

# CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

Accredited by NAAC with 'A' Grade, Affiliated to University of Calicut



## PG - COURSE OUTCOME

(ACADEMIC YEAR 2018 - '19)

**IRINJALAKUDA NORTH P.O., THRISSUR, KERALA - 680125,**

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Name of the programme				Master of Social Work
Short Name of the Programme				MSW
Code of the Programme				CCAMSW
Semester	Course code	Course Title	CO No:	Course Outcomes
1		History, Philosophy and Fields of Social Work	CO1	Identify the basic concepts, theories and philosophical assumptions of social work
			CO2	Trace the history of Social work and Social Work education in India and abroad
			CO3	Describe the methods and functions of Social Work
			CO4	Apply the principles and values in social work intervention
			CO5	Demonstrate Ethical and Professional Behavior
			CO6	Analyze social work as a profession
			CO7	Sensitize their roles in various fields of Social Work practice
		Sociology and Economics for Social Work Practice	CO1	Understand social and economic processes and system
			CO2	Understand the economics of development
			CO3	Know the basic social institutions like family, marriage, kinship in a scientific way
			CO4	Demonstrate ability to analyze an economic situation involving an issue of social responsibility, and defend or critique a course of action.
			CO5	Apply sociological and economic concepts and identify key socio-economic problems concepts and theories to the real world
		Human Growth and Development	CO1	Identify core concepts, strengths, and weaknesses of the major theories of lifespan development
			CO2	Explain the impact of biological/genetic influences on physical growth, cognition and behavior.
			CO3	Identify change throughout the entire lifespan, from conception to death

			CO4	Be able to demonstrate an understanding of different stages of development through the lifespan
			CO5	Identify and apply developmental concepts to everyday life
		Professional Skills for Social Workers	CO1	Identify and describe the important terms and concepts essentially required for a social worker in social work profession
			CO2	Utilise different techniques to evaluate oneself as a social worker
			CO3	Apply the core relationship skills required in social work profession
			CO4	Demonstrate skills in communication(especially verbal , non verbal and writing skills) and leadership skills in all social work interventions
			CO5	Identify and utilise various ICT resources in upgrading and updating their knowledge in Social Work
		Social Legislation and Human Rights	CO1	Identify the the legal rights of the people
			CO2	Understand the overall structure and framework of Indian Constitution and different social legislations
			CO3	Knowledge about the information of Human Rights in social work practice in general to individual groups and communities
			CO4	Utilize their knowledge for legal aid to the weaker section of the society with special focus to children ,women, disabled and senior citizens
2		Social Case Work	CO1	Understand and identify basic concepts in Social Case Work
			CO2	Developed various approaches to the problem solving process of Individual.
			CO3	Apply the principles,tools and techniques of case work to Case Work Practice
			CO4	Develop competencies in practicing Social Case Work in different settings

			CO1	Identify the groups , types of groups , importance of groups in social work intervention
			CO2	Understand the Social Group Work as a method of Social Work
			CO3	Understand the group dynamics, which is essential for Social work practice
			CO4	Comprehend important theories and models for Social Group Work practice.
		Social Group Work	CO5	Develops the attitude and competence to practice Social Group Work in various settings
			CO6	Intervene with Individuals, Families, Groups, Organizations, and Communities problems/needs
			CO7	Evaluate Practice with Individuals, Families, Groups, Organizations, and Communities whether the problem or need is satisfied
			CO8	Develop skills required for group work practice
			CO1	Analyze the community organization and social action as methods of social work
			CO2	Describe the key elements of community organization practice and social action
		Community Organisation and Social Action	CO3	Identify the models and strategies for community organization and social action
			CO4	Intervene with different problem situations in communities
			CO5	Apply the method, skills and techniques for participatory community work and social action
			CO1	Better understand one's own and others' behavior by applying the knowledge of assessment, diagnosis, classification systems and DSM categories.
		Psychology for Social Work	CO2	Gain an understanding of the wide breadth of behavior that is considered abnormal in our society
			CO3	Describe, discuss and analyze major issues and concepts in the field of Social Psychology

			CO4	Relate knowledge of theory in social psychology to situations in everyday life such as interpersonal and group relations	
		Theory and Practice of Counselling	CO1	Describe basic concepts and outline the process of Counselling	
			CO2	Comprehend important theories and approaches in counselling	
			CO3	Apply principles and code of ethics of counselling in the counselling process	
			CO4	Demonstrate skills required in various stages of counselling practice in different settings	
3		Quantitative and Qualitative Methods of Social Work	CO1	Analyze the Social Work Research as methods of social work	
				CO2	Identify the significance and characteristics of scientific research
				CO3	Describe research process of qualitative and quantitative research
				CO4	Conduct qualitative and quantitative research
				CO5	Apply the statistical techniques in social work research
			Participatory Project Planning and Training	CO1	Identify the principles in development project
				CO2	Identify and apply various tools and techniques in project identification and management
				CO3	Demonstrate skills in writing project proposal
				CO4	Outline the stages and steps in Participatory Training and facilitation
				CO5	Identify and utilise different methods required for participatory training and facilitation
			Community Health	CO1	Identify basic concepts in health and health care
				CO2	Identify common communicable diseases and non-communicable diseases.
				CO3	Understand and apply various laws and legislations and community health programmes pertaining to health care in the intervention

			CO4	Acquaint with nutritional problems and their management
			CO5	Organize various community health programmes,community based nutritional programmes, health camps and work in nutritional rehabilitation team
3	<b>Elective 1(Specialisation) - Medical and Psychiatric Social Work</b>			
		Health Care Social Work	CO1	Learn historical foundations and scope in health care social work
			CO2	Develop knowledge about role of social workers in health teams
			CO3	Apply different social work interventions in health care and different practice settings.
		Social Work in Mental Health Setting	CO1	Identify psychiatric illnesses ,their treatment and aftercare
			CO2	Organise their knowledge regarding different policies and programmes in the field of mental health
			CO3	Assess, intervene and evaluate individuals, families, groups, and communities in mental health settings
			CO4	Demonstrate their specific roles and functions of a psychiatric social worker in different mental health settings
	<b>Elective 2(Specialisation) - Rural and Urban Community Development</b>			
		Rural Community Development and Governance	CO1	Understand the characteristic features and challenges of rural and tribal communities
			CO2	Understand the concept, philosophy and principles of Community Development with focus on tribal and rural community
			CO3	Identify and apply government programmes and services in the rural and tribal community development
			CO4	Understand the evolution, structure and functions of Development Administration and Local Self Governance in rural and tribal community
			CO5	Demonstrate skills in community practice as a development worker.

		Urban Community Development and Governance	CO1	Identify the important terms, concepts and problems related to urban community and its impact on different sections of population
			CO2	Describe Urban Local Self Governance and its functioning
			CO3	Analyze and evaluate the functioning of urban community and the limitations for the effective functioning of the same
			CO4	Summarise major governmental initiatives undertaken by the Government for the betterment and welfare of community.
			CO5	Illustrate their skills as social workers in improving the status of vulnerable groups in the urban community
4		Administration of Human Service Organisation	CO1	Develop understanding of the basic elements and process of administration as a method in social work practice
			CO2	Analyse the importance of different types of organisations in social welfare development and its registration as organisations.
			CO3	Develop an overview of human resource management as an important component of administration of human service organisations
			CO4	Develop analytical skills to understand the organisational behaviour
			CO5	Develop an overview of human resource management as an important component of administration of human service organisations
			CO6	Practice the utility of the administrative structures to maintain employee relation and grievance redressal
		Social Work with Vulnerable Groups	CO1	Understand the prevailing realities and problems of vulnerable and marginalized groups in India.
	CO2		Learn the roles and functions of social workers in helping them	

			CO3	Understand the contribution of Government and Non-Government Organizations in promoting welfare of the marginalized and vulnerable groups.
			CO4	Understand the policies and welfare programmes and rights for vulnerable groups
	<b>Elective 1(Specialisation)- Medical and Psychiatric Social Work</b>			
	Therapeutic Approaches in Medical and Psychiatric Settings		CO1	Describe various types of alternative system of medicines used in psychiatric settings
			CO2	Demonstrate skill in the assessment and treatment of clients in their clinical experiences of practicum
			CO3	Demonstrate therapeutic communication techniques, including teaching patients and families, in the mental health setting.
	Social Work with Families		CO1	Identify basic concepts of family, marriage and family system perspective
			CO2	Comprehend different family development perspectives
			CO3	Apply the family assessment tools in family social work practice
			CO4	Developed skills and capacities to work in family social work practice settings
	<b>Elective 2 (Specialisation)- Rural and Urban Community Development</b>			
4	Environment Studies and Disaster Management		CO1	Identify the basic concepts in environment studies
			CO2	Sensitize the environment problems and impact of development initiatives.
			CO3	Analyze and evaluate the utilization and management of natural resources
			CO4	Identify the role of social work practice in environmental problems
			CO5	Analyze and communicate information on risks, relief needs in disasters and formulate strategies for mitigation in future.
	Social Work with Gender Issues		CO1	Identify the concepts related to gender and its significance in social work context



			CO2	Describe the important feminist theories and understand its impact on traditional and contemporary society.
			CO3	Analyze the status of women in traditional and contemporary society and evaluate the gaps for the reason of subordination of women in community.
			CO4	Demonstrate attitude and skills to work with different gender and gender issues especially related with women
<b>Name of the programme</b>			<b>Master of Arts, History</b>	
Short Name of the Programme			M.A. History	
Code of the Programme			CCAMHI	
Semester	Course code	Course Title	CO No:	Course Outcomes
1	CC19P HIS1CO1	Method of Historical Research	CO1	The course is designed to familiarize the first semester P.G. students with the basic understanding regarding the Methods of historical research
			CO2	Understand the new trends in historical writing
			CO3	Understand the possibility of Historical Research
			CO4	Enable them to develop skill in critical evaluation of sources
			CO5	Enable them to develop historical sense
			CO6	Aims to equip the students with basic research principles to do research in future
	CC19P HIS1CO2	Pre-Modern Kerala: Problems and Perspectives	CO1	Students will achieve broad mastery over various stages of pre – modern Kerala
			CO2	Students will identify and analyze primary sources associated with pre – modern Kerala
			CO3	Students will reflect on the formation of Malayali Identity
			CO4	Students will understand the process of social formation in Kerala
CO5			Students will understand early political structure of Kerala	

	CC19P HIS1C03	Problems, Perspectives and Debates in Early Indian History	CO1	To comprehend ancient and early medieval Indian history in a detailed comprehensive and analytical way
			CO2	To understand different shades of opinion and interpretations regarding the major themes in ancient and early medieval period
			CO3	To get an understanding of the historiography of the period
			CO4	Critically analyse the particular institutions and cultural elements in Indian society which may be considered different from those in other societies
			CO5	Critically evaluate the background to the rise of new religious ideas during the sixth century BCE, especially Buddhism and Jainism
	CC19P HIS1C04	Early Bronze and Iron Age Civilizations	CO1	To understand the history of the evolution of civilizations in various parts of the world other than South Asia
			CO2	To evaluate the intellectual and cultural contributions of these early civilizations to the mankind
			CO3	Identify major dynasties of ancient China and their achievements
			CO4	To grasp the ideological foundation of the political structure of those times
			CO5	To make a comparative analysis of the materialistic underpinning of the evolution of world civilizations
2	CC19P HIS2C01	History and Theory	CO1	The course serves as an introduction of major theories and key concepts in social sciences to the second semester P.G students
			CO2	Also aims to familiarise with major social science theories and its relation with history
			CO3	Equip students to theorise historical events and enable them to compare it with the contemporary situation
			CO4	Get updated in the area of social science theories

	CC19P HIS2C02	History of Modern Kerala: Problems and Perspectives	CO1	To comprehend the history of Modern Kerala in general and specifically the socio- cultural processes that have been shaped the identity of present Kerala society
			CO2	To familiarize the alternative readings of Kerala history by lower castes,women and environmentalists
			CO3	Critically understand the concept of Kerala Model of Development
			CO4	To grasp the idea of ‘Kerala Renaissance’
			CO5	To make a comparative analysis of social reform movements of upper castes and lower castes in Kerala
			CO6	To understand the colonialism and its impact on Kerala
	CC19P HIS2C03	State and Society in Medieval India	CO1	Students will know about various perspectives on the Medieval India
			CO2	Students will identify the nature of major dynasties existed in Medieval India
			CO3	Students will perceive the evolution of composite Indian society and culture
			CO4	Students will understand the development of science and technology in medieval period
			CO5	Students will identify the development of new styles in art and architecture
	CC19P HIS2C04	Selected Problems of Medieval and Modern World History	CO1	To understand the concept of Feudalism and its various interpretations
			CO2	Analyze the features of colonialism in Asia and Africa
			CO3	To comprehend the ideological foundation of modern civilization
			CO4	To understand the concept of Feudalism and its various interpretations
			CO5	To understand how Western capitalist exigencies led to colonial domination in various regions
3	CC19P HIS3C01	Perspectives on Colonialism	CO1	Identify major historiographical trends and works on colonialism in India

		CO2	Analyze the aspects of colonial India
		CO3	Explain the impact of colonialism, especially the economic impact
		CO4	Evaluate the nature of women's working conditions in colonial India
		CO5	To understand the economic impact of colonialism in India
CC19P HIS3C02	Discourses on Nationalism	CO1	To understand the concept nationalism
		CO2	To critically analyse the role of Indian National Congress and middle class in the formation and development of nationalism in India
		CO3	To critically understand different historical perspectives on nationalism in India
		CO4	To understand the origin and development of communalism in India
		CO5	To familiarize the students on recent readings of nationalism based on caste, and gender
CC19P HIS3E04	Selected Themes in Economic History of Medieval India	CO1	To comprehend the advancement of science and technology in Early Medieval and Medieval India
		CO2	To understand the relationship between the shift in socio-cultural environment and knowledge system in Medieval India
		CO3	To grasp the progress achieved in various aspects of life such as Mathematics, Medicine, Agriculture, Industries etc
		CO4	A critical analysis of the merits and drawbacks of knowledge systems in Medieval India
CC19P HIS3E05	Aesthetic Traditions of Medieval India	CO1	Students will recognize various methods and theories of art history
		CO2	Students will acquire knowledge on art traditions existed in various parts of Medieval India
		CO3	Students will recognize the influence of Persian art traditions over Indian art traditions
		CO4	Students will understand the concepts of art in medieval India

			CO5	Students will learn the tradition of translation in medieval India
4	CC19P HIS4C01	Problems and Debates in Contemporary India	CO1	Able to analyse critically the idea of secularism and practice of secularism in India
			CO2	Able to identify and analyze various social issues in the Contemporary India
			CO3	To understand and critically analyse the policy of reservation in independent India
			CO4	To comprehend changes in the social and political structure of contemporary India
			CO5	To understand the new developments and achievements in arts, literature and sports and how these realms defined and nurture the nationalism in India
	CC19P HIS4C02	Selected Themes in Pre-Modern South India	CO1	The course enables the fourth semester P.G. students to conceptualise the socio-cultural life of the people in pre-modern South India.
			CO2	Understand the contemporary trends in South Indian History
			CO3	Familiarise with key concepts in South Indian History
	CC19P HIS4E03	Science and Technology in Medieval India	CO1	To comprehend the advancement of science and technology in Early Medieval and Medieval India
			CO2	To understand the relationship between the shift in socio-cultural environment and knowledge system in Medieval India
			CO3	To grasp the progress achieved in various aspects of life such as Mathematics, Medicine, Agriculture, Industries etc.
			CO4	A critical analysis of the merits and drawbacks of knowledge systems in Medieval India.
	CC19P HIS4E06	Indian Literature in Historical Perspective	CO1	Students will be able to view Indian literary tradition in historical perspective and critically respond to texts.

			CO2	Students will identify that the relationship between history and literature are at multiple levels	
			CO3	Students will come to know how history and literature supplement each other	
<b>Name of the programme</b>			<b>Master of Science, Zoology</b>		
Short Name of the Programme			MSc. Zoology		
Code of the Programme			CCAMZL		
Semester	Course code	Course Title	CO No:	Course Outcomes	
1	ZO 1CT 01	BIOCHEMISTRY AND BIOPHYSICS	CO1	Understand the biological importance and different chemical interactions that stabilize biomolecules	
			CO2	Describe the classification, structure, reactions and biological roles of different Carbohydrates	
			CO3	Enumerate the classification, properties, different levels of protein structure, separation and purification of proteins	
			CO4	Explain the classification and functions of lipids and fatty acids	
			CO5	Understand the classification, nomenclature and properties of enzymes, their mode of action, inhibition, classification	
			CO6	Understand the biosynthetic and degradative pathways of major biomolecules such as glucose, nucleic acids, certain amino acids and certain lipid molecules	
			CO7	Understand the structural aspects of Nucleic acids and its monomeric subunits	
			CO8	Explain the principles of bioenergetics	
			CO9	Understand the biological effects of radiation	
			CO10	Explain basic principle of sound production	
				CO11	Understand the basic principle of electrophysiology
		ZO 1CT 02	BIOINSTRUMENTATION AND BIOSTATISTICS	CO1	Understand principle and application of microscopes

			CO2	Describe the separation techniques involved in paper, column, thin layer, gas and affinity chromatography.
			CO3	Introduces students to the process of protein electrophoresis using SDS-PAGE and to the process of DNA electrophoresis using agarose gels. Students must develop a working understanding of setting up gels and using them to carry out advanced experiments
			CO4	Explain basic principles of UV-Visible spectroscopy, NMR spectroscopy and Mass Spectroscopy.
			CO5	Understand recording and analysis of prominent biosignals of human and discuss general principles of imaging systems
			CO6	Determine the nanotechnology and actual working areas and applications
			CO7	Remember the scope and role of statistics; methods and procedures of sampling
			CO8	Understand the construction of tables, charts and graphs and its importance for statistical data comparison.
			CO9	Calculate averages and measures of dispersion and application of its knowledge on hypothesis testing
			CO10	Explain diversity indices and its application in diversity studies of fauna of a region
	ZO 1 CT 03	ECOLOGY AND ETHOLOGY	CO1	To understand our ecosystem
			CO2	To understand factors affecting population growth
			CO3	Describe the factors affecting ecosystem development
			CO4	To understand the species interactions
			CO5	To understand the concept of biodiversity conservation
			CO6	To understand the behaviour as a reaction to stimuli and explain concepts of instinctive and learned behaviour

			CO7	To describe the factors of motivation and to explain the conflict behaviour	
			CO8	To explain different aspects of social behaviour with special reference to termites and primates	
			CO9	To understand the concept of evolution and adaptiveness of behaviour	
			CO10	To describe the role of hormones and nervous system in behaviour	
2	ZO 2CT 04	PHYSIOLOGY	CO1	Physiology encompasses the functional dynamism in cells, tissues, organs and organisms	
			CO2	This course throws light on the homoeostatic mechanisms in the living system	
			CO3	Environmental physiology is included to draw information with regard to adjustments of an organism to fluctuations occurring externally	
			CO4	Neurophysiology is given prime importance to get an overview on diverse stimuli, perception by sensory organs and brain and proper response to the signals	
			CO5	Functional areas of brain are studied in detail along with the degenerative brain diseases.	
		ZO 2 CT 05	MOLECULAR BIOLOGY AND CYTOGENETICS	CO6	Ample importance is given to respiratory, renal, circulatory and gastrointestinal functions in respect of human physiology
	CO1			To understand the mechanism of DNA replication in prokaryotes and eukaryotes	
	CO2			Illustrate the basic concept of DNA damage and repair	
	CO3			Describe the mechanism of prokaryotic and eukaryotic transcription	
	CO4			To analyze the concepts of post transcriptional modifications and RNA editing	
			CO5	Explain the general features of genetic code.	



			CO6	Illustrate the structural components of prokaryotic and eukaryotic ribosome's
			CO7	Evaluate the eukaryotic post translational modifications
			CO8	Learn about Interrupted genes, gene family and Transposable genetic elements
			CO9	To identify the concept of Cancer and gene therapy.
			CO10	To understand the organization of Chromosomes and cytogenetics of Cancer
	ZO 2 CT 06	SYSTEMATICS AND EVOLUTION	CO1	Understand the concept of systematics and taxonomy in zoology
			CO2	Define typological, nominalistic, biological and evolutionary species concepts
			CO3	Understand the purpose of classification and various theories of classification
			CO4	Develop skills to collect and preserve specimens for identification
			CO5	Define chemotaxonomy, serotaxonomy and enumerate the various approaches used in this field
			CO6	Apply ethics to be followed while creating and publishing taxonomic publications
			CO7	Understand that natural selection is one of several processes that can bring about evolution through sexual selection
			CO8	Demonstrate knowledge of processes of microevolution, mutation, genetic drift, gene frequency, gene pool and bottle neck effect by describing the meaning of microevolution and its significance to modern evolutionary theory
			CO9	Explain molecular drive, molecular clocks and molecular divergence

			CO1 0	Understand hominid evolution by tracing the evolution of the hominids, beginning with the first primates, and explaining their relationship to prosimians, simians, and hominoids
2	ZO 2CP 01	PRACTICAL - BIOCHEMISTRY		
	ZO 2 CP 02	PRACTICAL - BIOINSTRUMENTATIO N		
	ZO 2CP 03	PRACTICAL - ECOLOGY AND ETHOLOGY		
	ZO 2 CP 02	PRACTICAL - PHYSIOLOGY		
	ZO 2 CP 02	PRACTICAL - CELL & MOLECULAR BIOLOGY		
	ZO 2 CP 03	PRACTICAL - SYSTEMATICS AND EVOLUTION		
	ZO 3 CT 07	IMMUNOLOGY AND CELL BIOLOGY	CO1	To understand innate and adaptive systems of immune response and the concepts of antigenicity and immunogenicity
			CO2	To understand the generation of different lymphocytes such as T cell and B cell
			CO3	To understand different immune effector mechanisms/molecules of the human body towards foreign antigens.

			CO4	To understand the structure and functioning of Major Histocompatibility Complex
			CO5	To understand the principle and procedure of different Immunotechniques used in the biomedical field
			CO6	To gain understanding on structure of antibody and its gene organization and rearrangement
			CO7	To understand about antigen antibody interactions and various reactions.
			CO8	To gain understanding about autoimmune and immunodeficiency diseases and to get idea about transplantation reaction and vaccination.
			CO9	To understand the mechanisms of cellular communications in prokaryotic and eukaryotic cells
			CO10	To explain the signal transduction mechanisms and their significance
			CO11	To describe the regulation of apoptosis
	ZO 3 CT 08	DEVELOPMENTAL BIOLOGY & ENDOCRINOLOGY	CO1	To understand basic concepts in development
			CO2	Explain the process of gametogenesis, fertilization and embryonic development
			CO3	To understand cellular and molecular basis of development
			CO4	To understand the genetic basis of development
			CO5	Describe the process of ageing and mechanisms
			CO6	To understand the impact of environment on development
			CO7	Describe different classes of chemical messengers and their physical characteristics.
			CO8	Explain how the secretion of hormone is regulated through positive and negative feedback mechanisms

			CO9	Summarize the anatomy, regulation, and physiological functions of the hormones of the hypophysis, thyroid, parathyroid, pancreas adrenal, hypothalamus and adrenal glands.
			CO10	Describe the anatomy of male and female reproductive systems including hormonal functions and pathophysiology.
	ZO 4 CT 09	MICROBIOLOGY & BIOTECHNOLOGY	CO1	Understand the biological diversity of microbial forms
			CO2	Enumerate different viral and bacterial diseases
			CO3	Understand different culture techniques and the importance of pure culture
			CO4	Illustrate the various steps in genetic engineering
			CO5	Understand the action of different restriction enzymes
			CO6	Explain different transfection methods, transgenic animals and their ethical issues
			CO7	Explain basic principle and types of PCR
			CO8	Understand different cell culture techniques
			CO9	Enumerate the applications of biotechnology
	ZO 3 ET 10	FISHERY SCIENCE - I TAXONOMY, BIOLOGY, PHYSIOLOGY & ECOLOGY	CO1	To gain the basic understanding on major families of fishes
			CO2	To gain the basic understanding on the different physiological systems of fish
			CO3	To gain the basic understanding on adaptive physiology of fishes
			CO4	To gain understanding on the brackish water ecology
			CO5	To gain understanding on the limnology.
			CO6	To gain understanding on oceanography
	ZO 4 ET 11	FISHERY SCIENCE- II CAPTURE AND CULTURE FISHERIES	CO1	To gain the basic understanding on the capture fishery from different water resources in India including marine, estuarine and freshwater systems

			CO2	To gain the basic understanding on the different types of aquaculture practices in India and abroad.
			CO3	To gain understanding on the pond design, pond construction, water quality management, feed and transportation requirements in aquaculture
			CO4	To gain understanding on the basic reproductive biology of fishes and induced breeding practices in aquaculture
			CO5	To gain the basic understanding on preparation and maintenance of aquarium
			CO6	To gain understanding on the major diseases encountered in aquaculture
	ZO 4 ET 12	FISHERY SCIENCE- III HARVESTING, POST HARVESTING TECHNOLOGY AND MARKETING	CO1	To understand commercial fishing methods
			CO2	To gain understanding about crafts and gears of fish harvesting
			CO3	To understand chemical composition and nutritional value of fishes
			CO4	To gain understanding about post mortem changes associated with fish muscle and various types of spoilage mechanisms
			CO5	To understand handling of harvested fish and different methods/techniques of fish preservation
			CO6	To understand about the processing of fishes, shrimps, cephalopods and lobsters
			CO7	To understand fish by products
			CO8	To understand national and international marketing of fish
	ZO 4 CP 04	PRACTICAL - IMMUNOLOGY AND CYTOGENETICS		

	ZO 4 CP 04	PRACTICAL - DEVELOPMENTAL BIOLOGY & ENDOCRINOLOGY		
	ZO 4 CP 04	PRACTICAL - BIOTECHNOLOGY		
	ZO 4 CP 04	PRACTICAL - MICROBIOLOGY		
	ZO 4 CP 04	PRACTICAL - MICROTECHNIQUE AND HISTOCHEMISTRY		
	ZO 4 EP 05	PRACTICAL - FISHERY SCIENCE - I- TAXONOMY, BIOLOGY, PHYSIOLOGY & ECOLOGY		
	ZO 4 EP 05	PRACTICAL - FISHERY SCIENCE - II CAPTURE AND CULTURE FISHERIES		

	ZO 4 EP 06	PRACTICAL - FISHERY SCIENCE - III - HARVESTING POST HARVESTING TECHNOLOGY AND MARKETING		
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<b>Name of the programme</b>				<b>Master of Science, Statistics</b>
Short Name of the Programme				M.Sc. Statistics
Code of the Programme				CCAMST
Semester	Course code	Course Title	CO No:	Course Outcomes
	ST1C01	ANALYTICAL TOOLS FOR STATISTICS I	CO1	Prove the Cauchy-Riemann equations and apply them to complex functions in order to determine whether a given continuous function is complex differentiable.
			CO2	Apply concept and consequences of analyticity and C-R-equations.
			CO3	Compute complex contour integrals and applying the Cauchy's integral in various versions.
			CO4	Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues.
			CO5	Prove the Cauchy Residue Theorem and use it to evaluate integrals
			CO6	Learn the methods and properties of Laplace transform and Inverse Laplace Transform, apply them to solve Linear Differential equations.
			CO7	Apply the fundamental concepts of Fourier series, Fourier Sine series, Fourier Cosine series to find series representation of irrational numbers.
	ST1C02	ANALYTICAL TOOLS FOR STATISTICS II	CO1	Use the basic concepts of vector and matrix algebra, including linear dependence / independence, basis and dimension of a subspace, rank and

			nullity, for analysis of matrices and systems of linear equations
			CO2 Evaluate determinants and use them to discriminate between invertible and noninvertible matrices; Use the characteristic polynomial to compute the eigen values and eigenvectors of a square matrix and use them to diagonalizable matrices when this is possible.
			CO3 Discriminate between diagonalizable and non-diagonalisable matrices; orthogonally diagonalizable symmetric matrices and quadratic forms
			CO4 Combine methods of matrix algebra to compose the change-of-basis matrix with respect to two bases of a vector space, identify linear transformations of finite dimensional vector spaces and compose their matrices in specific bases
	ST1C03	DISTRIBUTION THEORY	CO1 Understand the most common discrete and continuous probability distributions and their real life applications.
			CO2 Compute marginal and conditional distributions from joint distributions
			CO3 Get familiar with transformation of univariate and multivariate densities. Understanding of distribution helps to understand the nature of data and to perform appropriate analysis.
			CO4 Concept of non-central probability distributions
	ST1C04	PROBABILITY THEORY	CO1 Recognize common probability distributions for discrete and continuous variables
			CO2 Apply methods from algebra and calculus to derive the mean and variance for a range of probability distributions.
			CO3 Calculate probabilities relevant to multivariate distributions, including marginal and conditional probabilities



			and the covariance of two random variables.
		CO4	Understand the concept of convergence, common methods for evaluating an inequalities performance and properties of desirable estimators. Understand the central limit theorem and large-sample approximations for common statistics.
ST1CO5	STATISTICAL COMPUTING I	CO1	Solve the real analysis problems
		CO2	Apply linear algebra problems in real life situations
		CO3	Fit the distributions to a real life data using R-software
ST2CO6	DESIGN AND ANALYSIS OF EXPERIMENTS	CO1	Compare the pairs of treatment means using different methods when null hypothesis is rejected in ANOVA
		CO2	Analyze the data using split plot, strip plot and general factorial experiments
		CO3	Construct fractional factorial experiments and apply confounding in real life problems.
		CO4	Understand the analysis of BIBD, PBIBD, Quasi-Latin square, Youden square and cross over design and their applications in agriculture, business and industries.
ST2CO7	ESTIMATION THEORY	CO1	Understand the notion of a parametric models, point and interval estimation of the parameters of those models.
		CO2	Obtain the sufficient statistic, minimal sufficient statistic, m.l.e., moment estimator of the parameter
		CO3	Understand the concept of MVUE, MVBUE, UMVUE
		CO4	Describe the concept of Bayesian inference and their real life applications
ST2CO8	SAMPLING THEORY	CO1	Understand the basic principles underlying survey design and estimation
		CO2	Apply the different sampling methods for designing and selecting a sample from a population.

			CO3	Implement Cluster sampling, Ratio and Regression estimation in real life problems.
			CO4	Apply unequal probability sampling designs viz. PPSWR, PPSWOR including Lahiri's method and Murthy's estimator for survey.
	ST2 C09	TESTING OF HYPOTHESES	CO1	Formulate null and alternative hypotheses and apply small, large sample and non-parametric tests in real life problems.
			CO2	Compute probabilities of types of error, MP tests and MLR property
			CO3	Understand UMP and UMPU test with their applications
			CO4	Obtain asymptotic confidence interval of a parameter and its relation with testing of hypothesis problem.
	ST2 C10	STATISTICAL COMPUTING II	CO1	Explore small and large data-sets to create testable hypotheses and identify appropriate statistical tests
			CO2	Apply different designs in real life situations
			CO3	Estimate the parameter of a distribution from sample
			CO4	Perform sampling methods analysis using R-software
	ST3 C11	APPLIED REGRESSION ANALYSIS	CO1	Apply simple linear regression model to real life examples.
			CO2	Understand multiple linear regression models with applications and concept of Multicollinearity and autocorrelation.
			CO3	Compute multiple and partial correlation and checking residual diagnostic to validate model.
			CO4	Apply Logistic and Non-linear regression models and its implementation in real life situation
	ST3 C12	STOCHASTIC PROCESSES	CO1	Understand the stochastic processes, Markov chains, Transition probability matrix and various types of states
			CO2	Explain Random walk, Gambler ruins problem and apply Poisson process in real life situations

		CO3	Formulate and solve problems which involve setting up stochastic models
		CO4	Understand renewal theory and branching processes with applications
ST3E10	STATISTICAL QUALITY CONTROL	CO1	Understand the concepts of control charts
		CO2	Understand the concepts of Control charts with memory.
		CO3	Understand the concepts of Acceptance sampling by variables and various continuous sampling plans
ST3E02	TIME SERIES ANALYSIS	CO1	Understand the concept of time series with its components and able to compute ACVF and ACF.
		CO2	Remove trend and seasonality using different methods to convert the time series into stationary
		CO3	Apply auto regressive, moving average, ARMA, ARIMA models, BoxJenkins approach to forecast time-series data empirically
		CO4	Check and validate models with its residual analysis and diagnostic checking
ST3C13	STATISTICAL COMPUTING III	CO1	Draw controls charts and apply acceptance sampling plans in industry point of view
		CO2	Fitting of regression lines
		CO3	Predicting future values of a time series data
ST4C14	MULTIVARIATE ANALYSIS	CO1	Understand multivariate normal distribution and their real life applications
		CO2	Understand Wishart distribution, Hotelling T2 and Mahalanobis D2 statistic
		CO3	Implement dimension reduction techniques using software on real life problems
		CO4	Demonstrate knowledge and understanding of the basic ideas behind discriminant and clustering analysis techniques with applications
ST4E08	RELIABILITY MODELLING	CO1	Understand the elements of reliability, hazard function and its applications

			CO2	Understand the concept of censoring, life distributions and ageing classes and basic concepts of shock models.
			CO3	Understand the tests for exponentiality; tests for HPP vs. NHPP with repairable systems.
	ST4C15	PROJECT/DISSERTATION AND EXTERNAL VIVA VOCE	CO1	Search primary or secondary dataset and collect the data for analysis
			CO2	Apply the statistical techniques in the project which they had learned in the theory
			CO3	Interpret and conclude the statistical analysis scientifically. CO4: Represent his/her work through power point presentation
	ST4C16	STATISTICAL COMPUTING IV	CO1	Perform different types of multivariate techniques to analysis the data sets
			CO2	Finding reliability function, hazard rate of different life distribution.

**Name of the programme**

**Master of Science, Applied Geology**

Short Name of the Programme

M.Sc. Applied Geology

Code of the Programme

CCAMAG

Semester	Course code	Course Title	CO No:	Course Outcomes
	GEL 1C 01	PHYSICAL GEOLOGY AND GEOMORPHOLOGY	CO1	The Basic concepts of Earth and solar system
			CO2	Will learn about the modern techniques for the earthquake prediction.
			CO3	Understanding of various geomorphological principles and processes
			CO4	Practical Applications of geomorphological studies in various fields
	GEL 1C02	STRUCTURAL GEOLOGY AND GEOTECTONICS	CO1	Basics of geological mapping and map reading
			CO2	Identification of different geological structures in the field.
			CO3	Understandings of the basics of planetary tectonics
			CO4	Physico- Chemical and seismic properties of earth's interior

GEL 1C 03	GEOINFORMATICS	CO1	Will able learn the basic principles and application of Remote sensing in geosciences
		CO2	Understanding of digital image processing techniques in Geological application
		CO3	Fundamental concepts of Geographic information system
		CO4	GIS applications in Mineral exploration
GEL 1C 04	STRATIGRAPHY AND INDIAN GEOLOGY	CO1	Understanding the code of stratigraphic nomenclature
		CO2	Methods of stratigraphic correlation
		CO3	Understanding the major geological events in earth history
		CO4	Discussion on the stratigraphic boundary issues in the Indian sub-continent
GEL 2C 05	CRYSTALLOGRAPHY AND MINERALOGY	CO1	derivation of 32 crystal classes and stereographic projections
		CO2	Use of Crystal notations (Schoenflies notation, Herman Maugin)
		CO3	Conoscopic observations of minerals under petrological microscope
		CO4	Understanding the mineralogical composition of Crust and Mantle
GEL 2C 06	ECONOMIC GEOLOGY	CO1	Learn about the ore microscopy and fluid inclusion studies
		CO2	major theories of ore genesis
		CO3	Distribution and genesis of Fossil fuels
		CO4	National mineral policy
GEL 2C 07	HYDROGEOLOGY	CO1	the hydrogeological properties of rocks
		CO2	learn about the groundwater quality analysis
		CO3	Application of Geophysical methods in groundwater exploration
		CO4	Identification of ground water issues
GEL 2C 08	APPLIED PALAEOLOGY AND SEDIMENTOLOGY	CO1	The role of microfossils in petroleum exploration
		CO2	Understanding the evaluation history of ancient life
		CO3	Significance of heavy minerals in provenance studies

			CO4	detailed understanding of basin analysis and sedimentation
	GEL 3C 09	IGNEOUS AND METAMORPHIC PETROLOGY	CO1	The significance of texture and structure of igneous rocks
			CO2	Students will learn about the phase rule application in silicate systems
			CO3	Phase diagrams study helps to understand the course of crystallization of various chemical systems
			CO4	The comprehensive study of classification of igneous rocks
			CO5	The detailed learning of metamorphism in space and time
	GEL 4C 10	GEOCHEMISTRY AND ISOTOPE GEOLOGY	CO1	The overview of the origin & distribution of elements.in the Earth.
			CO2	Students will learn about the thermodynamic laws and application in geochemistry.
			CO3	will learn about the applications of both radiogenic and stable isotopes in geochemical studies
			CO4	Understanding of modern analytical techniques
<b>ELECTIVES</b>				
	GEL 3E 01a	CLIMATOLOGY	CO1	The knowledge of geographical distribution of climatic types
			CO2	The detailed understanding of Coriolis force, jet streams, air masses, clouds, wind
			CO3	Cyclones and their significance in India
			CO4	Importance of Air-sea interactions in climate
	GEL 3E 01b	COAL AND PETROLEUM GEOLOGY	CO1	The insight about origin and structure of coal seams
			CO2	The detailed understanding of coal petrography
			CO3	The detailed learning of reservoir rocks, source rocks and traps
			CO4	The knowledge about petroliferous basins in India
			CO1	The disaster management phases

	GEL 3E 02a	ENVIRONMENTAL GEOLOGY	CO2	The detailed understanding of Environmental consequences of natural hazards
			CO3	The detailed learning of Environmental impact assessment (EIA)
			CO4	The knowledge about various means of pollution
			CO5	The different aspects of waste management
	GEL 3E 02b	QUATERNARY GEOLOGY	CO1	The events and their evidences in Quaternary period
			CO2	The detailed understanding of radioactive methods
			CO3	The detailed learning of Causes of Quaternary climate change
			CO4	The knowledge of glaciation and deglaciation in diverse geographical environments
CO5			The concepts of climate modelling and prediction	
	GEL 3E 03a	MARINE GEOLOGY	CO1	The Sea bottom topography
			CO2	The detailed understanding of physical and chemical properties of sea water
			CO3	The detailed learning of Marine mineral resources
			CO4	The knowledge of Coastal processes and Coastal protection structures
			CO5	Ocean circulation and their significances
	GEL 3E 03b	GEOTECHNICAL ENGINEERING		
	GEL 4E 04a	EXPLORATION GEOLOGY	CO1	The basic knowledge of surface and subsurface exploration methods
			CO2	Application of geochemical and geophysical methods in mineral and oil exploration etc
			CO3	Detailed understanding methods of ore reserve estimation
			CO4	Learning of various geophysical well logging methods
	GEL 4E 04b	DISASTER MANAGEMENT	CO1	The insight about natural and manmade disasters.

			CO2	The detailed understanding of disaster preparedness and response
			CO3	The detailed learning of role of government, international agencies and NGO bodies in disaster management
			CO4	The knowledge about risk and vulnerability analysis
	GEL 4E 05a	ENGINEERING GEOLOGY	CO1	The geological studies and evaluation of major civil structures.
			CO2	The elementary concepts of rock mechanics and soil mechanics
			CO3	The detailed learning of various mining methods.
			CO4	The knowledge geological hazards and mitigation.
			CO5	The fundamentals of ore dressing
	GEL 4E 05b	ENVIRONMENTAL IMPACT ASSESSMENT	CO1	The Basic steps for the impact identification, prediction and assessment of various resources
			CO2	The detailed understanding of environmental impact assessment (EIA)
			CO3	The scenario of environmental impact assessment in India.
			CO4	The knowledge of analysis of Environmental impacts
<b>PRACTICAL</b>				
	GEL 1L 01	GEOMORPHOLOGY, STRUCTURAL GEOLOGY, GEOINFORMATICS	CO1	Interpretation of geologic maps
			CO2	Will learn stereographic solutions to problems in structural geology.
			CO3	Understanding geometric analysis of planar and linear structures
			CO4	Hands on exercises on the open source software QGIS will help the students to understand the basic elements of map making
			CO5	At the end of the course the students will be able to prepare maps by their own
			CO6	Students will be able to understand and do the basic image processing analysis



	GEL 2L 02	CRYSTALLOGRAPHY, MINERALOGY, ECONOMIC GEOLOGY, HYDROGEOLOGY, PALAEONTOLOGY AND SEDIMENTOLOGY	CO1	Students will learn how to prepare microfossil slides and their identification
			CO2	They will learn sieve analysis, plotting and interpreting the data
			CO3	They will learn to mount thin section of heavy minerals and their identification.
	GEL 3L 03	IGNEOUS AND METAMORPHIC PETROLOGY AND ELECTIVE COURSE	CO1	Preparation of thin sections of igneous and metamorphic rock samples
			CO2	Petrography of igneous and metamorphic rocks. Textures and structures of igneous and metamorphic rocks and their genetic significance with neat sketches.
			CO3	Identification of metamorphic mineral paragenesis in hand specimens and thin sections and arranging them according to the intensity of metamorphism
	GEL 4L 04	GEOCHEMISTRY AND ELECTIVE COURSE	CO1	The knowledge of calculation of bulk rock compositions from modal mineralogy and mineral chemistry.
			CO2	Determination of pH of groundwater samples
			CO3	Determination of Na and K using flame photometer

**Name of the programme**

**Master of Science, Clinical Psychology**

Short Name of the Programme

M.Sc. Clinical Psychology

Code of the Programme

CCAMCP

Semester	Course code	Course Title	CO No:	Course Outcomes
1	CPY1CO1	Psychodynamics and Cognition	CO1	To demonstrate understanding about cognitive psychology and its development
			CO2	To gain knowledge regarding the various theoretical perspectives put forth in attention, perception and learning
			CO3	Increased confidence in critiquing approaches
			CO4	Exposure to classic and recent research work in the field of attention,

			perception and learning (Research articles will be given for review)
CPY1CO2	Personality and Personal Growth	CO1	Demonstrate knowledge and understanding of Personality theories to explain uniqueness in human behaviour and trend.
		CO2	Appreciate theories that explain personality
		CO3	Develop a scientific attitude and ability of reflection and logical reasoning in understanding behaviour/ personality
CPY1CO3	Physiological Psychology	CO1	Have sound theoretical knowledge about the physiological reason behind behaviour.
		CO2	Predict the neurological reason behind mental illness
		CO3	Explain physiological, and endocrine reasons behind stress reactions
CPY1CO4	Advanced Social Psychology	CO1	To understand different psychosocial reasons behind social issues and scientifically plan and execute psychosocial interventions
		CO2	Conduct work on minor research projects, based on behaviour to contribute for a positive social change
		CO3	Explain how basic social psychological findings can be used to bring about desired changes
		CO4	Compare different explanations for a social psychological phenomenon
		CO5	Understand the differences between testing theories and testing interventions
		CO6	Describe the available evidence for selected practical problems
CPY1CO5	Clinical Psychology-1	CO1	To get a clear understanding of major psychological disorders, their etiology, classification, characteristic symptoms and management.
		CO2	To familiarize with the major therapeutic treatments for psychological disorders
CPY1CO6	Practical 1- Diagnostic Testing	CO1	Psychodiagnosis, administer, interpret and prepare scientific report.

			CO2	Get familiarised with personality assessment tools and demonstrate its usage in clinical setting
			CO3	Use effective psychological tool for assessment and evaluation of mental capacities.
	CPY1AO1	Community Extension work	CO1	Understand the need of extension of psychological services
			CO2	Get sensitized to the social needs for psychological extension services and demonstrate skill in community services as per the need of the hour
			CO3	Have extension skills and referral skills
2	CPY2CO7	Neuropsychology	CO1	Understand the neurological basis of behaviour and disorders.
			CO2	Neurological etiology and make predictions on the basis
			CO3	Explain behaviour on the basis of cerebral asymmetry
	CPY2CO8	Research Methodology	CO1	To get familiarised with scientific research methods in Psychology.
			CO2	Get motivated to do minor studies in Psychology using scientific methods
			CO3	Read studies and articles in Psychology to analyse methods, critically evaluate on the basis of the validity, reliability and objectivity.
	CPY2CO9	Clinical Psychology 2	CO1	Explain the concepts, etiology, diagnostic tools and classifications of psychopathology.
			CO2	Explain clinical picture of psychological disorders.
	CPY2CO10	Psychotherapeutics-1	CO1	To explain the scientific basis of psychotherapeutics
			CO2	To demonstrate skill in psychodiagnosis and explain etiological relation to therapies
	CPY2CO11	Experimental Psychology - Practicals	CO1	To do intelligence test, as per the need of the hour and prepare report
			CO2	Administer neuropsychological tests and prepare report
			CO3	Can work under the licensed clinical psychologists, to conduct clinical assessments

	CPY2AO2	Self Development Techniques	CO1	To administer relaxation and meditation procedures for self and others, which will work for calming down and manage stress
			CO2	Introduction Regarding the scope and application of Eastern and Western Psychological Techniques and their practical application. (Holistic Health Psychological Aspects.)
3	CPY3CO12	Counselling Psychology	CO1	Do counselling services for students,parents, teachers, organisational persinnel and specific groups
			CO2	Narrate sound theoretical backing of counselling with critical thinking.
	CPY3CO13	Psychotherapeutics -2	CO1	To utilise advanced theoretical backing of psychotherapeutic
			CO2	Explain etiology, understand diagnosis and work under licensed clinical psychologists
	CPY3CO14	Psychopathology	CO1	To understand the disorders of different sensory modalities and cognitive processes, etiological factors etc
			CO2	To describe and to denominate persons subjective experiences and behaviors
			CO3	To make sense of the abnormal human sensitivity
	CPY3CO15	Field Experiments	CO1	Can conduct scientific interviews, systematic observations,and administer biofeedback
			CO2	Conduct minor studies in Psychology using qualitative methods
			CO3	Scientifically analyse the content of a matter, written or vocal
			CO4	Can prepare valid and reliable psychological scales
			CO5	Take clinical, organisational and educational cases and conduct case studies
	CPY3CO16	Clinical Practicum	CO1	Work under the guidance of licensed clinical psychologists in mental health centres and hospitals.

	CPY3EO1	Holistic Psychology	CO1	Can utilize eastern and western theories to explain etiology of mental health issues.
			CO2	Understand the basis of Psychotherapy and explain the cultural and historic contributions to that.
	CPY3EO2	Medical Psychology	CO1	Be a consultant in health related behaviour and work under a medical practitioner or in a hospital
			CO2	Conduct awareness programmes in health behaviour, related with hospital
			CO3	Work in a hospital for the welfare of patients
			CO4	Can be a trainer or consultrant for medical professional for the skill development in patient welfare behaviour
			CO5	Work with the team in hospital designing
	CPY4CO17	Current Trends in Psychology	CO1	Understand the psychological basis of complex socio cultural behaviour
			CO2	Develop strategies for psycho social intervention.
	CPY4EO3	Clinical Neuropsychology	CO1	Can do higher studies in neuroscience
			CO2	Can work under the guidance of licensed neuro psychologists, to support assessment and practice.
	CPY4EO4	Industrial Clinical Psychology	CO1	Can practise in Industrial context to support organizational effectiveness, to deal with mental health issues of employees.
			CO2	Work in HR department of organizations and deal with adjustment issues of employees
			CO3	Work in employee welfare department.
	CPY4EO5	Forensic Clinical Psychology	CO1	Work under th guidance of licensed forensic psychologist, to support assessment and practise.
			CO2	Apply clinical psychology principles in forensic investigations and research
			CO3	Work in children's homes, correctional institutions like prison.
	CPY4EO6	Rehabilitation Psychology	CO1	Able to understand the concepts in rehabilitation psychology

			CO2	To understand the role of rehabilitation psychologist in the field of disability rehabilitation
			CO3	To understand the concept of impairment, disability and handicap
			CO4	To understand the characteristics of various disabilities
			CO5	To learn about different government schemes, policies and legislations for persons with disabilities.
			CO6	To learn about various models of rehabilitation
			CO7	To understand the basic principles of psychotherapy and its application in the field of disability
			CO8	To become aware of recent research/ trends in rehabilitation psychology.
	CPY4EO7	Community and Consulting Psychology	CO1	Work for the welfare of diversity in the community and do psychological interventions in community basis
			CO2	Do psychological services for equality and equity in the community
			CO3	Sensitized toward discrimination on the basis of minority, caste, gender, power and living locality and motivated and skilled to work against discrimination
	CPY4CO18	Dissertation and Viva-Voce	CO1	Write research proposals and reports
			CO2	To conduct minor studies in Psychology and do action research
			CO3	Conduct critical analysis of studies in Psychology.

### Name of the programme

**Master of Science, Botany**

Short Name of the Programme

M.Sc. Botany

Code of the Programme

CCAMBT

Semester	Course code	Course Title	CO No:	Course Outcomes
1	BOT1CO1	PHYCOLOGY, BRYOLOGY, PTERIDOLOGY AND GYMNOSPERMS	CO1	Identify algae and familiarize them with ecology, life cycle patterns and economic importance of major groups.
			CO2	Describe the importance, history, origin and evolution of Bryophytes, Pteridophytes and Gymnosperms with

				reference to important classificatory systems.
			CO3	Explain the ecological and economic significance of Bryophytes, Pteridophytes and Gymnosperms.
			CO4	Compare the important features of identification of the types mentioned in the syllabus.
			CO5	Evaluate the concepts how the stele evolution occurs in Pteridophytes and also familiar with the work done by Indian Pteridologist.
	BOT1C02	MYCOLOGY AND LICHENOLOGY, MICROBIOLOGY AND PLANT PATHOLOGY	CO1	Outline the classification of fungi based on structure and reproduction.
			CO2	Identify Pathogenic and Non-pathogenic diseases and understand principles of Plant disease management.
			CO3	Explain Plant diseases, study of the life history of causal organism, host and their relationship and control measure for plant diseases.
			CO4	Define the basic concepts of Microbiology, to study in detail the structure, habitats, physiology, reproduction and adaptation strategies of the various microorganisms like bacteria and the major classes, viruses and sub-viral particles.
			CO5	Outline the importance of microbiology in various fields like Industrial, food and Agriculture.
	BOT1C03	ANGIOSPERM ANATOMY, EMBRYOLOGY, PALYNOLOGY AND LAB TECHNIQUES	CO1	Explain the structure and development of plants and helps to explore the internal tissue organization of higher plants.
			CO2	Evaluate the concepts of reproductive biology of angiosperms.
			CO3	Apply the importance of anatomical, embryological and palynological characters in taxonomical classification.

			C04	Describe the structure of anther and role of gene expression during pollen development explain about fertilization and how pollen stigma interaction takes place
			C05	Apply the importance of NPC system in Plant identification and classification.
			C06	Develop skills for Sectioning, Mounting, Staining and Slide Preparations
			C07	Explain the role of Palynology in forensic studies and oil exploration.
	BOT1L01	PRACTICALS OF PHYCOLOGY, BRYOLOGY, PTERIDOLOGY, GYMNOSPERMS, MYCOLOGY AND LICHENOLOGY	C01	Describe the external and internal structure of lower group organism and know about the cellular drawing.
			C02	Identify different types of cyanobacteria
			C03	Develop skills for making micro preparation of algal, fungal and Lichen specimens for anatomical studies for identification and classification.
			C04	Develop skills for making micro preparation of Bryophytes, Pteridophytes and gymnosperms specimens for anatomical studies for identification and classification.
			C05	Gain the skill of identifying the fossil specimen.
			C06	Make collection of mentioned specimens from various localities, their Identification and preparation of herbarium
	BOT1L02	PRACTICALS OF MICROBIOLOGY, PLANT PATHOLOGY, ANGIOSPERM ANATOMY, EMBRYOLOGY, PALYNOLOGY AND LAB TECHNIQUES.	C01	Develop skill in sectioning and to prepare permanent micro and macro preparations.
			C02	Identify structure of stomata while peeling epidermis of leaves and nodal anatomy by making micro preparations of stem trough nodes.
			C03	Develop skill in the use of instruments such as microtome and to study Permanent slide preparations of Plant Specimens
			C04	Develop practical skills on dissection of stages in the development of embryo and endosperm



			CO5	Develop skills on isolation of pure bacterial culture by streak plate method
			CO6	Develop Practical skill on Staining of bacteria (negative staining, Gram staining and spore staining).
			CO7	Develop Practical skills in micropreparations of pollen my classical Acetolysis Method.
2	BOT2C04	CELL BIOLOGY, MOLECULAR BIOLOGY AND BIOPHYSICS	CO1	Analyses the dynamics of chromosome behavior and its interactions.
			CO2	Evaluate the central dogma of life
			CO3	Evaluate the concept of biophysical techniques of instrumentation
			CO4	Describe the knowledge of biophysics and molecular biology in research studies
			CO5	Explain the role of various cell organelles and developed knowledge about various phases of cell division
			CO6	Apply the knowledge of molecular evolution to decipher the phylogeny of gene families
	BOT2C05	CYTOGENETICS, GENETICS, BIOSTATISTICS, PLANT BREEDING AND EVOLUTION	CO1	Identify and define basic terms and concepts of genetics, interaction of gene and genetic recombination.
			CO2	Explain the role of statistical tools for collection, analysis, interpretation and visualization of data, and its application in Biological experiments.
			CO3	Describe about various plant breeding techniques used in crop improvement and their application in agriculture and Horticulture.
			CO4	Identify legal regulations related to IPR.
			CO5	Evaluate the concept and evidences of evolution, importance of geological time scale and evolution.
			CO6	Analyze the structural and numerical chromosome alteration in crop improvement
			CO7	Solve problems in quantitative, population and molecular genetics.
	BOT2C06	PLANT ECOLOGY, CONSERVATION	CO1	Explain the importance of ecosystem, biodiversity and energy flow

		BIOLOGY, PHYTOGEOGRAPHY AND FOREST BOTANY	CO2	Identify the phytogeographical distribution patterns of Plants.
			CO3	Recognize the different forest types and products and major and minor forest products for sustainable utilization of bio-resources.
			CO4	Apply new strategies for in situ and ex situ conservation of biodiversity
			CO5	Identify the population characteristics and its significance
			CO6	Identify the threatened plants and threats to global environment.
			CO7	Demonstrate skill for Environmental Impact Assessment and awareness to Environmental laws.
			CO8	Evaluate the role of different biodiversity conservation ventures at local/national and global levels.
			BOT2L03	PRACTICALS OF CELL BIOLOGY, MOLECULAR BIOLOGY, BIOPHYSICS AND CYTOGENETICS
CO2	Equipped with Preparation of buffers and measurement of pH using pH meter			
CO3	Analyze the working out problems from molecular genetics.			
CO4	Identify and analyze polytene chromosomes			
CO5	Develop drawing skills good Idiogram from given data.			
BOT2L04	Practicals of Genetics, Biostatistics, Plant Breeding, Plant Ecology, Conservation Biology, Phytogeography and Forest Botany	CO1	Describe Plant Population Details	
		CO2	Demonstrate hybridization technique in different crop plants.	
		CO3	Solve the Problems from Measures of dispersion, tests of significance and correlation analysis.	
		CO4	Develop skills for estimation of dissolved oxygen content in the water sample by Winkler's method	
		CO5	Develop skills for estimation of primary production in water samples by light and dark bottle method (Winkler's method).	

			CO6	Identify of the various floristic and vegetational regions of the world and India in maps
3	BOT3C07	PLANT PHYSIOLOGY, METABOLISM AND BIOCHEMISTRY	CO1	Explain the requirement of mineral nutrition for plant growth and the process of Photosynthesis, Respiration and Nitrogen metabolism.
			CO2	Explain about the Plant Growth hormones (Auxins, Gibberellins. Cytokinin, Ethylene)
			CO3	Analyse Response mechanisms of plants to biotic and abiotic stresses and can Analyse the role of external factors in plant development and stress induction.
			CO4	Analyse the role of enzymes in metabolic activities. They have developed knowledge about pathways of water through xylem and phloem.
			CO5	Evaluate the physiological, ecological and phylogenic importance of secondary metabolites.
			CO6	Explain different primary metabolic pathways and its regulations
			CO1	Evaluate the theories of origin and evolution of angiosperms, flower and floral parts and co-evolution of flower and pollinators.
	BOT3C08	ANGIOSPERM MORPHOLOGY AND TAXONOMY AND PLANT RESOURCES	CO2	Apply the knowledge of taxonomy to identify the plant species using floras and keys.
			CO3	Aware about the systems of classification and phylogeny of plants.
			CO4	Understand the rules of ICBN, botanical gardens, character weighing and literature in plant taxonomy.
			CO5	Identify the different plant family members through field trip and herbarium preparation.
			CO6	Identify and categorize different types of plant resources and their useful parts.
			CO7	Analyse the current scenario of Indian taxonomy, herbaria and organizations.

BOT3C09	BIOTECHNOLOGY AND BIOINFORMATICS	CO1	Understand the theory and techniques of plant tissue culture.
		CO2	Provide an in-depth understanding of the fundamental principles of biotechnology and the concepts and techniques involved in recombinant DNA technology.
		CO3	Provide an insight into the bioinformatic tools that aid analyses of biological data.
		CO4	Analyze the prospects, achievements and ethical issues regarding Gene Cloning
		CO5	Develop skill in micropropagation and to establish commercial Tissue Culture venture.
		CO6	Acquire knowledge in the usage of biological networks.
BOT3L05	PRACTICALS OF PLANT PHYSIOLOGY, METABOLISM, BIOCHEMISTRY, ANGIOSPERM MORPHOLOGY AND TAXONOMY	CO1	Determine water potential by tissue weight change method.
		CO2	Develop practical skills on Separation of leaf pigments by paper chromatography.
		CO3	Develop practical skills on Qualitative tests for monosaccharides, reducing and non-reducing oligosaccharides, starch, amino acids and protein.
		CO4	Determine Quantitative estimation of protein by Biuret.
		CO5	Make dissections and hand sections on different types of ovaries, different types of placentation in special types of flowers.
		CO6	Familiarization with local flora and construction of keys – use of floras in identification up to species
		CO7	Preparation of cleared whole mounts of floral parts to show vasculature.
BOT3L06	PRACTICALS OF PLANT RESOURCES, BIOTECHNOLOGY AND BIOINFORMATICS	CO1	Develop skills on DNA Isolation and Gel casting
		CO2	The students will learn about the basic concept, technical skills, hands-on experience and training in plant tissue culture

			CO3	Preparation and sterilization of culture media and Culturing of Carrot /Tobacco/Datura.
			CO4	Understand the morphological study of the source plants mentioned in the syllabus and identification of the plants and plant products.
			CO5	Preparation of scientific presentations using packages such as MS-PowerPoint.
			CO6	Develop acquisition of basic skills in Internet browsing and the use of web browsers and search engines.
4	BOT4E01	ELECTIVE I- ENVIRONMENTAL BIOLOGY AND BIODIVERSITY CONSERVATION	CO1	Explain about global and regional initiatives for Climate change and Environmental Protection.
			CO2	Analyze ecofriendly culture and to familiarize them with environmental ethics.
			CO3	Describe the impact of climate change on ecosystem and role of people movements for biodiversity conservation
			CO4	Aware different biodiversity information resources, meta-databases and virtual libraries.
			CO5	Analyze biodiversity in terms of wild and agro biodiversity and its traditional conservation practices.
			CO6	Identify and define about different types of habitats with reference to Kerala and India.
			CO7	Apply the principles of conservation strategies in global perspective for the use and restoration of threatened ecosystem and sustainable development.
	BOT4E02	ELECTIVE II- GENETIC ENGINEERING	CO1	Outline the general procedure of gene cloning and Prospects, achievements and demerits of Transgenic Organisms.
			CO2	Aware of gene therapy strategies and its application in medical field.
			CO3	Evaluate the basic concepts of genome organization in plants and about different molecular markers and its application

		CO4	Evaluate the merits and demerits of different tools used in Recombinant DNA technology
		CO5	Describe the importance of bio-nanotechnology in medicine and bioremediation and its biosafety concerns.
BOT4L07	Practicals of Electives I- ENVIRONMENTAL BIOLOGY AND BIODIVERSITY CONSERVATION	CO1	Develop Skills on determination of Physical and chemical analysis of soil and water.
		CO2	Identify different forest Types and Ecosystems
		CO3	Identify and explain about the relationship with invasive plants and degraded ecosystems.
		CO4	Understand charting and mapping of Vegetation.
BOT04EP01	Practicals of Electives II - GENETIC ENGINEERING	CO1	Develop skills on DNA Isolation and Gel casting.
		CO2	Apply theoretical knowledge to the problem-solving methods in to Restriction Mapping
		CO3	Apply theoretical Knowledge to solve problems related to central dogma of Biology.
		CO4	Apply the tools and Equipment's used in Recombinant DNA Technology
		CO5	Explain about dyes used in visualization of DNA.
BOT4P01	DISSERTATION	CO1	Analyze the knowledge gaps in botanical research.
		CO2	Identify relevant literature and write a literature review of the chosen field
		CO3	Apply theoretical frameworks to the chosen area of study
		CO4	Demonstrate the ability to collate and critically interpret data
		CO5	Demonstrate the skill to write research report and scientific publications
		CO6	Communicate with knowledge in a scientific manner
		CO7	Develop skills in hands on training on instruments and procedures related to the chosen area of study.

Name of the programme				Master of Science, Chemistry
Short Name of the Programme				M.Sc. Chemistry
Code of the Programme				CCAMCH
Semester	Course code	Course Title	CO No:	Course Outcomes
1	CHE1C01	Quantum Mechanics and Computational Chemistry	CO1	Explain the laws of quantum mechanics necessary for the description of atoms and molecules and their chemical reaction.
			CO2	Apply boundary conditions to constraint set of possible states.
			CO3	Choose the appropriate method in terms of applicability and accuracy for the calculation of a given chemical problem.
			CO4	Recognize the expansion of wave function as the linear combination of basic elements.
			CO5	Predict chemical properties at the atomic scale using computational language
	CHE1C02	Elementary inorganic chemistry	CO1	Describe the concept of Acids and bases on the basis of various theories
			CO2	Gain knowledge on the chemistry of main group elements, transition and inner transition elements
			CO3	Develop an understanding on the importance, various processes and applications of Nano materials
			CO4	Gain an insight into various reactions involved in nuclear chemistry
			CO5	Outline the applications of radioactivity and radiolysis.
	CHE1C03	STRUCTURE, AND REACTIVITY OF ORGANIC COMPOUNDS	CO1	Identify and define chemical bonding, reactivity and various effects in organic molecules.
			CO2	Compare Acidity and Basicity as well as aromaticity.
			CO3	Analyze the concepts of stereochemistry and will be able to analyze stereo chemical aspects in organic chemistry.
			CO4	Predict enantio selective product.

	CHE1C04	THERMODYNAMICS, KINETICS & CATALYSIS	C05	Describe mechanisms in asymmetric reaction.
			C01	Gain a good knowledge on the chemical kinetics, fast reactions, Catalysis and Surface chemical reactions
			C02	Calculate the rate constants of reactions and derive the rate expressions of chain reactions for the formation of hydrogen halides by applying steady-state approximation.
			C03	Describe various concepts on molecular reaction dynamics
			C04	Identify and analyze the chemical systems from thermodynamic point of view
			C05	Gain an insight into various kinds of catalysis and its applications
2	CHE2C05	GROUP THEORY AND CHEMICAL BONDING	C01	Visualize molecule in 3-D, describe the concept of symmetry elements and symmetry operations.
			C02	Recognize the point groups of molecules and apply symmetry considerations for optical activity and dipole moment.
			C03	Describe and demonstrate the group multiplication table, character table and representations of group.
			C04	Apply the projection operator for constructing SALCs
			C05	Correlate application of symmetry to spectroscopy and find IR and Raman mode of vibration.
	CHE2C06	CO-ORDINATION CHEMISTRY	C01	Analyze the effect of various ligand field strengths on d-metal ions.
			C02	Identify the electronic spectra of complexes with respect to spin and orbital selection rules, various transitions and charge transfer spectra
			C03	Describe the magnetic properties of complexes.
			C04	Outline the methods for distinguishing between outer and inner sphere redox reactions



		CO5	Describe the prediction of substitution lability in complex reactions.
CHE2C07	REACTION MECHANISM IN ORGANIC CHEMISTRY	CO1	Develop an ability to understand addition and elimination reactions with mechanism and stereo chemical aspect
		CO2	Identify aliphatic and aromatic, nucleophilic and electrophilic substitution with mechanism and kinetics
		CO3	Gain an insight into the theory of pericyclic reactions and to get an idea about the orbital overlap in chemical reaction.
		CO4	Analyze photochemical reactions with mechanism
		CO5	Describe the classification, structure and synthesis of natural products
CHE2C08	ELECTROCHEMISTRY, SOLID STATE CHEMISTRY AND STATISTICAL THERMODYNAMICS	CO1	Describe Debye –Huckel equation, limiting and extended forms and its application
		CO2	Compare the efficiency of different electro chemical cells
		CO3	Identify and analyze symmetry elements, symmetry operations and crystal systems.
		CO4	Analyze the stoichiometric and non-stoichiometric defects in crystals.
		CO5	Describe the importance and consequences of quantum mechanics for macroscopic particle systems
CHE1L01 & CHE2L04	INORGANIC CHEMISTRY PRACTICALS– I & I	CO1	Analyze the cation mixture
		CO2	Estimate the ions by complexometric titrations
		CO3	Find out intensity of colour using colorimetric methods
CHE1L02 & CHE2L05	ORGANIC CHEMISTRY PRACTICALS– I & II	CO1	Separate the mixture of organic compounds
		CO2	Analyze the compounds separated from the mixture by chemical analysis
		CO3	Find out the melting and boiling points of the compounds
		CO4	Prepare organic compounds by two or three steps

	CHE1LO3 & CHE2LO6	PHYSICAL CHEMISTRY – I & II	CO1	Describe the working and application of Potentiometer, conductivity meter, viscometer and refractometer.
			CO2	Identify the relation of solubility with molar heat of solution
			CO3	Recognize the distribution law
			CO4	Realize the principles behind the experiment performed in the laboratory.
3	CHE3CO9	MOLECULAR SPECTROSCOPY	CO1	Describe basic concepts and theories of microwave spectroscopy, IR, Raman, NMR and electronic spectroscopy
			CO2	Analyze the principle and application of NMR Spectroscopy
			CO3	Calculate UV $\lambda_{\text{max}}$ value of various compounds
			CO4	Analyze the spectrum and find out the correct structure of compounds as an application of spectroscopy
	CHE3CO10	ORGANOMETALLIC AND BIOINORGANIC CHEMISTRY	CO1	Describe different properties and structures for organometallic compounds from different parts of the periodic table and their trends.
			CO2	Identify synthetic routes to various classes of organometallic compounds.
			CO3	Compare ligand classes in organometallic chemistry, their effects on organometallic compounds, and influence on reactivity and catalysis.
			CO4	Apply the basic principles in inorganic and general chemistry to interdisciplinary topics in the field of bioinorganic chemistry.
			CO5	Describe the main roles of metal ions in biological processes, and identify the chemical properties that are required to each particular function.
	CHE3CO11	REAGENTS AND TRANSFORMATIONS IN ORGANIC CHEMISTRY	CO1	Acquire proper knowledge about various methods of oxidation and reduction reagents
			CO2	Apply synthetic reagents like DABCO, DMAP, DDO, oxane etc in organic synthesis

4			CO3	Describe the classification of polymers, structure and synthesis of bio-polymers like proteins, nucleic acids, cellulose, starch etc.
			CO4	Gain in depth knowledge about the heterocyclic compounds for different elements containing heterocyclic ring
			CO5	Analyze the molecular rearrangements with mechanism.
	CHE3E01	SYNTHETIC ORGANIC CHEMISTRY	CO1	Describe various oxidation and reduction methods
			CO2	Apply organometallic and metallic reagents for synthesis of organic compounds
			CO3	Synthesize an organic compound by retrosynthetic methods by C-C and C-X bond disconnection
			CO4	Identify nucleophilic condensation reactions of carbonyl compounds and apply it on the retrosynthetic analysis.
			CO5	Synthesize stereo and regioselective compounds by own planning, target selection reagents and solvents
	CHE4C12	INSTRUMENTAL METHODS OF ANALYSIS	CO1	Describe absolute and relative errors, mean and standard deviation, variance, confidence limits, student t and f tests
CO2			Analyze organic precipitating agents, acid base redox and precipitation titrations, and complexometric titrations	
CO3			Gain an in depth knowledge in electroanalytical methods like potentiometry, polarography their applications biomembrane, biological and biocatalytic electrodes.	
CO4			Differentiate between atomic fluorescence spectrometry, X ray absorption and X-ray diffraction methods	
CO5			Recognize different chromatographic methods, detectors and CHN analysis by GC.	
CHE4O6	NATURAL PRODUCTS AND POLYMER CHEMISTRY	CO1	Elaborate general methods of structural elucidation of compounds of natural origin.	

		CO2	Learn advanced methods of structural elucidation of compounds of natural origin.
		CO3	Identify isolation, purification and characterization of chemical constituents from the natural source
		CO4	Recognize different polymerization process with respect to synthesis mechanisms and kinetics
		CO5	Communicate challenges, analysis, and conclusions related to polymer chemistry.
CH4EO8	ORGANOMETALLIC CHEMISTRY	CO1	Have a good overview of the fundamental principles of organotransition-metal chemistry and know how chemical properties are affected by metals and ligands
		CO2	Use knowledge about structure and bonding issues to understand the stability and reactivity of simple organometallic complexes
		CO3	Use of modern methods to characterize organometallic compounds
		CO4	Recognize fundamental reaction types and mechanisms and how to combine these to understand efficient catalytic processes
		CO5	Identify the applications of organometallic homogeneous catalysis in production of compounds.
CHE3LO7 & CHE4L10	INORGANIC CHEMISTRY PRACTICALS– III & IV	CO1	Quantitatively separate binary mixtures of ions in solution and estimation by volumetric, colorimetric or gravimetric methods
		CO2	Separate binary mixtures by ion-exchange method
		CO3	Prepare inorganic complexes
CHE3LO8 & CHE4L11	ORGANIC CHEMISTRY PRACTICALS– III & IV	CO1	Expertise the estimation of reducing sugar, amino group, phenolic group and esters volumetrically
		CO2	Expertise the estimation of vitamin A, drugs and anti-biotics colorimetric ally
		CO3	Expertise the extraction of natural products and purification by column and TLC

			CO4	Expertise the preparation of TLC plate activation and identification of compounds dyes, food additives, food colors, amino acids, sugars, pesticides and herbicides
	CHE3LO9 & CHE4L12	PHYSICAL CHEMISTRY PRACTICALS– III & IV	CO1	Describe specific conductance and calculate Arrhenius parameter and order of a reaction
			CO2	Differentiate the rate of adsorption on various system
			CO3	Deep insight into phase equilibria experiments.
			CO4	Expertise in handling polarimeter, spectrophotometer and chemistry softwares

**Name of the programme**

**Master of Science,  
Environmental Science**

Short Name of the Programme

M.Sc.Environmental Science

Code of the Programme

CCAMES

Semester	Course code	Course Title	CO No:	Course Outcomes
1	ESW 1C 01	Fundamentals of Ecology and Environment	CO1	Enable to understand fundamentals, Scope, Importance of Environmental Science and structure and function of different compartments of the Environment.
			CO2	Gain knowledge on multidisciplinary nature of environmental Science and need of Environmental awareness.
			CO3	Develop an understanding on different Environmental factors and various ecological processes.
			CO4	Gain insight into various processes involved in ecosystems.
	ESW 1C 02	Physical Processes in the Environment	CO1	Lay foundation on Structure and Composition of atmosphere and General atmospheric circulation.
			CO2	Develop an insight in to thermodynamics of atmosphere and associated processes.
			CO3	Gain knowledge on various processes involved in ecosystem.
			CO4	Develop an understanding on diurnal variations in temperature and their significance in pollutant dispersion.
	ESW 1C 03	Energy and Environment	CO1	Demonstrate distinction between Renewable and Non-Renewable energy resources.

			CO2	Gain awareness on world's and India's energy reserves and consumption.
			CO3	Develop knowledge on modern techniques for energy resource recovery.
			CO4	Insight into some key concepts such as Energy production and impacts on environment, Important multipurpose power projects and environmental issues in India, Sustainable energy management, problems and solutions and Energy crisis and challenges of energy transformation.
	ESW 1C 04	Environmental Pollution and Waste Management	CO1	Develop an insight in to the fundamental Concepts of Environmental pollution.
			CO2	Develop perspective on Air pollution, Water Pollution and Soil Pollution by and looking into concerned pollutants and their effects.
			CO3	Develop an insight into different impacts of wastes on environment.
			CO4	Gain knowledge about innovative Waste management approaches.
	ESW IC 05	Practical – I	CO1	Acquire skills on Methods of sampling and preservation of water
			CO2	Develop practical skill in Physico -chemical analysis of water
			CO3	Gain skill in assessment of micro algal / phytoplankton / zooplankton diversity and estimation of their numerical strength using standard methods.
			CO4	Attain skill in Drainage Basin analysis.
	ESW IC 06	Practical – II	CO1	Train on the Methods of analysis of physical and chemical properties of soil.
			CO2	Develop practical skill in Sieve analysis of sediments
			CO3	Gain skill in Air quality assessment.
			CO4	Enable to assess population / community structure using various sampling methods.
			CO5	Develop skill in assessment of primary and secondary productivity in aquatic and terrestrial ecosystems.
			CO6	Gain skill in Segregation and analysis of solid waste.
2	ES 2C 07	Fundamentals of Environmental Engineering	CO1	Develop an understanding of Concepts, characteristics of environmental engineering and ethics in environmental engineering.

		CO2	Develop perspective on Sources of water pollution, pollutant dynamics in environment, measurement of water pollution, water quality parameters, water pollution treatment (primary, secondary and tertiary, constructed wetlands), reduction, reuse and recycling techniques.
		CO3	Gain knowledge in Solid waste characterization, dynamics of wastes in environment, management and disposal of solid wastes and Treatment methods.
		CO4	To make aware of Legislation on management and handling of municipal solid wastes, bio-medical wastes and hazardous wastes, Vermi composting and vermi-technology.
ES 2C 08	Environmental Microbiology and Biotechnology	CO1	Enable to understand the characteristics, classification, identification and morphology of microorganisms.
		CO2	To make aware of physiological status of microorganisms in the environment.
		CO3	Develop an insight in to microbes in air, water and soil and their role in environment.
		CO4	Develop perspective on Emerging trends in biotechnology for Environmental Protection and innovative biotechnological Methods in Pollution Control.
ES 2C 09	Hydrology and Water Resource Management.	CO1	Develop perspective on Surface water hydrology and groundwater hydrology.
		CO2	Enable to estimate Flood frequency and water balance.
		CO3	To make aware of Distribution of water - local, regional and global.
		CO4	Develop an insight in to Water resource management.
ES 2C 10	Remote Sensing and GIS.	CO1	Develop a comprehensive perspective on topographical maps.
		CO2	Develop an insight in to methods and equipment used in Aerial Photo Interpretation.
		CO3	Trains on Remote sensing and GIS techniques to solve environmental problems.
		CO4	Enable to apply remote sensing and GIS techniques in various fields.
ES 2C 11	Practical –III	CO1	Enable to analyze physico-chemical properties of solid waste.

			CO2	Train on media preparation, Isolation techniques, Identification of microorganisms, staining, MPN method and enumeration of THB load.
			CO3	Enable to determine the potability of water and to estimate the synthetic organic compounds in water and soil /sediment samples.
		Practical –IV	CO1	Enable to identify and characterize identification of rocks and minerals.
			CO2	Develop skill to identify various geomorphic and environmental features in the maps.
			CO3	Acquire skills to digitize and analyze maps.
			CO4	Develop skills to work with GPS device.
			CO5	Enable to edit both spatial data and attribute data.
			CO6	Acquire skills in Digital Image Processing.
			CO7	Empower with RS and GIS Techniques for problem solving in various fields.
	ES 2C 12	Environmental Assessment Tools and Monitoring Methods.	CO1	Develop an understanding on Fundamental principles on Environment Impact Assessment (EIA), Risk Assessment (RA) and Environmental Management Plan (EMP).
			CO2	Gain an insight in to concept of Environmental Impact Statements and EIA in sustainable development.
			CO3	Empower with Statistical analysis for problem solving in various fields.
			CO4	Develop an insight in to fundamental principles of probability.
			CO5	Develop perspectives on Eco informatics and its applications in Environmental Science.
	ES 2C 13	Environmental Toxicology and Occupational Health and Safety	CO1	Gain knowledge on global transport of pollutants and fate of pollutants in ecosystems.
			CO2	Develop an insight in to Biochemical effects of environmental contaminants.
			CO3	Develop perspectives on Environmental health and safety.
			CO4	Enable to apply Occupational health & safety management system in different field of industry.
			CO5	Develop an understanding on fundamentals of Ergonomics.



			CO6	To make aware of Environmental risk assessment and management.
ES 2C 15	Biodiversity and Conservation		CO1	Demonstrate importance of diversity at different levels of biological organization.
			CO2	Lay foundation on basic concept of ecological and biological processes that ensures long-term Stability of ecosystems.
			CO3	Develop an insight into Threats to Biodiversity, National and International Programmes for biodiversity conservation.
			CO4	Analyze the values of biodiversity and scientific approaches for conservation that can lead to sustainable development.
			CO5	Gain knowledge on IUCN categories, Red Data Book and related documentation and traditional conservation mechanisms.
			CO6	Develop a comprehensive perspective on Ex-situ / in-situ conservation techniques.
		ES 2C 16	Environmental Disaster Management	
	CO2			Enable to understand weather and climate and Treaties and conventions - IPCC.
	CO3			Develop an insight into Forest protection and management.
	CO4			Develop awareness on concept of Emergency Disaster management, Tools of Disaster management, Emergency Management Information Systems (EIMS), Phases of disaster management.
	CO5			Enable to analyze Environmental problems faced by India and the world and Sustainable development - problems and perspectives.
ES 2C 17	Practical - V		CO1	Enable to estimate Starch, Amino acids, Protein, Reducing and Non-reducing sugars, Primary and Secondary metabolites and Phenolic contents in biological specimens.
			CO2	Enable to assess (LC50).
			CO3	Develop skills to do Environmental Impact Assessment of developmental project.
			CO4	Train on different Statistical tools (Direct and computational) for the analysis of environmental data.

	ES 2C 18	Practical – VI	CO1	Enable to identify major fauna and flora of terrestrial, freshwater and marine ecosystems.
			CO2	Train on estimation of primary productivity.
			CO3	Train on estimation of phyto sociological parameters by quadrat method.
			CO4	Develop skills in mapping of disaster prone areas and development of management plans.
2	ES 2C 19	Elective 1 - Environmental Planning policies and Management	CO1	Develop an understanding on basic principles of Environment planning and management, Environmental Audit, Environmental quality standards (ISO standards).
			CO2	To make aware of all Environmental Conventions on climate change.
			CO3	Develop an insight in to the role of National and International Agencies and other UN organizations in Environmental protection and Management.
			CO4	Develop perspectives on Environmental education and awareness, Role of NGOs in the implementation of environmental policies, Peoples Participation and various movements for environmental protection and Management.
	ES 2C 20	Elective 2 - Indian Environmental Laws	CO1	Develop an understanding on concepts of Environmental ethics and Constitutional status of environment.
			CO2	Enable to apply Environmental laws (Water (Prevention and Control of Pollution) Act - 1974, Water (Prevention and Control of Pollution) Cess Act -1974, Wildlife (Protection) Act -1972, Forest (Conservation) Act -1980, Air (Prevention and Control of Pollution) Act -1981, The Environment (Protection) Act -1986 and The Public Liability Insurance Act – 1991.
			CO3	To make aware of powers of Central and State Pollution Control Boards and Power of Central / State Governments to supersede the respective Central / State Boards in Environmental protection and management.
			CO4	Get a detailed knowledge on International environmental treaties and conventions with respect to Environmental protection, conservation and management.

ES 2C 21	Elective 3 - Current Environmental Issues in India	CO1	Develop perspectives on concepts of Sustainable development.
		CO2	Gain insight in to impact of climate change on environment.
		CO3	Get an insight in to the relevance of bio diversity conservation and management.
		CO4	Develop understanding on Institutional mode of environmental planning, policy formulation and strategies.
		CO5	To make awareness on popular environmental movements and people's participation in environmental conservation and management.
ES 2C 22	Elective 4 - Wildlife and Avian Biology	CO1	Develop an insight in to Biology and Taxonomy of certain wild species.
		CO2	Gain knowledge on Environmental Impact on Wildlife.
		CO3	Create an awareness on anthropogenic pressures on wild fauna and flora
		CO4	Make awareness on Wildlife administration and legislation in Wildlife protection and conservation.
ES 2C 23	Elective 5 - Environmental Economics	CO1	Develop perspectives on Basics and trends of Environmental Economics.
		CO2	Gain insight in to main characteristics and analysis of environmental goods.
		CO3	Create awareness on Cost Benefit Analysis (CBA).
		CO4	Enable to apply Economics in Pollution control.
ES 2C 24	Elective 6 - Natural Resources: Conservation and Management	CO1	Develop an understanding on role of environmental Planning and management in Sustainable Development.
		CO2	Create an awareness on status of conservation of Natural resources of India
		CO3	Gain an insight in to the Soil, Mineral, Water and Forest resource management.
		CO4	Enable to analyze basic concepts of Social and human interference, management of social environmental issues and urban problems related to Natural resource management.
ES 2C 25	Elective 7 - Green Chemistry	CO1	Create awareness on the basics of Green chemistry.
		CO2	Enable to assess the fate of chemicals in the environment.

			CO3	Get knowledge on Emerging Green Technologies & Alternative Energy Sources.
			CO4	Create Economic perspectives on pollution prevention and minimization.
			CO5	To make aware of emerging Green alternatives for fertilization and pest control.
<b>Name of the programme</b>			<b>Master of Arts, Economics</b>	
Short Name of the Programme			M.A. Economics	
Code of the Programme			CCAMEC	
Semester	Course code	Course Title	CO No:	Course Outcomes
1	CC19PECO1 C01	MICROECONOMICS: THEORY AND APPLICATIONS-I	CO1	The students get equipped with the knowledge and skill in effective decision making under uncertain market situations, and also understands the importance of time allocation and household management
			CO2	The theoretical tools they learn would help them to develop economic theory and equip them to apply in any of the applied courses later in their degree.
			CO3	Compares the traditional and modern theories of cost and analyse the superiority of modern theory of cost over traditional theory
			CO4	To equip the students' awareness with regard to general equilibrium and its superiority over partial equilibrium and make them to know details on economics of uncertainty and information.
	CC19PECO1 C02	MACROECONOMICS: THEORIES AND POLICIES I	CO1	The aim of this course is to acquaint the students with fundamental macroeconomic problems and their policy solution.
			CO2	Illustrate the meaning of inflation, deflation, stagflation and reflation, identify different kinds of inflation, causes and effects of inflation on different sectors of the economy, describe different measures to control inflation.
			CO3	Understand the macro economic principles in Indian context and Study various approaches for demand for money
			CO4	Demonstrate the meaning and function of money, high powered money, monetary and paper system, illustrate various version of quantity theory of money.

			CO5	Understand Say's law of market, classical theory of employment and Keynes objection to the classical theory, demonstrate the principle of effective demand and income determination.
			CO6	To study the significance and impact of multiplier, accelerator, and the theories of trade cycle.
	CC19PECO1 C03	INDIAN ECONOMY: PROBLEMS AND POLICIES	CO1	The aim of this course is to sharpen the analytical faculty of the student by highlighting an integrated approach to the functioning aspects of the Indian economy, keeping in view the scope for alternative approaches.
			CO2	Indian economy is a unique amalgam of alternative competing and often conflicting theories and a proper understanding of its working is imperative if the student is to comprehend the ramifications that underlie most of the observed phenomena in the Indian economic set-up.
			CO3	Acquire the basic knowledge about the structure of Indian Economy and the knowledge for resolving the economic problems of India
			CO4	Know the key problems in the Economic Development in India, and the efforts and different policies taken for the Economic Development of India
			CO5	Acquire the knowledge of analyzing the Macro Economic policies
	CC19PECO1 C04	QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS I	CO1	To understand the basics of statistics and the theoretical background of correlation and regression and its application in Economics.
			CO2	Explain the rules for calculating derivatives, uses and application in calculating inter- relationship among total, marginal and average cost and revenue, calculate maxima, minima, elasticity, decide the optimal level of production for a firm.
			CO3	To help students develop hypothesis for their research work and facilitate a research bent of mind in statistical tools.
			CO4	Demonstrate the rules for calculating integration, describe the importance and application of integration in consumers' and producers' surpluses, total revenue and cost.

	CC10PECO2 C05	MICROECONOMICS: THEORY AND APPLICATIONS-II	CO1	To create awareness of using mathematical techniques in economic theories and to aid students, by examining a series of important topics, which make them equip with theoretical and empirical understanding.
			CO2	Understand how factor market works, illustrate basic tools in welfare economics, and illustrate the concept of social welfare functions and compensation principles.
			CO3	The theoretical tools they learn would help them to develop economic theory and equip them to apply in any of the applied courses later in their degree.
			CO4	To equip the students' awareness with regard to general equilibrium and its superiority over partial equilibrium and make them to know details on economics of uncertainty and information.
			CO5	Understands the concept of asymmetric information and its implications
			CO6	Identify the various types of investment function analysis and understand the elements of social cost benefit analysis.
	CC10PECO2 C06	MACROECONOMICS: THEORIES AND POLICIES II	CO1	This course aims to promote understanding of alternative macroeconomic theories and policies to provide the student with analytical skills which will assist him in identifying the current state of the economy and future developments.
			CO2	Make them understand the idea about aggregates and their significance and Learn the theoretical background of macro economics.
			CO3	Understand Say's law of market, classical theory of employment and Keynes objection to the classical theory, demonstrate the principle of effective demand and income determination.
			CO4	Understand the macro economic principles in Indian context and Study various approaches for demand for money.
	CC19PECO2 C07	PUBLIC FINANCE: THEORY AND PRACTICE	CO1	This aid students, by examining a series of topics, which failed to analyse in microeconomics or to say the market failure.

			CO2	This makes the students equip themselves in theoretical and empirical understanding to analyse why there is a government or public good at all and how are we able to reach a consensus or prerogative to provide that.
			CO3	The theoretical tools they learn would help them to develop economic theory in public sector economics and equip them to apply in any of the applied courses later in their degree.
			CO4	It also aims to teach students to use analytical tools to interpret concrete cases to use public intervention (as a remedy to market failings), which includes wealth redistribution, taxation, public spending, social security, etc. The emphasis will be laid on learning how to formulate a logical and coherent argument.
	CC19PECO2 C08	QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS II	CO1	Demonstrate the basic concept of probability, theoretical distribution, probability theorems; solve probability problems by applying probability concept.
			CO2	To help students develop hypothesis for their research work and facilitate a research bent of mind in statistical tools.
			CO3	To help students understand the major theories of estimation, sample properties and different estimation methods.
			CO4	To inculcate the practice of applying various statistical tools and apply statistical tools in research
3	CC19PECO3 C09	INTERNATIONAL TRADE	CO1	Familiarize both theoretical and empirical aspects of international economics and understand the consequences of global interdependence
			CO2	Evaluate the international economic problems and issues facing the world economies
			CO3	Understand the importance of international trade and analyse various international trade theories
			CO4	Understand the importance and way to regulate international trade and the national economy in the global context
			CO5	Know the impact of trade policies both at national and international level and understand the EXIM Policy.
			CO6	Study the level of international financial flows and understand the functions of

			international institutions in the global economy
CC19PECO3 C10	GROWTH AND DEVELOPMENT	CO1	The study of economic development has gained importance because of the sustained interest of the developing countries in uplifting their economic conditions.
		CO2	Aims to promote understanding of theories of growth and development with a view to providing the student with analytical skills in identifying the development issues and prescribing strategies for further development.
		CO3	To understand and analyze theoretical and empirical issues in various economic concepts of Growth and Development with special reference to India.
		CO4	To provide critical thinking on contemporary issues on economic growth and development and understand the evolution of growth and development in the modern era.
		CO5	To understand the functions of MNCs in the global economy
CC19PECO3 C11	BASIC ECONOMETRICS	CO1	Learning more about the estimation and testing process and to identify how good a model is by understanding a general linear regression model
		CO2	It enhances the students' knowledge to know how to apply regression techniques to statistical data and the basic assumptions of regression techniques
		CO3	Analyse various problems related to regression analysis and evaluates its consequences and remedial steps
		CO4	Learning to introduce dynamicity to the econometric models and to effectively estimate the models.
		CO5	Understanding the application of econometrics to basic economic concepts and evaluating its mathematical and economic impacts
CC19PECO3 E01	Elective Course I BANKING: THEORY AND PRACTICE	CO1	Comprehend and categorise the relevance of various banking institutions.
		CO2	Describe the various policy reforms in banking industry
		CO3	Describe the recent developments and various innovations in banking



			CO4	Discuss the impact of government policy and regulations on the banking industry.
			CO5	To grasp the conduct of monetary policy and its effect on the interest rate, credit availability, prices, and the inflation rate
4	CC19PECO4 C12	INTERNATIONAL FINANCE	CO1	Show the importance of maintaining equilibrium in the balance of payments and suggests suitable measures to correct disequilibrium as well.
			CO2	Understand the conditions of financial markets and its impact in the economy.
			CO3	Show the benefits of international trade in a way how nations with strong international trade have become prosperous and have the power to control world economy and how global trade can be one of the major contributors of reducing poverty.
			CO4	Demonstrate the role and significance of foreign exchange rate and its markets with its impact on various sectors in the economy.
	CC19PECO4 C13	FINANCIAL MARKETS	CO1	Explain the broad features of Indian financial institutions with its apex banks' objectives and purview. Also understand the instruments to control credit in the country.
			CO2	Effectively narrate the kinds and components of money with its regulatory system, be aware of the functions, objectives and limitations of commercial banks.
	CC19PECO4 E01	Elective Course II ADVANCED ECONOMETRICS	CO1	The student will learn the forecasting techniques and enriches them with problem solving skills.
			CO2	The main accent is done on economic interpretations and application of considered econometric models.
			CO3	Learning the basics of time series econometrics and to attain conceptual clarity
			CO4	Acquires the skills to interpret models involving qualitative information and to deal with equations involving simultaneity
			CO5	Understands how to apply Simultaneous regression models to statistical data
			CO6	Learning more about the estimation and testing of Indirect Least Squares and 2SLS

			CO7	Acquires the skills to understand various ARIMA Models
			CO8	Understands Panel Data and estimation of panel data regression models
	CC19PECO4 E06	Elective Course III AGRICULTURAL ECONOMICS	CO1	Sensitize the overall development and engine of growth in agriculture. Draw distinctive features of rural and urban economy or agricultural and non-agricultural which can influence the whole economy.
			CO2	Realize the need to exploit and utilize limited resources available in the economy through development and improvement of production techniques.
			CO3	Gain knowledge of the causes of regional variations in productivity and production, social and economic inequality, size of land holdings and lack of quality inputs etc. and suggest appropriate measures for the whole economy
<b>Name of the programme</b>				<b>Master of Arts, English Literature</b>
Short Name of the Programme				M.A. English Literature
Code of the Programme				CCAMAG
<b>Semester</b>	<b>Course code</b>	<b>Course Title</b>	<b>CO No:</b>	<b>Course Outcomes</b>
1	ENG1CO1	British Literature from the Age of Chaucer to the 18th Century	CO1	To make the students aware of these literary periods and the trends of each.
			CO2	To introduce them to a bunch of English poetry; drama; prose and fiction
	ENG1CO2	British Literature: The Nineteenth Century	CO1	To make the student thorough with the main writers and their works of the literary period
			CO2	To introduce works of different authors and their styles.
			CO3	To make the students capable of analyzing these works.
	ENG1CO3	History of English Language	CO1	To enlighten the students with the evolutions of English language
			CO2	To enlighten the students with the evolutions of English language
	ENG1CO4	Indian Literature in English	CO1	To provide an overview of the various phases of the evolution of Indian writing in English.
			CO2	To introduce students to the thematic concerns, genres and trends of Indian writing in English.

			CO3	To expose students to the pluralistic aspects of Indian culture and identity.
2	ENG2CO5	Twentieth century British Literature up to 1940 Literature: Post 1940	CO1	To know the trend of the writing of this period
			CO2	To introduce poems, prose and drama of the period and to make them analysed in the light of the trend of the period.
			CO3	To study how politics of the time influence literary works and vice versa.
	ENG2 CO6	Literary Criticism and Theory - Part 1	CO1	To instill in the students a theory basis
			CO2	To make the students analyse and interpret literature based on theory
			CO3	To enhance the critical thinking of students by introducing to them a bunch of literary and political theories.
			CO4	To make them known the evolution of literary theories
	ENG2CO7	American Literature	CO1	To introduce the students the periods of American literature.
			CO2	To introduce to them a bunch of poems, plays and fiction written by American authors and make the students know the trend of these from time to time.
	ENG2CO8	Postcolonial writings	CO1	To introduce the theory of post-colonialism
			CO2	To enable the students, interpret literature based on the theory.
			CO3	To know sensitize the students with how language has borne the politics of the colonizer.
3	ENG3CO9	Twentieth century British Literature post 1940	CO1	To know the trend of the writing of this period
			CO2	To introduce poems, prose and drama of the period and to make them analysed in the light of the trend of the period.
			CO3	To study how politics of the time influence literary works and vice versa.
	ENG3C10	LITERARY CRITICISM AND THEORY - PART 2	CO1	To instill in the students a theory basis
			CO2	To make the students analyse and interpret literature based on theory
			CO3	To enhance the critical thinking of students by introducing to them a bunch of literary and political theories.
			CO4	To make them known the evolution of literary theories.
	ENG3E02	European Fiction in Translation	CO1	To introduce students to the Europe's best fictions in translation

			CO2	To generate a broad vision of life by making the students to come to grips with universal problems and varied life situations.
			CO3	To make the students to have a feel of excellent classics in translation in various genres by a judicious selection. It should instill in the students a spirit of enquiry and further exploration.
	ENG3E09	American Ethnic Writing	CO1	To make the students empathize with the works of the 'voiceless' people
			CO2	To analyze how far is their writing experience based on American ethnic.
			CO3	To know the discourse of the colonizer and how it has pushed the 'other' to the margins.
			CO4	To study the politics of the oppression
4	ENG4C11	English Literature in the 21st Century	CO1	To know the trend of the writing of this period
			CO2	To introduce poems, prose and drama of the period and to make them analysed in the light of the trend of the period.
			CO3	To study how politics of the time influence literary works and vice versa.
	ENG4P01	Dissertation / Project	CO1	To develop writing skills
			CO2	To learn to integrate writing and thought and to apply the conventions of academic writing correctly.
			CO3	To cultivate, in the students, an urge for research.
	ENG4E14	Indian English Fiction	CO1	To provide an overview of the various phases of the evolution of Indian writing in English.
			CO2	To introduce students to the thematic concerns, genres and trends of Indian writing in English.
			CO3	To expose students to the pluralistic aspects of Indian culture and identity.
4	ENG4E18	Malayalam Literature in English Translation	CO1	To give an authentic knowledge about the chronological developments of Malayalam language and literature
			CO2	To familiarize the students with the different genres of literature and our variety art-forms.
			CO3	To increase the creative and communicative skills of students.

			CO4	To discuss about the recent trends in Malayalam language and literature and its practical aspects in current situations.
			CO5	To enable them to make multidisciplinary approaches towards other disciplines
			CO6	To welcome them in the world of Translation works and its wide cultural and linguistic importance.
			CO7	To enable them for analyzing the recent social, cultural, environmental issues and response to it.
<b>Name of the programme</b>			<b>Master of Science, Mathematics</b>	
Short Name of the Programme			M.Sc. Maths	
Code of the Programme			CCAMMS	
<b>Semester</b>	<b>Course code</b>	<b>Course Title</b>	<b>CO No:</b>	<b>Course Outcomes</b>
	MTH1C01	Algebra I	CO1	To gain knowledge of plane isometries
			CO2	To learn the concept of Group action and its applications
			CO3	To gain knowledge about series of groups
			CO4	To explain Sylow theorem and its applications
			CO5	To understand the concept of group presentation
			CO6	To gain knowledge in polynomials over a ring.
	MTH1C02	Linear Algebra	CO1	To understand the concept of vector spaces, subspaces, linear independence, bases and co-ordinates
			CO2	To understanding linear transformations, their algebra and representation of transformations by matrices
			CO3	To discuss dual space, hyperspace and transpse of a linear transformation
			CO4	To Illustrate elementary canonical forms
			CO5	To understand the concept of inner product spaces and their properties
			CO6	To apply orthonormalization techniques to solve problems
	MTH1C03	Real Analysis	CO1	To create an idea of basic topological properties
			CO2	To discuss continuity of a function and related theorems

			C03	To define derivative of a function and prove theorems on it
			C04	To understand differentiation of vector valued functions
			C05	To generate a knowledge of Riemann Stieltjes integrals
			C06	To explain uniform continuity and uniform convergence
	MTH1C04	Discrete Mathematics	C01	To understand how lattices and Boolean algebra are used as tools
	MTH1C04	Discrete Mathematics	C02	To learn how to work with some of the discrete structures
	MTH1C04	Discrete Mathematics	C03	To acquire ideas pertaining to graph theory in a systematic manner
	MTH1C04	Discrete Mathematics	C04	To define Automata and discuss the acceptability of a string by finite automation
	MTH1C04	Discrete Mathematics	C05	To construct deterministic and non-deterministic finite state machine
	MTH1C05	Number Theory	C01	To understand the concept of arithmetical functions and its properties
	MTH1C05	Number Theory	C02	To develop the idea of Dirichlet multiplication
	MTH1C05	Number Theory	C03	To understand Euler summation formula and its applications
	MTH1C05	Number Theory	C04	To formulate an idea of distribution of prime numbers
	MTH1C05	Number Theory	C05	To analyse the concept of quadratic residues and quadratic reciprocity laws
	MTH1C05	Number Theory	C06	To develop the idea of cryptography
	MTH2C06	Algebra- II	C01	To learn the concepts of prime and maximal ideals
	MTH2C06	Algebra- II	C02	To gain knowledge about extension fields and their properties
	MTH2C06	Algebra- II	C03	To learn the concept of splitting fields
	MTH2C06	Algebra- II	C04	To get an idea of geometric construction of numbers
	MTH2C06	Algebra- II	C05	To gain knowledge in elements of Galois theory
	MTH2C06	Algebra- II	C06	To learn an idea of cyclotomic extensions
	MTH2C06	Algebra- II	C07	To understand the concept of insolvability of a quintic
	MTH2C07	Real Analysis II	C01	To understand the concepts of Lebesgue measure of subsets of real numbers
	MTH2C07	Real Analysis II	C02	To create a knowledge of Lebesgue measurable functions

			C03	To develop concepts of general Lebesgue integral
			C04	To discuss about uniform integrability and prove Vitali theorem
			C05	To study about functions of bounded variation
			C06	To create an idea of Spaces
	MTH2C08	Topology	C01	To develop basic concepts of topological spaces and its properties
	MTH2C08	Topology	C02	To understand the concept of quotient spaces
	MTH2C08	Topology	C03	To identify spaces having special properties
	MTH2C08	Topology	C04	To classify spaces using separation axioms
	MTH2C08	Topology	C05	For utilization of Urysohn characterization of normality and Tietze characterization of normality
	MTH2C09	ODE & calculus of variation	C01	To develop an idea of power series solutions
	MTH2C09	ODE & calculus of variation	C02	To analyse the concept of Bessel functions and Legendre Polynomials
	MTH2C09	ODE & calculus of variation	C03	To understand the concept of systems of first order differential equation
	MTH2C09	ODE & calculus of variation	C04	To gain the knowledge of boundary value problems
	MTH2C09	ODE & calculus of variation	C05	To get the knowledge of calculus of variations
	MTH2C10	Operations Research	C01	To formulate a real-life problem as a mathematical programming model in general, standard and canonical forms
	MTH2C10	Operations Research	C02	To optimize the linear programming problem using various method
	MTH2C10	Operations Research	C03	To solve integer programming problems
	MTH2C10	Operations Research	C04	To analyse the concepts of scheduling of sequential activities and flow in network analysis
	MTH2C10	Operations Research	C05	To acquaint with the knowledge regarding the theory of games and treat the rectangular game as a linear programming problem
	MTH 3C11	Multivariable Calculus & Geometry	C01	To determine derivative of a multivariable function
	MTH 3C11	Multivariable Calculus & Geometry	C02	To prove necessary condition for a function to be continuously differentiable in terms of partial derivatives
	MTH 3C11	Multivariable Calculus & Geometry	C03	To discuss inverse function theorem and implicit function theorem

			CO4	To understand the concepts parameterization, re-parameterization, tangent vector and arc length of a plane curve
			CO5	To discuss about curvature and torsion of curves
			CO6	To introduce some surfaces in 3-dimension and related concepts like normals and orientability
			CO7	To explain level surfaces, ruled surfaces and surfaces of revolution
			CO8	To explain different types of curvatures of surfaces and curves in surfaces
			CO9	To introduce first and second fundamental form of surfaces
	MTH3C12	Complex Analysis	CO1	To develop the relation between analytic functions and its power series representation.
			CO2	To analyze the properties of Mobius transformation
			CO3	To develop theorems of complex integration
			CO4	For classification of singularities of functions and Laurent series development
			CO5	For derivation of Rouché's theorem, Maximum modulus principles, Schwarz's lemma and Hadamard's three circles theorem
	MTH3C13	Functional Analysis	CO1	To acquaint with the notion of normed linear spaces and the basic results regarding them.
			CO2	To develop a clear understanding on different linear spaces -Banach spaces, Innerproduct spaces
			CO3	To get basic knowledge on complete inner product spaces, called Hilbert spaces, and some of the main inequalities and identities which is applicable on Hilbert spaces
			CO4	To get clear picture on the concept of bounded linear functionals on Hilbert spaces and bounded linear operators and compact operators on Banach spaces
			CO5	To get a deep understanding on Hahn Banach Theorems and its consequences
	MTH3C14	PDE & Integral Equations	CO1	Apply a range of techniques to solve first order equations.
			CO2	Be familiar with the canonical form of hyperbolic, parabolic and elliptic equations



			CO3	Model physical phenomena using partial differential equations such as heat equations and wave equations.
			CO4	Be compete in solving wave equation, elliptic problems and non homequations equations using the method of separation of variables.
			CO5	Understand integral equations.
	Elective I- MTH3E03	Measure & Integration	CO1	To understand the concept of measurability
			CO2	To explain integration of complex functions using the concepts of measurability
			CO3	To discuss the properties of Borel measures and measurable functions
			CO4	To study Randon- Nikodym theorem
			CO5	To analyze Riesz Representation theorem and Fubini theorem
	MTH4C15	Advanced Functional Analysis	CO1	To get a basic knowledge on the notions – Spectrum, self-adjoint operators ,compact operators and some theories related to it.
			CO2	To know about Spectral theory, Minimax Principle and its applications on integral operators
			CO3	To develop an understanding on projection operators , spectral decompositions and Hilbert theorem
			CO4	To know the fundamental theorems applicable on Banach spaces-Open mapping theorem, Closed Graph Theorem and Banach -Steinhaus Theorem.
			CO5	To introduce the concept of Banach Algebras and some basic theorems related to it
	Elective II- MTH4E08	Commutative Algebra	CO1	To know definitions concerning elements in rings and ideals in commutative algebra
			CO2	To discuss modules.
			CO3	To focus on constructions like tensor product and localization and the basic theory for this
			CO4	To demonstrate primary decomposition and integral dependence
			CO5	To compare Noetherian rings and Artinian rings.
			CO6	To participates in scientific discussions and begin with own research in commutative algebra.

			CO7	To use commutative algebra as an essential tool to explore several other areas of mathematics, such as algebraic geometry, number theory, and non commutative algebra
	Elective III- MTH4E09	Differential Geometry	CO1	To sketch level curves, graph of a function and vector fields
			CO2	To find the tangent space at a point of a level curve
			CO3	To explain surfaces of n-dimension and orientation
			CO4	To explain geodesics
			CO5	To discuss the concept parallel transport
			CO6	To discuss Weingarten map and related theorems
			CO7	To define curvature of a plane curve and explain local and global parameterizations
			CO8	To discuss differential one form
			CO9	To explain curvature of surfaces
	Elective IV- MTH4E09	Graph Theory	CO1	To familiar with the basic concepts of Graph theory
			CO2	To understand some familiar problems in graph theory
			CO3	To understand the concept of matchings
			CO4	To gain the knowledge of some important theorems in graph theory
			CO5	To develop an idea of chromatic number and related topics

## Master of Science, Computer Science

**Name of the programme**

Short Name of the Programme

M.Sc.CS

Code of the Programme

CCAMCS

Semester	Course code	Course Title	CO No:	Course Outcomes
1	CSS1C01	Discrete mathematical structures	CO1	To introduce discrete mathematics concepts necessary to understand basic foundation of Computer Science.
	CSS1C02	Advanced Data structures	CO1	To introduce basic and advanced data structures dealing with algorithm development and problem solving
	CSS1C03	Theory of computation	CO1	To provide the students with an understanding of basic concepts in the theory of computation
	CSS1C04	The art of programming methodology	CO1	To learn the art of designing algorithms and flowcharts.

			C02	To introduce the concept of algorithmic approach for solving real-life problems.
			C03	To develop competencies for the design and coding of computer programs.
			C04	To learn designing programs with advanced features of C.
	CSS1C05	The computer organization and architecture	C01	To familiarize with the digital fundamentals, computer organization, computer architecture and assembly language programming
	CSS1L01	Practical 1	C01	To practically implement the theory portions covered in The Art of Programming Methodology (CSS1C04) and Advanced Data Structures (CSS1C02).
2	CSS2C06	Design and analysis of algorithm	C01	To introduce the concept of algorithmic approach for solving real-life problems.
			C02	To teach basic principles and techniques of computational complexity.
			C03	To familiarize with parallel algorithms and related techniques
	CSS2C07	Operating system concepts	C01	Introduce the underlying principles of an operating system.
			C02	Exposure of multi programming, virtual memory and resource management concepts.
			C03	Case study of public and commercially available operating systems
	CSS2C08	Computer Networks	C01	To provide the student with a top down approach of networking starting from the application layer.
			C02	To introduce computer networking in the back drop of Internet protocol stack.
	CSS2C09	Computational Intelligence	C01	To introduce concepts of Artificial Intelligence and Machine Learning.
	CSS2C10	Principles of software engineering	C01	To develop familiarity with software engineering principles and practices.

			C02	To have an understanding about the process of product/literature survey, techniques of problem definition, and methods of report writing
	CSS2L02	Practical- II	C01	To practically implement the theory portions covered in the courses <i>Operating System Concepts</i> (CSS2C07) and <i>Computer Networks</i> (CSS2C08) and to extend the programming knowledge acquired through course <i>The Art of Programming Methodology</i> (CSS1C04).
3	CSS3C11	Advanced database management system	C01	To understand the relational model, and know how to translate requirements captured in an Entity-Relationship diagram into a relational schema.
			C02	To reason about dependencies in a relational schema.
			C03	To understand normal form schemas, and the decomposition process by which normal forms are obtained.
			C04	To familiarize with advanced SQL' statements.
			C05	To understand advanced features of database technologies
	CSS3C12	Object oriented programming concepts	C01	To learn object oriented concepts and programming concepts and methodologies and to learn its implementation using Java.
	CSSC13	Principles of compilers	C01	To introduce the fundamental concepts and various phases of compiler design
	CSSL03	Practical - 3	C01	To practically implement the theoretical aspects covered in Advanced Database Management System (CSS3C11) and Object Oriented Programming Concepts (CSS3C12) and to extend the programming knowledge acquired through The Art of Programming Methodology (CSS1C04) to encompass object oriented techniques.
4	CSS4P01	Project	C01	To give a practical exposure to the process of software development life cycle.

			C02	To develop a quality software solution by following the software engineering principles and practices. Students are also encouraged to take up a research oriented work to formulate a research problem and produce results based on its implementation/simulation/experimental analysis.
<b>Name of the programme</b>			<b>Master of Commerce</b>	
Short Name of the Programme			M.Com	
Code of the Programme			CCAMCM	
Semester	Course code	Course Title	CO No:	Course Outcomes
1	MCM1C01	Business Environment & Policy	CO1	To familiarize students with the concepts of macro-economic in which a business organisation operates
			CO2	To give an idea about the policies of the government and assess their impact on business
	MCM1C02	Corporate Governance & Business Ethics	CO1	To familiarize the students with the knowledge of corporate ethics
			CO2	To enable the students to understand the emerging trends in good governance practices
			CO3	To create corporate financial reports in the global and Indian context
	MCM1C03	Quantitative Techniques for Business Decisions	CO1	To acquaint students with important quantitative techniques, which enable sound business decision making
			CO2	To make students learn the process of applying appropriate quantitative techniques for validating findings and interpreting results
	MCM1C04	Management Theory and Organizational Behaviour	CO1	To have a detailed understanding of management theories to be adopted in an organisation
			CO2	To enable the students to understand the various concepts of organisational behaviour
	2	MCM2C06	Advanced Corporate Accounting	CO1
CO2				To provide insight into some of the important accounting standards of IFRS/Ind AS

			CO3	To enable problem solving abilities among students in matters of various corporate situations such as consolidation of group information, corporate restructuring and liquidation
	MCM2C07	Advanced Strategic Management	CO1	To provide insight into some of the important strategic management concepts and analysis of the environment in which the business operates
			CO2	To enable the students to understand various approaches regarding implementation of strategies
	MCM2C08	Strategic Cost Accounting	CO1	To enable the students to know the applications of cost accounting tools, techniques and concepts in managerial decision making process
			CO2	To provide students adequate knowledge of cost management and control techniques and to enable them to apply these for managing business
	MCM2C09	International Business	CO1	To acquaint students with important theories of international trade and the international business environment
			CO2	To enable the students to acquire knowledge regarding international economic institutions and international business functional strategies
	MCM2C10	Management Science	CO1	To familiarize students with concepts of management science and tools supporting decision making
			CO2	To enable students to apply management science techniques in appropriate decision situations
3	MCM3C11	Financial Management	CO1	To acquaint the students with the basic analytical techniques and methods of financial management of business organisation
			CO2	To provide the students the exposure to certain advanced analytical techniques that are used for taking financial policy decisions
	MCM3C12	Income Tax Law, Practice and Tax planning 1	CO1	To enable students to understand computation of income under various heads, taxable income of various entities, tax planning and procedure of assessment
	MCM3C13	Research Methodology	CO1	To acquaint students with process and methodology of research

			CO2	To enable students to identify research problem, collect and analyze data and present results
	MCM3E01	Investment Management	CO1	To establish a conceptual framework for the study of security analysis and portfolio management
			CO2	To provide the students with the ability to understand and utilize the skill of optimizing returns
	MCM3E02	Financial Markets and Institutions	CO1	To provide the students a sound information and knowledge of broad framework of financial markets and institutions
			CO2	To impart the students an understanding of the inter-linkage and regulatory framework within which the system operates in India
4	MCM4C14	Financial Derivatives & Risk Management	CO1	To make the students efficient in the area of derivatives, by giving them the knowledge of basics in options, futures, swaps etc
	MCM4C15	Income Tax Law, Practice and Tax planning 2	CO1	To acquaint the students with theoretical and practical knowledge of assessment and tax planning of different assesseees
			CO2	To familiarize the students with major and latest provisions of the Income Tax laws and related judicial pronouncements pertaining to various assesseees with a view to derive maximum possible tax benefits admissible under the law
	MCM4E03	International Finance	CO1	To understand the concept and significance of international finance
			CO2	To understand the international financial markets and exchange theories
			CO3	To get an idea about foreign exchange exposure and risk management
	MCM4E04	Advanced Strategic Financial Management	CO1	To build an understanding among students about the concepts, vital tools and techniques used for financial decision making by a business firm

**Name of the Programme**

**Master of Science, Physics**

Short Name of the Programme

M.Sc. Physics

Code of the Programme

CCAMPH

Semester	Course code	Course Title	CO No:	Course Outcomes
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	CCPH1C01	Classical Mechanics	CO1	Understand the formalism of Lagrangian and Hamiltonian mechanics and apply to physical systems.
			CO2	Understand the classical background of quantum mechanics by learning Poisson brackets and Hamilton -Jacobi equation
			CO3	Understand in detail the ideas regarding analysis of rigid body dynamics and kinematics
			CO4	Understand the theory of small oscillations in detail
			CO5	Understand the basic ideas and concepts of non linear equations and chaos
	CCPH1C02	Mathematical Physics	CO1	Understand different orthogonal curvilinear coordinate Systems and obtain the transformation equations
			CO2	Understand various differential calculus operators in various coordinate systems.
			CO3	Understand the concept of matrices and tensors and apply them to various problems in Physical.
			CO4	Understand and solve second order differential equations representing different physical problems
			CO5	Understand various special functions as the solutions of second order differential equations and evaluate the value of various coefficients.
			CO6	Understand and apply Fourier series to solve problems and use Fourier Transforms and Laplace transforms to evaluate Integrals.
	CCPH1C03		CO1	To gain a solid understanding of Maxwell's equations and its solutions in different situations.
			CO2	To be able to infer the behaviour of plane electromagnetic waves pertaining to motion in different physical medium and boundary conditions. In particular, one should be able to understand derivation of the familiar Snell's law, law of reflection from the boundary conditions of electric and magnetic field.
			CO3	To be able to apply the behaviour of electromagnetic waves to different physical configurations which make the propagation of waves from one region of space to another. Focus is given on systems which have engineering applications so that students will have a



				hands on experience on applying the theory of electrodynamics to physically relevant situations.
			CO4	Focus is given on gaining a fair understanding of the relativistic nature of electrodynamics. One should be able to realise the unified nature of electric field and magnetic field in the relativistic domain, in contrast to the classical view of electric field and magnetic field as separate phenomenon.
			CO5	To be able to apply the concepts of electromagnetism to understand physics of plasma. This will help students understand how the equations of electrodynamics are applied in conjunction with other areas of physics. In particular, one will be able to figure out how electrodynamics is utilised along with equations in statistical mechanics and fluid mechanics to develop the plasma physics.
	CCPH1C04	Electronics	CO1	Understand the basic construction and working principle of JFET and MOSFET, and their applications
			CO2	Understand the theory and working of different photonic and microwave devices such as LEDs, semiconductor lasers, Photodetectors, solar cells, Tunnel diode and transferred electron devices.
			CO3	Understand the basic operational amplifier characteristics, ideal Op-Amp parameters and its frequency response.
			CO4	Understand the different applications of Op-Amp
			CO5	Understand the use of K-maps for simplification, working of different type of counters using flip-flops, CCDs and basic ideas of Intel 8085 microprocessor
	CCPH2C05	Quantum Mechanics -I	CO1	Learn one of the popular Hilbert Space formalism (HSF) in Quantum Mechanics (QM). Learn the concepts of linear vector space, various abstract operators and their properties, state vectors and their algebra, eigen values
			CO2	Understand how HSF is built up on certain postulates. Role of uncertainty, Measurement in QM

			CO3	Understand the quantum dynamics, Schrodinger equation and the evolution of a quantum mechanical system using different pictures.
			CO4	Understand the QM definition of angular momentum, addition of angular momentum and Pauli's spin matrices.
			CO5	Understand the importance of symmetry in space and time and the connection with various conservation laws.
			CO6	Understand how the symmetry and anti-symmetry of wavefunctions leads to FD and BE statistics
			CO7	Understand the QM theory of scattering. Learn partial wave analysis
			CO8	Learn to solve exactly solvable problems in QM
	CCPH2C06	Mathematical Physics -II	CO1	Understand the basic concepts regarding complex variables and functions
			CO2	Understanding of complex integration and use it to evaluate definite integrals
			CO3	Understand the fundamentals of group theory
			CO4	Understanding the significance of group representations in physics
			CO5	Use Green's functions as a tool to solve differential equations
			CO6	Understand the various methods to solve integral equations
			CO7	Use Fourier series as a tool to evaluate periodic functions
			CO8	Understand the two basic integral transforms as mathematical tools of physics
	CCPH2C07	Statistical Mechanics	CO1	Understand the statistical basis of thermodynamics by defining microscopic and macroscopic states of a system.
			CO2	Understand microcanonical, canonical and grand canonical ensembles and obtain various physical properties of systems in these ensembles.
			CO3	Understand the formulation of quantum statistical mechanics.
			CO4	Understand and obtain thermodynamics of ideal Bose gas, black body radiation and field of sound waves.
			CO5	Understand the thermodynamics of ideal Fermi gas, Pauli paramagnetism and Landau diamagnetism

	CCPH2C08	Computational Physics	CO1	Understand the basics of Python language, data types and modules
			CO2	Knowledge on modules for for maths and visualisation like numpy and pylab modules.
			CO3	Understand Arrays and matrices, its operations and data visualization using them
			CO4	Apply numerical methods with the help of computational techniques for solving various physics problems
	CCPH3C09	Quantum Mechanics -II	CO1	Understand the WKB approximation method, connection formulae, Bohr Sommerfeld quantization rule, potential barrier penetration transmission probability
			CO2	Understand time independent perturbation theory for degenerate and non degenerate systems and apply in stark and zeeman effect
			CO3	Understand the technique of variational method and solve hydrogen atom and helium atom problems.
			CO4	Understand time dependent perturbation theory and apply in constant perturbation, harmonic perturbation. How atoms interact with e.m.waves
			CO5	Understand the Diracs and Klein Gordons, relativistic formulation of quantum mechanics.
	CCPH3C10	Nuclear and Particle Physics	CO1	To enhance the knowledge in nuclear force and its properties.
			CO2	Deep understanding about different radioactive decay mode by which a stable nuclei can be obtained.
			CO3	To obtain an idea about the shell model to explain the existence of magic numbers. Deep knowledge regarding different nuclear reactions, fission and fusion.
			CO4	Understanding about different nuclear detectors.
			CO5	Knowledge regarding basic forces in nature, classification of elementary particles and conservation laws.
			CO6	Understanding about quark model of elementary particles.
	CCPH3C11	Solid State Physics	CO1	Understand the relation between crystalline structure, reciprocal lattice and X-ray diffraction data.

			CO2	Understand about different types of bondings in the solids and their properties.
			CO3	Understand the idea of Phonons and influence of lattice vibration on thermal behaviour.
			CO4	Solve problems on Einstein and Debye model of specific heat capacity.
			CO5	Understand how electrons and holes behave in semiconductors
			CO6	Understand the dielectric , ferroelectric properties
			CO7	Understand the magnetic behaviour of crystals.
			CO8	Understand the idea of superconductivity
			CO9	Solve problems on superconductivity
			CO10	Understand how light emitting diodes and solar cells work.
			CO11	Understand the electrical and thermal behaviour of metals using quantum concepts
	CCPH3E11	Experimental Techniques	CO1	Understand the working of vacuum pumps, vacuum gauges and other accessories associated with the creation of vacuum.
			CO2	Knowledge of different thin film deposition techniques, thickness and conductivity measurement of thin films.
			CO3	Knowledge on different particle accelerators, principle and their application
			CO4	Knowledge on nuclear techniques used for material analysis
			CO5	Understand the concept of X-ray diffraction technique for identification and structural analysis of different materials.
	CCPH4C12	Spectroscopy (4C)	CO1	Understand the Vector atom model, different coupling schemes, and the effect of magnetic field and electric field on atomic spectra.
			CO2	Understand the principles of Microwave and Infrared spectroscopy and their use in determining the structural properties of the molecules.
			CO3	Understand the principles of linear and nonlinear Raman spectroscopy and the combined use of Raman and IR spectroscopy in structural determination.
			CO4	Understand the principles of electronic spectroscopy, rotational fine structure

				and the determination of dissociation energy.
			CO5	Understand the fundamental concepts of NMR, ESR and Mossbauer spectroscopy
	PHY4E14	Communication Electronics	CO1	An idea regarding amplitude, frequency and phase modulation.
			CO2	Understand the elements of information theory and digital communication. Various error detecting methods and codes were studied.
			CO3	Knowledge on communication systems such as receivers, transmitters. An idea about satellite communication can be obtained.
			CO4	Theory concerned with analog to digital communication and vice versa. Techniques regarding analysis of linear systems.
			CO5	Idea about different sources of EM radiation and their characteristics. Knowledge in propagation of radio waves and their attenuation.
	PHY4E20	Microprocessors, microcontrollers and application	CO1	Study the organisation and internal architecture of microprocessor 8085
			CO2	Learn assembly language programming
			CO3	Learn about peripheral devices and their interfacing of microprocessor
			CO4	Aware of memory interfacing and different data transfer schemes
			CO5	Study the structure of microcontroller
			CO6	Learn microcontroller programming
			CO7	Aware about the AVR architecture and Assembly language programming
			CO8	Study the AVR programming in C language
	PHY4E13	Laser systems, Optical Fibers and Applications	CO1	The basic Laser theory and analysis of optical resonators.
			CO2	Various laser systems, working principles and energy level diagrams.
			CO3	The detailed elucidation of Nonlinear optics, four wave mixing and Z-scan Technique.
			CO4	The application of Lasers in different fields like Holography, Spatial frequency filtering, medicine, chemical reactions etc.
			CO5	Essential ideas of optical fibers and its structure, optical fibers as cylindrical waveguides and single mode fibers.

	PHY4E17	Advanced Condensed Matter Physics	CO1	Have gained an obvious understanding of Elementary Excitations in solids and energy in lattice vibrations.
			CO2	Knows the alloying phenomenon and its band structure calculation, super structures, quantum
			CO3	Have grasped the idea of defects, vacancies, dislocations as well as strength of the materials.
			CO4	Widen their understanding of nanomaterials to quantum dots, quantum wires as well as its
			CO5	Understand the thin film growth technology (Vapour deposition, Solution deposition) and its optoelectronic and microelectronic applications