manage and work effectively within information organizations

Electronic Publications

- Explain the Concept, Definition, Scope, Types of e-publications
- Describe the trends in future of e-publications, Problems related to e-publications
- Explain and demonstrate the Media usage, file formats, Software & Hardware technologies
- Explain the Standards in E-publishing

Information technology applications

- Describe the different networking systems
- Demonstrate the technology and use of internet.
- Describe the concept of digital library
- Explain the requirement for management and administration of digital library.
- Explain the use of artificial intelligence in library

Information Retrieval

- Describe Cataloguing & Subject Indexing: Principles and Practices
- Describe Indexing Language & Vocabulary Control.
- Assigned Indexing Practice, Using LCSH & Sear's List
- Derived Indexing Practice
- Design and Development of IR Thesaurus
- Search Methods and Formulation of Search Strategy

**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
CHHATRAPATI SAMBHAJINAGAR**

DEPARTMENT OF COMMERCE

Master of Commerce (M.Com)

Program Outcomes:

PO 1: After completing 2 years Master in Commerce learners would gain fundamental and comprehensive knowledge of Research Methodology, Finance, Marketing, Business Law and HR.

PO 2: The Masters of Commerce Focus Curriculum which offers number of Specialization and practical exposures for the learners to face the modern day to day challenges in Commerce and Business.

PO 3: The program emphasizes global perspectives, preparing students through practical projects student can gain experience by applying business modern and analytical tools.

PO 4: Students will be able to develop effective communication skills through presentations and written assignments, enhancing their ability.

PO 5: The program encourages entrepreneurship by providing insights into startup finance, business planning, and risk management in future entrepreneurial venture.



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