COURSE OUTCOMES

Department of Mathematics

M.Sc. in Mathematics

FIRST SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	ABSTRACT ALGEBRA	MATH-101C	This course aims to provide a first approach to the subject of algebra, which is one of the basic pillars of modern mathematics. The focus of the abstract algebra course will be the study of certain structures called groups, rings, fields and some related structures. Applications of abstract algebra are increasingly important in certain areas, for example in communication theory, electrical engineering, computer science, and cryptography.
2	REAL ANALYSIS AND MEASURE THEORY	MATH-102C	Real analysis is the fundamental concept of mathematics. Without proper understanding of real analysis it is quite difficult to advance in any field of mathematics. Real analysis is an area of analysis that studies concepts such as sequences and their limits, continuity, differentiation, integration and sequences of functions. By definition, real analysis focuses on the real numbers, often including positive and negative infinity to form the extended real line. In mathematical analysis, a **measure** on a set is a systematic way to assign a number to each suitable subset of that set, intuitively interpreted as its size. In this sense, a measure is a generalization of the concepts of length, area, and volume.
3	CLASSICAL MECHANICS	MATH-103C	Classical mechanics is a physical theory describing the motion of macroscopic objects, from projectiles to parts of machinery, and astronomical objects, such as spacecraft, planets, stars and galaxies. For objects governed by classical mechanics, if the present state is known, it is possible to predict how it will move in the future (determinism) and how it has moved in the past (reversibility). Classical mechanics provides extremely accurate results when studying large objects that are not extremely massive and speeds not approaching the speed of light. When the objects being examined have about the size of an atom diameter, it becomes necessary to introduce the other major sub-field of mechanics: quantum mechanics. To describe velocities that are not small compared to the speed of light, special relativity is needed.
4	ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS	MATH-104C	In mathematics, a differential equation is an equation that relates one or more functions and their derivatives. In applications, the functions generally represent physical quantities, the derivatives represent their rates of change, and the differential equation defines a relationship between the two. Such relations are common; therefore, differential equations play a prominent role in many disciplines including engineering, physics, economics, and biology.

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			In mathematics, a partial differential equation (PDE) is an equation which imposes relations between the various partial derivatives of a multivariable function. Partial differential equations are ubiquitous in mathematically-oriented scientific fields, such as physics and engineering. For instance, they are foundational in the modern scientific understanding of sound, heat, diffusion, electrostatics, electrodynamics, fluid dynamics, elasticity, general relativity, and quantum mechanics.
5	FOUNDATION COURSE OF ADVANCED COMPUTER SKILLS	MATH-105COE	A computer is a machine that can be instructed to carry out sequences of arithmetic or logical operations automatically via computer programming. Modern computers have the ability to follow generalized sets of operations, called programs. These programs enable computers to perform an extremely wide range of tasks. A "complete" computer including the hardware, the operating system (main software), and peripheral equipment required and used for "full" operation can be referred to as a computer system. This term may as well be used for a group of computers that are connected and work together, in particular a computer network or computer cluster. Computers are used as control systems for a wide variety of industrial and consumer devices. This includes simple special purpose devices like microwave ovens and remote controls, factory devices such as industrial robots and computer-aided design, and also general purpose devices like personal computers and mobile devices such as smart phones. The Internet is run on computers and it connects hundreds of millions of other computers and their users.
6	COMMUNICATION SKILLS IN ENGLISH	CSE-101	This course will acquaint the students with the English language, its importance and use in the contemporary world. It will enable the learners to gain basic knowledge of English grammar rand vocabulary and also nourish their speaking and writing skills in English language.

Remarks:

- The courses bearing serial number 1 to 4 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- The courses mentioned in Serial No: 5 and 6 are COMPULSORY COURSES that every student has to take in FIRST semester.
- The course as mentioned at serial number 5 would be taken by the FIRST Semester students of the Department of Mathematics as a Compulsory Course. This course has 4 credits and full marks 100 (Internal: 30 + End Term: 70 (Theory: 50, Practical: 20)).
- The course as mentioned at serial number 6 would be taken by the FIRST Semester students of the Department of Mathematics as a Compulsory Course from the Department of English. This course has 2 credits and full marks 100 (Internal: 50 + End Term: 50).

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SECOND SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	COMPLEX ANALYSIS	MATH-201C	Complex analysis, traditionally known as the theory of functions of a complex variable, is the branch of mathematical analysis that investigates functions of complex numbers. It is useful in many branches of mathematics, including algebraic geometry, number theory, analytic combinatorics, applied mathematics; as well as in physics, including the branches of hydrodynamics, thermodynamics, and particularly quantum mechanics. By extension, use of complex analysis also has applications in engineering fields such as nuclear, aerospace, mechanical and electrical engineering.
2	LINEAR ALGEBRA	MATH-202C	Linear algebra is central to almost all areas of mathematics. For instance, linear algebra is fundamental in modern presentations of geometry, including for defining basic objects such as lines, planes and rotations. Also, functional analysis, a branch of mathematical analysis, may be viewed as basically the application of linear algebra to spaces of functions. Linear algebra is also used in most sciences and fields of engineering, because it allows modeling many natural phenomena, and computing efficiently with such models.
3	CONTINUUM MECHANICS	MATH-203C	Continuum mechanics is a branch of mechanics that deals with the mechanical behavior of materials modeled as a continuous mass rather than as discrete particles. The French mathematician Augustin-Louis Cauchy was the first to formulate such models in the 19th century. Continuum mechanics deals with physical properties of solids and fluids which are independent of any particular coordinate system in which they are observed. These physical properties are then represented by tensors, which are mathematical objects that have the required property of being independent of coordinate system. These tensors can be expressed in coordinate systems for computational convenience. Materials, such as solids, liquids and gases, are composed of molecules separated by space. On a microscopic scale, materials have cracks and discontinuities. However, certain physical phenomena can be modeled assuming the materials exist as a continuum, meaning the matter in the body is continuously distributed and fills the entire region of space it occupies. A continuum is a body that can be continually

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			sub-divided into infinitesimal elements with properties being those of the bulk material.
4	FUNCTIONAL ANALYSIS	MATH-204C	Functional analysis is a branch of mathematical analysis which studies the transformations of functions and their algebraic and topological properties. Functional analysis has strong parallels with linear algebra, as both fields are based on vector spaces as the core algebraic structure. Functional analysis endows linear algebra with concepts from topology (e.g. inner product, norm, topological space) in defining the topological vector space. An important part of functional analysis is the extension of the theory of measure, integration, and probability to infinite dimensional spaces, also known as infinite dimensional analysis.
5	NATIONAL SERVICE SCHEME (NSS)	NSS-201OE	The symbol for the NSS has been based on the giant Rath Wheel of the world-famous Konark Sun Temple (The Black Pagoda) situated in Odisha, India. The wheel portrays the cycle of creation, preservation and release. It signifies the movement in life across time and space, the symbol thus stands for continuity as well as change and implies the continuous striving of NSS for social change. The eight bars in the wheel represent 24 hours of a day. The red colour indicates that the volunteer is full of young blood that is lively, active, energetic and full of high spirit. The navy blue colour indicates the cosmos of which the NSS is tiny part, ready to contribute its share for the welfare of the mankind. It stands for continuity as well as change and implies the continuous striving of NSS. The programme aims to instilling the idea of social welfare in students, and to provide service to society without bias. NSS volunteers work to ensure that everyone who is needy gets help to enhance their standard of living and lead a life of dignity. In doing so, volunteers learn from people in villages how to lead a good life despite a scarcity of resources. it also provides help in natural and man-made disasters by providing food, clothing and first aid to the disaster's victims.
6	MATHEMATICS FOR SOCIAL SCIENCES	MATH – 205OE	Mathematics is the most beautiful and most powerful creation of the human spirit. Nature used beautiful mathematics in creating the world. Mathematics is the art of giving the same name to different things. Everything around us is mathematics. Social Sciences are related to the study of social life, social change, and the social causes and consequences of human behaviour. Sociologists investigate the structure of groups, organizations, and societies, and how people interact within these contexts. The subject matter of social sciences is diverse ranging from crime to religion, the family to the state, the divisions of race and social class, and the shared beliefs of a common culture and social stability to radical change in whole societies.

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			Mathematics for Social Sciences is an interdisciplinary field of research concerned both with the use of mathematics within sociological research as well as research into the relationships that exist between mathematical logic and social phenomena. It is in fact is combination of two seemingly completely different fields of academia and it provides the inherent mathematical understanding of various social issues and challenges.

Remarks:

- The courses bearing serial number 1 to 4 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- Each student has to opt either the course mentioned in Serial No: 05 or a course offered by the other departments as OPEN ELECTIVE COURSE in SECOND semester.
- The course as mentioned at serial number 5 may be taken by the SECOND Semester students of the Department of Mathematics as an OPEN ELECTIVE COURSE offered by the NSS Cell. This course has 4 credits and full marks 100 (Internal: 30 + End Term: 70 (Theory: 40, Practical: 30)).
- The course as mentioned at serial number 6 may be taken by the SECOND Semester students of the other Departments as an OPEN ELECTIVE COURSE offered by the Department of Mathematics. This course has 4 credits and full marks 100 (Internal: 30 + End Term: 70).

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THIRD SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	TOPOLOGY	MATH-301C	In mathematics, topology is concerned with the properties of a geometric object that are preserved under continuous deformations, such as stretching, twisting, crumpling and bending, but not tearing or gluing. The motivating insight behind topology is that some geometric problems depend not on the exact shape of the objects involved, but rather on the way they are put together. For example, the square and the circle have many properties in common: they are both one dimensional objects (from a topological point of view) and both separate the plane into two parts, the part inside and the part outside.
2	NUMERICAL ANALYSIS WITH COMPUTER APPLICATIONS-I	MATH-302C	Numerical analysis is the study of algorithms that use numerical approximation (as opposed to symbolic manipulations) for the problems of mathematical analysis (as distinguished from discrete mathematics). Numerical analysis naturally finds application in all fields of engineering and the physical sciences, life sciences, social sciences, medicine, business and even the arts have adopted elements of scientific computations, ordinary differential equations appear in celestial mechanics (predicting the motions of planets, stars and galaxies); numerical linear algebra is important for data analysis; stochastic differential equations and Markov chains are essential in simulating living cells for medicine and biology. Before the advent of modern computers, numerical methods often depended on hand interpolation formulas applied to data from large printed tables. Since the mid-20th century, computers calculate the required functions instead, but many of the same formulas nevertheless continue to be used as part of the software algorithms.
3	GRAPH THEORY	MATH-303C	In mathematics, graph theory is the study of graphs, which are mathematical structures, used to model pair wise relations between objects. A graph in this context is made up of vertices (also called nodes or points) which are connected by edges (also called links or lines). A distinction is made between undirected graphs, where edges link two vertices symmetrically, and directed graphs, where edges link two vertices asymmetrically; see Graph (discrete mathematics) for more detailed definitions and for other variations in the types of graph that are commonly considered. Graphs are one of the prime objects of study in discrete mathematics.

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4	PROBABILITY AND STATISTICS	MATH-301E	Probability is the branch of mathematics concerning numerical descriptions of how likely an event is to occur, or how likely it is that a proposition is true. The probability of an event is a number between 0 and 1, where, roughly speaking, 0 indicates impossibility of the event and 1 indicates certainty. These concepts have been given an axiomatic mathematical formalization in probability theory, which is used widely in areas of study such as mathematics, statistics, finance, gambling, science (in particular physics), artificial intelligence, machine learning, computer science, game theory, and philosophy to, for example, draw inferences about the expected frequency of events. Probability theory is also used to describe the underlying mechanics and regularities of complex systems. Statistics is the discipline that concerns the collection, organization, analysis, interpretation and presentation of data. In applying statistics to a scientific, industrial, or social problem, it is conventional to begin with a statistical population or a statistical model to be studied. Statistics deals with every aspect of data, including the planning of data collection in terms of the design of surveys and experiments.
5	OPERATIONS RESEARCH	MATH – 302E	Operations research (OR) is a discipline that deals with the application of advanced analytical methods to help make better decisions, capability development, management and assurance. The terms management science and decision science are sometimes used as synonyms. Employing techniques from other mathematical sciences, such as mathematical modeling, statistical analysis, and mathematical optimization, operations research arrives at optimal or near-optimal solutions to complex decision-making problems. Because of its emphasis on human-technology interaction and because of its focus on practical applications, operations research has overlap with other disciplines, notably industrial engineering and operations management, and draws on psychology and organization science. Operations research is often concerned with determining the extreme values of some real-world objective: the maximum (of profit, performance, or yield) or minimum (of loss, risk, or cost).
6	FUZZY SET THEORY AND APPLICATIONS	MATH – 303E	In mathematics, fuzzy sets (a.k.a. uncertain sets) are somewhat like sets whose elements have degrees of membership. n classical set theory, the membership of elements in a set is assessed in binary terms according to a bivalent condition — an element either belongs or does not belong to the set. By contrast, fuzzy set theory permits the gradual assessment of the membership of elements in a set; this is described with the aid of a membership function valued in the real unit interval [0, 1]. Fuzzy sets generalize classical sets, since the indicator functions (aka

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			characteristic functions) of classical sets are special cases of the membership functions of fuzzy sets, if the latter only take values 0 or 1.In fuzzy set theory, classical bivalent sets are usually called crisp sets. The fuzzy set theory can be used in a wide range of domains in which information is incomplete or imprecise, such as bioinformatics
7	NONLINEAR DYNAMICS	MATH – 304E	In mathematics and science, a nonlinear system is a system in which the change of the output is not proportional to the change of the input. Nonlinear problems are of interest to engineers, biologists, physicists, mathematicians, and many other scientists because most systems are inherently nonlinear in nature. Nonlinear dynamical systems, describing changes in variables over time, may appear chaotic, unpredictable, or counterintuitive, contrasting with much simpler linear systems. Typically, the behavior of a nonlinear system is described in mathematics by a nonlinear system of equations, which is a set of simultaneous equations in which the unknowns (or the unknown functions in the case of differential equations) appear as variables of a polynomial of degree higher than one or in the argument of a function which is not a polynomial of degree one.
8	MATHEMATICAL ELASTICITY	MATH – 305E	In physics and materials science, elasticity is the ability of a body to resist a distorting influence and to return to its original size and shape when that influence or force is removed. Solid objects will deform when adequate loads are applied to them; if the material is elastic, the object will return to its initial shape and size after removal. This is in contrast to plasticity, in which the object fails to do so and instead remain in its deformed state. The physical reasons for elastic behavior can be quite different for different materials. In metals, the atomic lattice changes size and shape when forces are applied (energy is added to the system). When forces are removed, the lattice goes back to the original lower energy state. For rubbers and other polymers, elasticity is caused by the stretching of polymer chains when forces are applied.
9	FLUID DYNAMICS	MATH – 306E	In physics and engineering, fluid dynamics is a subdiscipline of fluid mechanics that describes the flow of fluids—liquids and gases. It has several subdisciplines, including aerodynamics (the study of air and other gases in motion) and hydrodynamics (the study of liquids in motion). Fluid dynamics has a wide range of applications, including calculating forces and moments on aircraft, determining the mass flow rate of petroleum through pipelines, predicting weather patterns, understanding nebulae in interstellar space and modelling fission weapon detonation. Fluid dynamics offers a systematic structure—which underlies these practical disciplines—that embraces empirical and semi-empirical laws derived from flow measurement and used to

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			solve practical problems. The solution to a fluid dynamics problem typically involves the calculation of various properties of the fluid, such as flow velocity, pressure, density, and temperature, as functions of space and time.
10	VEDIC MATHEMATICS	MATH – 307E	Vedic Mathematics is a super-fast way of calculation whereby you can do supposedly complex calculations like 996 x 998 in less than five seconds flat. It is highly beneficial for school and college students and students who are appearing for their entrance examinations. Vedic Mathematics is far more systematic, simplified and unified than the conventional system. It is a mental tool for calculation that encourages the development and use of intuition and innovation, while giving the student a lot of flexibility, fun and satisfaction. It means giving them a competitive edge, a way to optimize their performance and gives them an edge in mathematics and logic that will help them to shine in the classroom and beyond. Therefore, it's direct and easy to implement in schools – a reason behind its enormous popularity among academicians and students. It complements the mathematics curriculum conventionally taught in schools by acting as a powerful checking tool and goes to save precious time in examinations. The methods & techniques are based on the pioneering work of late Swami Shri. Bharati Krishna Tirthaji, Shankracharya of Puri, who established the system from the study of ancient Vedic texts coupled with a profound insight into the natural process of mathematical reasoning. There are just 16 Sutras or Word Formulae which solve all known mathematical problems in the branches of Arithmetic, Algebra, Geometry and Calculus. They are easy to understand, easy to apply and easy to remember. Moreover, Vedic Mathematics is an integral part of Indian Knowledge System.

Remarks:

- The courses bearing serial number 1 to 3 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). In case of course mentioned at serial no. 2, End Term marks division is Theory: 50 + Practical: 20.
- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any ONE of these DSE courses in THIRD semester.

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FOURTH SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	INTEGRAL TRANSFORMS AND INTEGRAL EQUATIONS	MATH-401C	In mathematics, integral equations are equations in which an unknown function appears under an integral sign. There is a close connection between differential and integral equations, and some problems may be formulated either way. See, for example, Green's function, Fredholm theory, and Maxwell's equations. In mathematics, an integral transform maps a function from its original function space into another function space via integration, where some of the properties of the original function might be more easily characterized and manipulated than in the original function space. The transformed function can generally be mapped back to the original function space using the inverse transform.
2	NUMERICAL ANALYSIS WITH COMPUTER APPLICATIONS-II	MATH-402C	Numerical analysis is the study of algorithms that use numerical approximation (as opposed to symbolic manipulations) for the problems of mathematical analysis (as distinguished from discrete mathematics). Numerical analysis naturally finds application in all fields of engineering and the physical sciences, life sciences, social sciences, medicine, business and even the arts have adopted elements of scientific computations. ordinary differential equations appear in celestial mechanics (predicting the motions of planets, stars and galaxies); numerical linear algebra is important for data analysis; stochastic differential equations and Markov chains are essential in simulating living cells for medicine and biology. Before the advent of modern computers, numerical methods often depended on hand interpolation formulas applied to data from large printed tables. Since the mid 20th century, computers calculate the required functions instead, but many of the same formulas nevertheless continue to be used as part of the software algorithms.
3	DISCRETE MATHEMATICS	MATH – 401E	Discrete mathematics is the study of mathematical structures that are fundamentally discrete rather than continuous. In contrast to real numbers that have the property of varying "smoothly", the objects studied in discrete mathematics – such as integers, graphs, and statements in logic. Concepts and notations from discrete mathematics are useful in studying and describing objects and problems in branches of computer science, such as computer algorithms, programming languages, cryptography, automated theorem proving, and software development. Conversely, computer implementations are significant in applying ideas from discrete mathematics to real-world problems, such as in

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			operations research.
4	ADVANCED OPERATIONS RESEARCH	MATH – 402E	Operations research (OR) is a discipline that deals with the application of advanced analytical methods to help make better decisions, capability development, management and assurance. The terms management science and decision science are sometimes used as synonyms. Employing techniques from other mathematical sciences, such as mathematical modeling, statistical analysis, and mathematical optimization, operations research arrives at optimal or near-optimal solutions to complex decision-making problems. Because of its emphasis on human-technology interaction and because of its focus on practical applications, operations research has overlap with other disciplines, notably industrial engineering and operations management, and draws on psychology and organization science. Operations research is often concerned with determining the extreme values of some real-world objective: the maximum (of profit, performance, or yield) or minimum (of loss, risk, or cost).
5	FUZZY TOPOLOGY	MATH – 403E	Fuzzy topology is the generalization of general topology. Fuzzy topology has applications like reformulation, of and generalization of, algebraic geometry and catalyzed modern theory of dynamical systems. Very recently fuzzy topology techniques are being applied to the N-body orbital simulations in vector fields, in order to visualize a new theory of gravity..
6	MATHEMATICAL BIOLOGY	MATH – 404E	Mathematical and theoretical biology is a branch of biology which employs theoretical analysis, mathematical models and abstractions of the living organisms to investigate the principles that govern the structure, development and behavior of the systems, as opposed to experimental biology which deals with the conduction of experiments to prove and validate the scientific theories. The field is sometimes called mathematical biology or biomathematics to stress the mathematical side, or theoretical biology to stress the biological side. Theoretical biology focuses more on the development of theoretical principles for biology while mathematical biology focuses on the use of mathematical tools to study biological systems, even though the two terms are sometimes interchanged. Mathematical biology aims at the mathematical representation and modeling of biological processes, using techniques and tools of applied mathematics and it can be useful in both theoretical and practical research. Describing systems in a quantitative manner means their behavior can be better simulated, and hence properties can be predicted that might not be evident to the experimenter. This requires precise mathematical models. Because of the complexity of the living systems, theoretical biology employs several fields of mathematics

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			and has contributed to the development of new techniques.
7	ADVANCED MATHEMATICAL ELASTICITY	MATH – 405E	In physics and materials science, elasticity is the ability of a body to resist a distorting influence and to return to its original size and shape when that influence or force is removed. Solid objects will deform when adequate loads are applied to them; if the material is elastic, the object will return to its initial shape and size after removal. This is in contrast to plasticity, in which the object fails to do so and instead remain in its deformed state. The physical reasons for elastic behavior can be quite different for different materials. In metals, the atomic lattice changes size and shape when forces are applied (energy is added to the system). When forces are removed, the lattice goes back to the original lower energy state. For rubbers and other polymers, elasticity is caused by the stretching of polymer chains when forces are applied.
8	ADVANCED FLUID DYNAMICS	MATH – 406E	In physics and engineering, fluid dynamics is a sub-discipline of fluid mechanics that describes the flow of fluids—liquids and gases. It has several sub-disciplines, including aerodynamics (the study of air and other gases in motion) and hydrodynamics (the study of liquids in motion). Fluid dynamics has a wide range of applications, including calculating forces and moments on aircraft, determining the mass flow rate of petroleum through pipelines, predicting weather patterns, understanding nebulae in interstellar space and modelling fission weapon detonation. Fluid dynamics offers a systematic structure—which underlies these practical disciplines—that embraces empirical and semi-empirical laws derived from flow measurement and used to solve practical problems. The solution to a fluid dynamics problem typically involves the calculation of various properties of the fluid, such as flow velocity, pressure, density, and temperature, as functions of space and time.
9	PROJECT WORK	MATH – 407E	Project work, which is also a discipline specific elective course, is important as gives a glimpse of research work to the aspiring students. This in fact encourages them to opt for high quality research in the future.

Remarks:

- The courses bearing serial number 1 to 2 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). In case of course mentioned at serial no. 2, End Term marks division is Theory: 50 + Practical: 20.
- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any TWO of these DSE courses in FOURTH semester.

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Ph.D in Mathematics

Ph.D Course Work			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	RESEARCH METHODOLOGY-I	MATH-501	To train the scholars in formulating a research proposal maintaining all sorts of research ethics as well as to train them regarding the basics of statistics. To train them about hands-on computer knowledge, which may help them in their research work.
2	RESEARCH METHODOLOGY-II	MATH-502	To train the scholars for reviewing the published research articles and books in a relevant field. To train them in field works and hands on knowledge on Communication Skills. To train them regarding writing of research articles.
3	FUZZY SET AND FUZZY TOPOLOGY	MATH – 503	The course is offered to the scholars as per their interest to pursue Ph.D. degree. Accordingly, this course is offered to provide knowledge about fuzzy sets as a generalization of classical set theory. To develop their knowledge on fuzzy topology as a generalization of classical topology and to teach them about the recent research trends of this course.
4	ADVANCED OPERATIONS RESEARCH	MATH-504	The course is offered to the scholars as per their interest to pursue Ph.D. degree. Accordingly, this course is offered to provide knowledge about advanced operations research and to teach them about the recent research trends of this course.
5	NONLINEAR DYNAMICS AND MATHEMATICAL MODELLING	MATH – 505	The course is offered to the scholars as per their interest to pursue Ph.D. degree. Accordingly, this course is offered to provide training and knowledge on nonlinear mathematical modelling of different phenomena related to biology, sociology etc. and to teach them about the recent research trends of this course. Moreover, this course is essential for interdisciplinary research trends.
6	PROJECT WORK	MATH – 506	To provide training how to make a project proposal, is important as it gives a glimpse of research work to the aspiring scholars.

Remarks:

- The courses bearing serial number 1, 2 and 6 are COMPULSORY COURSES each of having 4 credits and full marks 100.
- The courses bearing serial number 3 to 5 are ELECTIVE COURSES each of having 4 credits and full marks 100. Each student has to opt any ONE of these ELECTIVE COURSES.

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COURSE OUTCOMES

Department of Political Science

M.A. in Political Science

FIRST SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	POLITICAL THEORY	PS-101 (CC-I)	This course aims to increase the understanding about politics, develop research and analytical skills including ability to think critically to construct logical arguments among the post graduate level students. It is intended to guide the students to collect, analyse and interpret evidence and date and to formulate reasoned conclusions linking them with some theoretical ideas.
2	WESTERN POLITICAL THOUGHT-I	PS-102 (CC-II)	Philosophical writings of Political Thinkers are reflections of the socio-political problems of their time. This course is designed to acquaint students about philosophies of different Western political thinkers. This course will equip students to understand historically written texts and use of such ideas to solve contemporary socio-political problems by interpreting those philosophical writings.
3	INDIAN GOVERNMENT AND POLITICS	PS-103(CC-III)	Government and Political System of present India is a legacy of British System. The Constitution of India sets out the framework of powers, privileges, responsibilities and areas of functions of central government, state government and other bodies. This course aims to train the students giving a holistic idea about Indian polity and administration.
4	NORTHEAST INDIA: AN OVERVIEW (ELECTIVE)	PS-104(DSE-I)	The North Eastern Region (NER) has been politically and geographically very sensitive in the nation building process in independent India. The Government of India has adopted various policies to deal with these issues. An assessment on these policies by revisiting the people's faith will further help to understand about NER. This course is designed to enable the students to be familiar, explain and manage social, economic and political issues that are subject to public debate in the NER today and come up with comprehensive suggestions to these issues.
5	GOVERNANCE: CONCEPTS, THEORIES AND ISSUES (ELECTIVE)	PS-105(DSE-I)	The achievements of a government depend upon the quality and nature of goods and services it provides, its redistributive activities and the nature of its regulations on market, individual and organizational behaviour. Today there are persistent problems in public system management due to either less or lack of emphasis on humanism, a dilemma of incompatibility between bureaucracy and democracy, corruption in administration, politicization of economic and public policy. This course will draw the attention of various issues involved in

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			the study of public sector governance and train the students to evaluate the existing mechanisms dealing with governance.
6	DEVELOPMENT STUDIES (ELECTIVE)	PS-106(DSE-I)	Development Studies is a multidisciplinary branch of Social Science and is being taught in different Universities especially in the third world countries. The issue has become an important area of academic research as the developmental aspect of a country is having correlative and causal relationship with numerous other issues affecting the ultimate development called 'sustainable development.' The paper therefore, intends to impart conceptual and theoretical knowledge to the students relating to diverse aspects of development. Through the understanding of conceptual and theoretical basis, the students would acclamatise themselves on the current debates relating to the relationship of development with gender, environment and tribal issues.
7	COMMUNICATION SKILLS IN ENGLISH	CSE-101	This course will acquaint the students with the English language, its importance and use in the contemporary world. It will enable the learners to gain basic knowledge of English grammar and vocabulary and also nourish their speaking and writing skills in English language.

Remarks:

- The courses bearing Serial No. 1 to 3 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- The courses mentioned in Serial No. 4 to 6 are DISCIPLINE SPECIFIC COURSES and student has to take any one in FIRST Semester.
- The course as mentioned at serial number 7 would be taken by the FIRST Semester students of the Department of Political Science. This course has 2 credits and full marks 100 (Internal: 50 + End Term: 50)

SECOND SEMESTER

Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	WESTERN POLITICAL THOUGHT-II	PS – 201(CC-IV)	Philosophical writings of Political Thinkers are reflections of the socio-political problems of their time. This course is designed to acquaint students about philosophies of different Western political thinkers. This course will equip students to understand historically written texts and use of such ideas to solve contemporary socio-political problems by interpreting those philosophical writings.
2	PUBLIC ADMINISTRATION: CONCEPTS, THEORIES AND APPROACHES	PS – 202 (CC-V)	Theories are perspectives with which people make sense of their world experiences. It accentuates intellectual depth in the discipline. The course is designed to train the students with different theoretical perspectives available in Public Administration. The course is expected to provide cumulative experience and synthesize them to deepen their understanding about the discipline.

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3	COMPARATIVE POLITICS: CONCEPTS, THEORIES AND APPROACHES	PS-203 (CC-VI)	The purpose of this course is to introduce students about the patterns of government and working of institutions in various countries. It is expected to help students to develop analytical thinking about various methods of camparision, approaches and theories of comparative politics. The course develops various perspectives-developmental, cultural and sociological-to look at the developed and developing countries to help students to become future policy makers of the country.
4	INDIAN CONSTITUTION AND INSTITUTIONS	PS-204 (OE)	Constitution of India is the most fundamental document, which defines the structure, powers and framework of functioning of different organs of governments and encompassing the central, state and local governments. The course aims to give students ideas about the basis of Indian Constitution and functioning of governments and other organs of governments in India.
5	WOMEN'S STUDIES	PS-205 (OE)	The central concern of this paper is to offer a broad outline with regard to the nature and growth of women's movement in the modern age, women's participation in political and administrative activities, legal provisions available for protection of rights of women and most vital issue of women's health.
6	HUMAN RIGHTS: THEORY AND PRACTICE	PS-206 (OE)	The objective of this course is to train students about different aspects of rights of human beings. Students are expected to learn here different international and national instruments for protection of human rights more specifically the rights of the vulnerable groups.
7	LOCAL GOVERNMENT IN INDIA	PS-207 (OE)	Local Self-Government is an important unit of administration that ensures the participation of the community in the local governance. Hence, the objective of the course is to impart in dept knowledge and understanding on the institution of local self-government in India. Through this course the students will have understanding on the structures, functions, sources of fund and resource mobilisation at the rural and urban local government. In due course, the students would be able to come out with new ideas and arguments on diverse issues of local-self government and identify the challenges encountered by the institutions.

Remarks:

- The courses bearing serial number 1 to 3 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- Each student of Second Semester has to opt one paper offered by the other departments as OPEN ELECTIVE COURSE in SECOND semester.
- The course as mentioned at serial number 4 to 7 may be taken by the SECOND Semester students of the other Departments as an OPEN ELECTIVE COURSE offered by the Department of Political Science. This course has 4 credits and full marks 100 (Internal: 30 + End Term: 70).

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THIRD SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	INDIAN POLITICAL THOUGHT	PS-301 (CC-VII)	This course introduces the specific elements of Indian political thought with basic focus of study on individual thinkers and the themes that define the process of evolution of Indian political thought. The objective of the course is to study the general themes of these thinkers from varied social and temporal contexts and help students understanding the relevance of philosophical ideas of these thinkers in the process of socio-political development in Indian as well as world politics.
2	INTERNATIONAL RELATIONS: THEORIES AND APPROACHES	PS-302 (CC-VIII)	The objective of this course is to enable students to acquire knowledge of International Relations as an evolving discipline. It is expected to guide the students to establish a relationship between IR Theory and IR practice to organise and sharpen their ideas and assumptions of international politics and advance more swiftly in their study of IR.
3	RESEARCH METHODOLOGY	PS-303 (CC-IX)	Research is the basis for development of any discipline. Through research, one can make scientific and systematic study of a particular issue of the discipline. It is an art of scientific investigation. This course will enable students to understand the basic idea about social science research, different methods of scientific research.
4	BASIC COMPUTER SKILLS	PS-304 (CE)	The course is designed to aquatint students with the use and application of the fundamentals of computer for their day-to-day basic computer activities. It will enhance the IT literacy among the students and enable them to write letters, articles, prepare flow chat, PowerPoint presentation, calculation with excel, etc. They will also able to learn the different aspects of Open-Source Software. This course will offer hands on training with basic computer knowledge.

Remarks:

- The courses bearing serial number 1 to 4 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any ONE of these DSE courses in THIRD semester.

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FOURTH SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	PUBLIC POLICY: AN INTRODUCTION	PS-401 (CC-X)	The discipline of public policy has gained momentum with increase of government developmental activities. Public Policy aims to give solutions to social, political and economic problems. It also helps in identifying the way to move towards future. The main objective of this course is to train students about the different basic aspects of public policy, background and issues related to public policy formulation and implementation.
2	POLITICAL PROCESSES IN INDIA	PS-402 (CC-XI)	This course is designed to introduce students about concepts and debates centred with political processes in India with special focus on the issue of development strategies, identity politics and social movements, regionalism, gender issues in Indian politics and role of civil societies and political parties in Indian political processes. It is expected to offer students the analytical and research skills needed to understand the political processes with the working of Indian state.
3	INDIA'S FOREIGN POLICY	PS-403 (CC-XII)	Foreign policy of a state outlines the objectives and activities in relation to its interaction with other states. The objective of this course is to introduce the post graduate students with the perspectives of Indian foreign policy, India's relations with the major super powers, neibhours and its negotiation strategies at multilateral forums/regimes. It also introduces the students with contemporary external challenges and how India is attempting to deal with these external challenges.
4	ENVIRONMENT AND DISASTER MANAGEMENT	PS-404 (DSE-1)	Environmental pollution is now recognized as a serious global problem. It is causing severe environmental disasters in many parts of the world every now and then. An effective environmental administration at global, national and local level has become the most urgent need of the hour to save all living creatures and make the earth a live able place without further endangering the environment. The objective of the course is to draw the attention of the students about this menace, train them in the mechanisms for its mitigation

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			and to initiate debates, dialogues and directions of thinking about politico-administrative reforms for evolving an environmental state structure to the pursuit of 'good life'.
5	PUBLIC POLICY IN INDIA	PS-405 (DSE-II)	In the post-independent era, the government of India has undertaken massive developmental activities in the form of policy for social welfare of women, children and other vulnerable sections of society with special focus on health and education. This course will orient students about theoretical concepts of social policy as well as different policies initiated for the social development and promotion of health and educational sectors in India.
6	DISSERTATION	PS-406 (DSE-III)	This course is basically practice-oriented. It will orient students in academic reading, writing and formal presentation. This course will expose students to the new learning tools of exploring research in the discipline of Political Science and other allied disciplines. The students will also have a sense of hands-on training, by undertaking some limited research ideas, and experiment the same through field study.

Remarks:

- The courses bearing serial number 1 to 3 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70)
- The courses bearing serial number 4 to 6 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any ONE of these DSE courses in FOURTH semester.

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Ph.D. in Political Science

Ph.D. Course Work			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	RESEARCH METHODOLOGY-I	PS-501	This course will enable students to understand the basic idea about research, different methods of scientific research, statistical tools and application of computer in doing research.
2	RESEARCH METHODOLOGY-II	PS-502	This course Research Methodology-II will acquitant the students with application of theories in research design, methods of data and writing of a research report based on the postulated research design.
3	ADVANCED RESEARCH IN POLITICAL SCIENCE	PS-503	With the help of this course "Advanced Research in Political Science" the scholars will be trained with different theoretical perspectives available in Political Science and to introduce them with recent researches in the field of Political Science. The course is expected to provide cumulative experience and synthesize them to deepen their understanding of the discipline.
4	TERM PAPER	PS-504	This course will enable the research scholars to write synopsis, project proposal and research articles.

Remarks:

- The courses bearing serial number 1 to 4 are COMPULSORY COURSES each of having 4 credits and full marks 100.

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COURSE OUTCOMES

Department of English

M.A. in English

FIRST SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Poetry-I	ENG-101 (CC-I)	This paper will familiarize the students with the literary tradition of poetry from the medieval period to the age of Milton. It will introduce the students to early English poetry and the different forms and poetic structure of different periods.
2	Drama-I	ENG-102(CC-II)	This paper will introduce students to the English Drama which flourished during the Elizabethan Age and Jacobean period and includes most important works of renowned dramatists like Shakespeare, Marlowe and their contemporaries. It will emphasize on the centrality of Shakespeare in English Drama in the Contemporary period and the centuries after that.
3	Literary Theory and Criticism- I	ENG-103(CC-III)	This is the body of ideas and methods that is used in the practical reading of Literature. The This is the body of ideas and methods that is used in the practical reading of Literature. The objective of this course is to give the students a certain way of looking at a text as well as to study, analyse, evaluate and interpret literature.
4	European Literature in Translation	ENG-104(DSE-I)	To understand English Literature, it is very important to learn about the literature of other European Countries since the politics, religion, culture and movements are inter-connected. This paper will introduce the students to the important writings of famous writers of Europe and the impact it had on English Literature and the world.
5	Women's Writing	ENG-105(DSE-I)	Women's Writing is based on the notion that it is a category of writing done by women based on their experience. It may also refer to the general study of women writers. The objective of this course is to acquaint students to recognize and discuss aspects of women's writing, demonstrate understanding of critical and theoretical debates surrounding women's writing, awareness of cultural and inter- cultural concerns and to interpret and analyse literary works by women.
6	Communication Skills In English	CSE-101	This course will acquaint the students with the English language, its importance and use in the contemporary

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			world. It will enable the learners to gain basic knowledge of English grammar and vocabulary and also nourish their speaking and writing skills in English language.

Remarks:

- The courses bearing serial number 1 to 3 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- The courses mentioned at 4 and 5 are Discipline Specific Elective out of which students have to select any one each of having 4 credits and full marks 100 (Internal : 30 + End Term: 70).
- The course as mentioned at serial number 6 would be taken by the FIRST Semester students of all the Departments of the University as a Compulsory Course from the Department of English. This course has 2 credits and full marks 100 (Internal: 50 + End Term: 50).

SECOND SEMESTER			
Sl. No.	**Course Title**	**Course Code**	**Course Outcome (CO)**
1	**Poetry- II**	**ENG-201(CC-IV)**	The objective of this course is to comprehend the development of trends in British poetry as well as to view British Literature in its socio-cultural and political contexts. The Course is also designed to understand the theme, structure and style in British poetry.
2	**Drama-II**	**ENG-202(CC-V)**	Modern period saw the most notable changes and movements in English Literature. Modern period saw an avant-garde movement in the genre of Drama with different writers experimenting in the field of writing drama with new innovations and ideas. The objective of the paper is to introduce the students to new ideas, theories and movements of the 20th Century and its effect on English Drama.
3	**Fiction-I**	**ENG-203(CC-VI)**	The objective of the paper is to familiarize the students with the development of the novel as a genre in English Literature during the 18th and 19th Century. It will focus on the cultural and Social perspectives of the period, the concerns of the writers and their contribution to Novel.
4	**Popular Literature**	**ENG-204(OE)**	Popular Literature is based on those writings which are different from canonical literature as well as intended for the masses and primarily designed to entertain. The objectives of this course is to introduce students to the wide and continued acceptance of the books which are measured by sales, frequent imitation, adaptation to other cultural forms and general commercial success

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			while also introducing the students to genres such as romance, detective fiction, fantasy etc. which can help them to gain a better understanding of the popular roots of literature.
5	**Partition Literature**	**ENG-205 (OE)**	This paper will familiarize the students to the Socio-economic changes that occurred during the partition which is reflected in the literary writings of various authors.
6	**Popular Fiction**	**ENG-207 (OE)**	Popular Fiction is based on those writings which are intended for everyone to read and derive pleasure from it. The Objective of this course is to introduce students to the different genres of Popular Fiction, viz, Science Fiction, Detective Fiction, Fantasy etc. which will help them to gain a better understanding of Popular Fiction.

Remarks:

- The courses bearing serial number 1 to 3 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- Each student has to opt either the course mentioned in Serial No: 4 to 6 or a course offered by the other departments as OPEN ELECTIVE COURSE in SECOND semester.
- The course as mentioned at serial number 6 may be taken by the SECOND Semester students of the other Departments as an OPEN ELECTIVE COURSE offered by the Department of English. This course has 4 credits and full marks 100 (Internal: 30 + End Term: 70).

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THIRD SEMESTER			
Sl. No.	**Course Title**	**Course Code**	**Course Outcome (CO)**
1	**Poetry-III**	**ENG-301(CC-VII)**	The paper intends to introduce students the poetry from the Victorian period to contemporary times which focus mainly on the style, narration, technique and theme of the modern poetry.
2	**American Literature – I**	**ENG-302 (CC-VIII)**	The objective of this course is to understand the historical background of American Literature and the American Dream. Also, this course will teach the students the socio-cultural and political events responsible for the development in American literary history.
3	**Literary Theory and Criticism-II**	**ENG-303 (CC-IX)**	The objective of this course is to give the students a firm grounding in a major methodological aspect of literary studies known as theory as well as to understand the concept of structuralism and post- structuralism, to learn about the rise of feminism and its significance for the betterment of women society and the scope of orientalism by studying post-colonial literature.
4	**Basic Computer Skills**	**ENG-304 (CE)**	After completing the Basic course in Computer Skill students will able to use the computer for their day to day basic computer activities. It will enhance the IT literacy of students. After completion of this course, students will able to write letters, articles, prepare flowchart, PowerPoint presentation, calculation with excel, etc. They will also able to learn the different aspects of Open Source Software. This course will offer hands on training with basic computer knowledge.

Remarks:

- The courses bearing serial number 1 to 3 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- The course bearing serial number 4 is Compulsory ELECTIVE COURSE (CE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).

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FOURTH SEMESTER			
Sl. No.	**Course Title**	**Course Code**	**Course Outcome (CO)**
1	**Indian Writing in English**	**ENG-401 (CC-X)**	The objective of this course is to understand the various features of Indian Literature in English, to understand how well the Indian culture is reflected in literature as well as to understand the socio- cultural aspect.
2	**Fiction-II**	**ENG-402 (CC-XI)**	The objective of the Course is to introduce students the new innovations in the field of Fiction. It will read the texts with special focus on new theories developed due to colonialism, war, feminism and psychoanalysis. It will enable students to learn and appreciate the new techniques in Fiction and their impact on Society and Literature.
3	**American Literature-II**	**ENG-403 (CC-XII)**	This course introduces to the second part of American Literature in continuation with the previous course. The objective of this study is to get an insight into the society, politics and art and how they affect literature as well as a glimpse into American novel and to develop a skill to appreciate American poetry.
4	**Postcolonial Literature**	**ENG-404 (DSE-II)**	The paper will introduce students to major issues, themes, and literary concepts of the postcolonial such as race, class, history, language, gender, movements and migration.
5	**Dalit Literature**	**ENG-405 (DSE-II)**	The objective of this course is to understand about the stark portrayal of reality and the Dalit political scene.
6	**Dissertation**	**ENG-406 (DSE-II)**	This course is basically practice-oriented. It will orient students in academic reading, writing and formal presentation. This course will expose students to new learning tools of exploring research in the discipline of English Language and Literature. Also, the students will have a sense of hands-on training, by undertaking some limited research ideas, and experience the same through field study.

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7	**Indian Aesthetics: Theories and Comparisons**	**ENG-407 (DSE-II)**	This Paper will introduce the students to Indian aesthetics and its unique philosophical and spiritual point of view on art, architecture and literature.

Remarks:

- The courses bearing serial number 1 to 3 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- The courses bearing serial no 4 to 7 are Discipline Specific elective out of which a student have to select any one each of having 4 credits and full marks 100 (Internal : 30 + End Term: 70).

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Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	**Research Methodology -I**	**ENG-501**	Research is the basis for development of any discipline. Through research, one can make scientific and systematic study of a particular issue of the discipline. It is an art of scientific investigation. This course will enable students to understand the basic idea about research, different methods of scientific research, statistical tools and application of computer in doing research.
2	**Research Methodology-II**	**ENG-502**	Research is the basis for development of any discipline. Through research, one can make scientific and systematic study of a particular issue of the discipline. It is an art of scientific investigation. This course Research Methodology-II will introduce the students with application of theories in research design, methods of data and writing of a research report based on the postulated research design.
3	**English and Research**	**ENG-503**	This paper shall cover trends in critical theories. After going through this course, the research scholars will study important contemporary critical and literary trends and approaches.

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4	**Term Paper**	**ENG-504**	This course will help the research scholars to prepare one Dissertation/Research Paper/Project/Assignment related to his/her area of research interest with the application of research methods they have been introduced in Research Methodology I & II.

Remarks:

- The courses bearing serial number 1 to 4 are each having 4 credits and full marks 100.
- For each Course there shall be eight (8) questions from the entire syllabus. Out of these questions, a student shall have to answer five (5) questions with each carrying twenty (20) marks.

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COURSE OUTCOMES

BLISc 1st Semester

Course Code	Course Title	Course Outcome (CO)
BLIS 101	Foundations of Library and Information Science	**CO1:** To understand the concept and difference of data, information, knowledge and wisdom, Knowledge Society and information Transfer Cycle **CO2:** To learn about different types of libraries and significance of them **CO3:** To impart the knowledge about different laws related to library and information centers **CO4:** To acquire the knowledge about various national and international library associations

Course Code	Course Title	Course Outcome (CO)
BLIS 102	Library Management	**CO1:** To understand the concept of Management, different schools, principles and functions of management **CO2:** To elucidate the acquisition and subscription process of books and periodicals **CO3:** To interpret management of financial and human resource in a library **CO4:** To gain knowledge about library committee, statistics related to a library and various other aspects.

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Course Code	Course Title	Course Outcome (CO)
BLIS 103	Knowledge Organization: Classification (Theory)	**CO1:** To know the concept of Universe of Knowledge and different classification scheme **CO2:** To get acquainted with the concept of library classification and related aspects **CO3:** To understand history and development of different classification schemes used in the field of Library and information science **CO4:** To experience current trends in library classification

Course Code	Course Title	Course Outcome (CO)
BLIS 104	Knowledge Organization: Classification (Practice)	**CO1:** To bridge the gap between theory and practical application of library classification **CO2:** To enable students to build class number for complex subject matters **CO3:** To enable students to build class number for compound subject matters **CO4:** To be able to assign book numbers using necessary tools.

Course Code	Course Title	Course Outcome (CO)
BLIS 105	Field Work and Literature Survey	**CO1:** To know the practical implications of library and information science **CO2:** To know how to review a literature **CO3:** Submitting the review in the format of

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		a project

Course Code	Course Title	Course Outcome (CO)
BLIS 106	Computer Skills	**CO1:** To be computer literate and get used to basic computer skills **CO2:** To learn essentials of Word Processing Software as well as PowerPoint Processing Software **CO3:** To learn Database making and associated activities **CO4:** To be trained in using Open Source Software

BLISc 2nd Sem

Course Code	Course Title	Course Outcome (CO)
BLIS 201	Knowledge Organisation: Cataloguing (Theory)	**CO1:** To introduce the students to library catalogue and various parts of it
		CO2: To acquaint students with catalogue codes and normative principles of cataloguing
		CO3: To make students aware of Subject Catalogue, Union Catalogue and current trends in Cataloguing

Course Code	Course Title	Course Outcome (CO)
BLIS 202	Basic of ICT (Theory)	**CO1:** To know about the fundamentals of computer and its genesis
		CO2: To know about library automation, its

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		standards and library management software
		CO3: To learn about various telecommunication technologies, computer networks as well as library networks

Course Code	Course Title	Course Outcome (CO)
BLIS 203	Information Sources, Systems and Services	**CO1:** To make the students learn about information sources, Reference Sources and Electronic information sources available
		CO2: To make them learn about Reference sources of information and information services
		CO3: To make them learn about national and international information systems and networks

Course Code	Course Title	Course Outcome (CO)
BLIS 204	Knowledge Organisation: Cataloguing (Practice)	**CO1:** To bridge the gap between theory and practical aspects of Cataloguing
		CO2: To do hands on practice of Library Cataloguing of books as well as non book materials

Course Code	Course Title	Course Outcome (CO)
BLIS 205	Basic of ICT (Practice)	**CO1:** To provide hands on training on ICT
		CO2: T get acquainted with using Library Management Software
		CO3: To know how to conduct a search in a database, or in different union catalogues

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		with search filters on.

Course Code	Course Title	Course Outcome (CO)
BLIS 206	Evaluation of Reference tools	**CO1:** To enable students to evaluate reference tools
		CO2: To make students able to decide best suited reference tools for their library later on.

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MLISc 1st Semester

Course Code	Course Title	Course Outcome (CO)
MLIS 101	Information Retrieval Systems (Theory)	**CO1:** To enable the students to understand the basic and advance level of Information Retrieval Systems. **CO2:** To familiarize students regarding the notion of indexing language and natural language. **CO3:** To provide clear concept of indexing systems and techniques. **CO4:** To understand different information retrieval models and measurement techniques

Course Code	Course Title	Course Outcome (CO)
MLIS 102	Library Automation (Theory)	**CO1:** To provide a concise picture of library automation - **CO2:** To know about steps of library automation theoretically and automatic identification methods **CO3:** To be familiar with Retrospective Conversion in libraries **CO4:** To enable students in content creation in Web and associated concepts

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Course Code	Course Title	Course Outcome (CO)
MLIS 103	Library Automation (Practice)	**CO1:** To bridge the gap between library automation theory and practice **CO2:** To be able to install and configure Library Management Software **CO3:** To be able to use Library Management Software for all day to day activities in the libraries **CO4:** To comprehend creation of library database and generating Barcode

Course Code	Course Title	Course Outcome (CO)
MLIS 104	Job Diary and Study Tour	**CO1:** To learn about all the library activities practically by working in the Central Library of Maharaja Bir Bikram University. **CO2:** To gather experience by doing hands on practice. **CO3:** To visit some selected libraries and explore state of the art facilities available there. **CO4:** To make a comparative and critical evaluation among the libraries visited.

Course Code	Course Title	Course Outcome (CO)
MLIS 105	Metrics Studies	**CO1:** To enable students to understand the concept of metrics in library science **CO2:** To acquaint students with Bibliometric, Informetric, Scientometric and Webometric **CO3:** To understand citation analysis along

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		with H–Index, G-Index and I-Index **CO4:** To make the students aware of Impact factor and measuring the same

Course Code	Course Title	Course Outcome (CO)
MLIS 106	Computer Skills	**CO1:** To enhance the IT skills of students **CO2:** To impart knowledge in Open Source Software **CO3:** To acquaint students with C++ to create program **CO4:** To design code for website and practice image editing software

MLISc 2nd Semester

Course Code	Course Title	Course Outcome (CO)
MLIS 201	Digital Library and Web Technology (Theory)	**CO1:** To enable the students understand the concept of Digitization and Digital Library **CO2:** To learn about Institutional Repository and linked concept **CO3:** To know about several Digital Library Software and their features **CO4:** To gain knowledge of digital preservation and allied ideas

Course Code	Course Title	Course Outcome (CO)
MLIS 202	Research Methodology	**CO1:** To make the students aware about Research and Research Design process

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		CO2: To know about various types of Research Methods, Techniques and Tools **CO3:** To learn about different Statistical measures related to research works **CO4:** To understand report writing process and ethical issues regarding research reports

Course Code	Course Title	Course Outcome (CO)
MLIS 203	Digital Library and Web Technology (Practical)	**CO1:** To acquire practical knowledge in digital library software **CO2:** To gain knowledge in creating digital documents with metadata **CO3:** To design website with content management software **CO4:** To bridge the gap between digital library theory and practice

Course Code	Course Title	Course Outcome (CO)
MLIS 204	Dissertation	**CO1:** To enable students to carry out research work **CO2:** To prepare students to carry out further research works such as M.Phil or Ph.D. in future

Course Code	Course Title	Course Outcome (CO)
MLIS 205 (Open Elective)	Basic of E-Resources and Open Access	**CO1:** To make the students understand about concept of E-resources and related basic things as well as searching them
		CO2: To know about various formats

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		document, image and audio files
		CO3: To understand the concept of open access

Course Code	Course Title	Course Outcome (CO)
MLIS 206	Marketing and Library Services	**CO1:** To let the students understand concept of Marketing
		CO2: To make the students know how to promote LIS products and services in digital era
		CO3: To acquire knowledge about Library consultancy services
		CO4: To enable the students to analyse the concept of marketing

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PGDLAN 1st Semester

Course Code	Course Title	Course Outcome (CO)
LAN 101	Library Automation and Networking	**CO1:** To enable the student to understand the basic and advance level of automation technique.
		CO2: To make the students able to build automated library system
		CO3: To acquire knowledge about simple and advanced search technique.
		CO4: To enable the students to create content for web environment.

Course Code	Course Title	Course Outcome (CO)
LAN 102	Library Automation: ILMS (Practical)	**CO1:** To enable the student to understand the basic and advance level of automation technique.
		CO2: To make the students able to install, configure, use various Modules of Integrated Library Management Software such as Koha and/ or SOUL.

Course Code	Course Title	Course Outcome (CO)
LAN 103	Web Technology (Practical)	**CO1:** To enable the students to design library website using Content Management System.

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PGDLAN 2ND Semester

Course Code	Course Title	Course Outcome (CO)
LAN 201	Digital Library (Theory)	**CO1:** To enable the student to understand the concept of digital library.
		CO2: To make the students aware of different digital library software.
		CO3: To acquire knowledge about Institutional Repository, Content management and Digital Preservation Copyright, Metadata Harvesting and Access

Course Code	Course Title	Course Outcome (CO)
LAN 202	Digital Library (Practical)	**CO1:** To make the students able to install, configure, develop, use various Modules of Digital Library Software DSpace.

Course Code	Course Title	Course Outcome (CO)
LAN 203	Dissertation/ Project Work	**CO1:** To enable the student to carry research work which will further help them in Ph.D. research.

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Ph.D in Library and Information Science

Ph.D Course Work			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	RESEARCH METHODOLOGY-I	LIS-501	To train the scholars in formulating a research proposal maintaining all sorts of research ethics as well as to train them regarding the basics of research design. To train them about writing the research report to help them for their research work.
2	RESEARCH METHODOLOGY-II	LIS -502	To train the scholars for reviewing the published research articles and books in a relevant field. To train them in field works and hands on knowledge on Communication Skills. To train them regarding writing of research papers/ articles.
3	KNOWLEDGE STRUCTURE AND LIS TRENDS	LIS – 503	The course is offered to the scholars as par their interest to pursue Ph.D degree. Accordingly, this course is offered to provide knowledge about Knowledge Structure of Library and Information Science. To develop their knowledge on and LIS Trends and recent research in the field.
4	ADVANCED RESEARCH IN LIS	LIS-504	The course is offered to the scholars as par their interest to pursue Ph.D degree. Accordingly, this course is offered to provide knowledge about advanced operations research such as Bibliometric Research, Digital Recourses. Also to teach them about hand on practices of data analysis software.
5	APPLICATION OF DIGITAL LIBRARY	LIS – 505	The course is offered to the scholars as par their interest to pursue Ph.D degree. Accordingly, this course is offered to provide training and knowledge on Digital Library. Also to teach them about the recent research trends in web technology.
6	DISSERTATION	LIS – 506	To provide training how to make a project proposal, is important as gives a glimpse of research work to the aspiring scholars. To develop their knowledge on writing the report and to generate interest to publish the articles.

Remarks:

- The courses bearing serial number 1, 2 and 6 are COMPULSORY COURSES each of having 4 credits and full marks 100.
- The courses bearing serial number 3, 4 and 5 are ELECTIVE COURSES each of having 4 credits and full marks 100. Each student has to opt any ONE of these ELECTIVE COURSES.

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COURSE OUTCOMES

Department of History

M.A. in History

FIRST SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	**HISTORIOGRAPHY**	HIST-101 (CC-I)	1. The students will be taught about the meaning and scope of History. 2. They will also be taught about the relationship of History with other disciplines like Archaeology, Geography, Anthropology, Linguistic, Sociology, Philosophy, Political Science and Applied Science and Literature. 3. They will learn about the traditions of Historical writing. 4. The course provides information about Indian Historical writing, Marxist, Subaltern and recent trends in Historical writing in North East India. 5. Major theories of history and techniques of Historical Research are also taught to the students.
2	**Ancient Societies**	HIST-102(CC-II):	1. The students are taught about the Human Evolution. 2. The course also discusses about the first Urbanization in Human History, about the Iron Age Civilization in India and the Aegean World and the about the decline of early Empire like the Mauryan Empire and the Imperial Rome.
3	**Feudalism**	HIST 103 (CC-III)	1. The students will learn about the transition of Societies from Ancient to Feudal Societies. 2. The course will discusses about the transition of early Medieval Indian Society 3. The concept of Feudalism in Europe, India and the North East India is clearly defined for the understanding of the students. 4. The students will also learn about the Indian Feudalism in Slavery, Urban Decay, Peasantry and about Feudal Land Tenure.
4	**Capitalism and Imperialism Course**	HIST 104 (DSE-I):	1. The course discusses about the theories and practices of Capitalism and Imperialism. 2. The Students will be taught about the Political Economy of capitalism and imperialism. 3. The course also discusses about England in transition during the 16th up to the 17th Century 4. The students are also taught about the development of Capitalism and Imperial expansion and its impact in World History
5	**Post Independent India**	HIST-105 (DSE-I)	1. The course intends to acquaint students with the contemporary history of India after independence 2. Students will get acquainted with the nation building programme

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			after Independence. 3. Students will learn about India's economic development after Independence. 4. Students will get a clear idea about independent India's foreign policy.
6	COMMUNICATION SKILLS IN ENGLISH	CSE-101	

Remarks:

In Semester I, a student shall have to study three (3) Core Courses which are compulsory and One (1) Discipline Specific Elective (DSE) out of two Electives offered by the Department. Each Course carries four (4) Credits. Students shall have to study one Compulsory Elective Course on Communication Skills in English of two (2) Credits.

- All Core Courses (CC), Discipline Specific Elective (DSE) Courses, Open Elective (OE) are divided into
- 4 Units and carry 30 Marks in Internal Assessment and 70 Marks in the End Semester Examination.
- Internal Assessment shall be conducted by the concerned Course Teacher and submit the marks to the
- Controller of Examinations. The Internal Assessment shall be in the form of Assignment/Written
- Test/Seminar etc. Semester End Examinations are conducted by the Controller of Examinations. In the
- Semester End Examination, for each Course there shall be eight (8) questions, out of which a student shall
- have to answer five (5) questions with each carrying fourteen (14) marks

SECOND SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	**Nationalism**	HIST 201 (CC-IV):	1. Be familiar with the theories of nationalism 2. Learn about the socio-economic and political aspects of European history 3. Learn about the early nationalist stirrings, the impact of the First World War, the Russian Revolution, about India and China till the 1940s and the Japanese nationalism 4. Help the students to understand the Second World war and its impact on national movements in Asia and Africa
2	**Society and Culture in Colonial India**	HIST 202 (CC-V):	1. Learn about the religious dissent and protest, caste structure, education and economy of 18the Century India. 2.Be familiar with Sanskritization, westernization, modernization, Bengal Renaissance in colonial India. 3. Be familiar with the socio - religious reform movements in India 4. Learn about the development of education and press in colonial India 5. Be familiar with the different lower caste and backward caste movements in colonial India.
3	**Economic History of Colonial India**	HIST 203(CC-VI):	1. Be familiar with the Indian economy of 18 th Century 2. Learn about the various land tenure systems and commercialization of agriculture in colonial India. 3. Learn about the famines and peasant uprisings during colonial India

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			4. Learn about the agency houses, modern banking, transport and communications, working class during colonial period
4	**M. K. Gandhi and India**	HIST-204 (OE):	1. Learn about Gandhian philosophy. 2. Learn about Gandhis's method and strategy during national movement. 3. Learn about Gandhi's relation with contemporary leaders and personalities like Rabindranath Tagore, Nehru, Ambedkar. 4. Get a detailed overview on Gandhi and his critiques. 5. Learn about the contemporary relevance and impact of Gandhi.
Remarks: In Semester II, a student shall have to study three (3) Core Courses which are compulsory and One (1) Open Elective (OE) offered by the Departments other than History or a student can opt any Course from SWAYAM of four (4) Credits of his/her choice [The list of such Courses shall be provided by the Department in the beginning of the Semester. Each Course carries four (4) Credits.]			

THIRD SEMESTER			
Sl. No.	**Course Title**	Course Code	Course Outcome (CO)
1	**Socio- Political History of Europe (1870 -1945)**	HIST 301(CC-VII):	1. Students will learn about Political development in Germany (1871- 1914). 2. Students will learn about the r ise in population, emigration, social structure of working c lass, middle class, aristocracy, social upheavals in Europe. 3. Students will have detailed knowledge about the Balkans and Russia (1870 -1914). 4. Students will also learn about the state and social welfare, education, position of women, factory reforms, health care, and Social conditions in Europe. 5. Students will also learn about the two World Wars and its assessments.
2	**'ontemporary World (1945 -1991)**	HIST 302(CC-VIII):	After studying this course, students will: 1. Be familiar with the Post Second World War Reconstruction. 2. Learn about the Decolonization in Asia and Africa. 3. Learn about the Social Movements. 4. Help the student's to understand the major areas of tension. 5. Will also learn about the Global associations and their functioning.

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3	**Socio -Economic History of North East India**	HIST 303(CC-IX):	1. Students will learn about the Pre- colonial societies in North East India. 2. Students will learn about Aristocracy and tribal chieftain. 3. Students will have detailed knowledge about the Pre-Colonial Economy. 4. Students will also learn about the Literary and cultural development in North- East India. 5. Students will also learn about the Growth of Industry like tea, coal, oil, handloom and handicrafts, etc.
4	**PS-304 (CE)**	Basic Computer Skills	
Remarks: In Semester III, a student shall have to study three (3) Core Courses which are compulsory and One (1) Compulsory Elective (CE) in Basic Computer Skills. Each Course carries four (4) Credits			

FOURTH SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	**Indian Nationalism**	HIST 401(CC-X):	1. Be familiar with the historiography of the national movement. 2. Learn about the origin of Indian Nationalism 3. Be familiar with the idea of Swadeshi and anti- partition movement 4. Be familiar with the various aspects of the national movement of the Gandhian phase. 5. Will learn about rise and growth of communalism in colonial India
2	**BRITISH COLONIAL POLICY AND EXPANSION IN COLONIAL INDIA**	HIST 402(CC-XI):	1. Learn about the decay and decline of Mughal rule in India and how European settlements were established. 2. Learn about the British policy and strategy of expansion from Clive to Dalhousie. 3. Impart a detailed knowledge on the various aspects of the Revolt of 1857. 4. Learn about British expansion in North east India. 5. Give student an idea about the political and economic aspects of decolonization.
3	**INDIAN KNOWLEDG E SYSTEM**	HIST 403(CC-XII):	1. Learn about the nature, object, components and structure of Indian Knowledge System with reference to knowledge system of Vedas, Upanishads, Bhagavadgītā, Buddhism and Jainism.

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			2. Learn about knowledge system of Bhakti Movement, Brahma-Samaja, Rāmānuja, Chaitanya, Sankar Deva , Nanak and Kabir 3. Give student an idea about Swami Vivekananda, Sri Aurobindo, Tagore and Gandhi and their contributions in the Indian Knowledge System.
4	**HISTORY OF TRIPURA**	HIST-404 (DSE-II):	1. Students will learn about Sources of the history of Tripura. 2. Students will learn about Tripura's land, people, settlement, etc. 3. Students will have detailed knowledge about British relations with Tripura. 4. Students will also learn about growth of political developments in Tripura during 1947 - 1958. 5. Students will also learn about the Socio- Economic condition in Tripura 19th - 20th Century.
5	**ECOLOGY AND ENVIRONMENT IN HISTORY**	HIST-405 (DSE-II):	1. the course makes an attempt to apprise the students of History with a crucial issue of ecology and environment 2. Students will get an in- depth idea about the nature of Human- Nature interaction ancient India. 3. Students will get an in- depth idea about the nature of Human- Nature interaction in medieval India. 4. The course intends to apprise the students about the impact of colonial rule on India' s environment 5. Students will also learn about environmental issues i n post- independence India.

Remarks:

- In Semester IV, a student shall have to study three (3) Core Courses which are compulsory and One (1)
- Discipline Specific Elective (DSE) out of two Electives offered by the Department. Each Course carries
- four (4) Credits.

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COURSE OUTCOMES

Department of Chemistry

IMD Chemistry (UG)

FIRST SEMESTER			
SL. No.	Course Title	Course Code	Course Outcomes (CO)
1	Inorganic Chemistry-I	CC-I	• This course demonstrates Bohr's theory, its limitations, hydrogen spectra, de Broglie equation, Heisenberg's Uncertainty Principle and its significance. • Modern periodic table, classification of elements on the basis of electronic configuration. • To learn General characteristics, types of bonds, radius ratio, packing fractions, Born-Landé equation with derivation and importance of Kapustinskii expression for lattice energy. • To understand calculation of equivalent Weights of oxidants and reductants, standard electrode potential, formal potential
2	Physical Chemistry- I	CC-II	• This course aimed to impart to the student, knowledge of Postulates and derivation of the kinetic gas equation; collision frequency; collision diameter. • To learn Behaviour of real gases and causes of deviation from ideal behaviour, van der Waals equation of state, its derivation and application in explaining real gas behaviour. • To understand Qualitative treatment of the structure of the liquid state; physical properties of liquids; Liquid- Vapour equilibrium, vapour pressure, surface tension, Surface energy and Contact angle. • Idea about Nature of the solid state, law of constancy of interfacial angles, law of rational indices and Miller indices.
3	Environmental Studies	AECC – I	• This course aims to impart to the student, knowledge of Ecosystems and Biodiversity and Conservation. • To understand Multidisciplinary nature of environmental studies. • Know about Environmental Pollution and Environmental Policies & Practices. • To understand Human Communities and the Environment.
4	DSC/GE (Phy)	GE1	• This course helps the students, to understand Vectors. Vector algebra. Scalar and vector products. Derivatives of a vector with respect to a parameter. • Idea about Laws of Motion, Rotational Motion and Momentum and Energy. • Know the Newton's Law of Gravitation, motion of a particle in a central force field. • To understand Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy

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5	DSC/GE (Math)	GE1	• This course aimed to demonstrate ε-δ definitions of limit and continuity and Differentiability of functions. Successive differentiation, Leibnitz's theorem. • To understand Mean Value theorems of Lagrange and Cauchy. • Idea about Partial derivatives, chain rule in partial derivatives and Homogeneous functions. • To understand Tangent, subtangent, normal, subnormal, curvature, radius of curvature.

Remarks:

- The courses bearing serial number 1 & 2 are CORE COMPULSORY COURSES each of having 6 credit and full marks 100 (Internal: 30 + End Term: 70).
- The course mentioned at serial number 3 are Ability Enhancement Compulsory Course each of having 2 credit and full marks 100 (Internal: 20 + End Term: 80).
- The courses mentioned at serial number 4 & 5 are Generic Elective (GE) each of having 6 credit and full marks 100 (Internal: 20 + End Term: 80).

IMD Chemistry (UG)

SECOND SEMESTER

SL. No.	Course Title	Course Code	Course Outcomes (CO)
1	Organic Chemistry I	CC-III	• This course demonstrated, Hybridization and its applications, orbital pictures of bonding. • To understand Types of Stereoisomerism, conformation and configuration; Fischer, Newmann, Sawhorse and flying-wedge projection formulae. • To learn Formation of alkenes and alkynes by elimination reactions, E1, E2, E1cb mechanisms. • Idea about Aromaticity: Hückel's rule of aromaticity, antiaromatic, nonaromatic and homoaromatic compounds.
2	Physical Chemistry II	CC-IV	• This course aimed to Utility of Thermodynamics study, System and Surrounding, isolated, closed and open systems. • To understand second Law of Thermodynamics, Second Law, Carnot Theorem, Application of Carnot cycle. • To understand Buffer solutions; derivation of Henderson equation and its applications; buffer capacity. • Idea about Henrys Law, Cause of positive and negative deviations, lowering of vapour pressure, Raoult's and their applications.
3	English Communication	AECC – II	• This course helps the students for Verbal and non-verbal communication; personal, social and business communication. • Learn Speaking Skills – Monologue and Situational Dialogue; Group Discussion. • Improve Writing Skills – Basic tools for writing skill: Vocabulary, use of determiners and prepositions.
4	DSC/GE (Phy)	GE2	• To understand Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss theorem. • To learn Biot-Savart's law & its applications- straight conductor, circular coil, solenoid carrying current. • To understand Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, Self-inductance of a single coil and a solenoid.
5	DSC/GE (Math)	GE2	• To learn Significance of ordinary differential equation and formation of a differential equation.

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			• To understand Linear differential equations of second order with constant and variable coefficients. • Idea about Wronskian and its properties.

Remarks:

- The courses bearing serial number 1 & 2 are CORE COMPULSORY COURSES each of having 6 credit and full marks 100 (Internal: 30 + End Term: 70).
- The course mentioned at serial number 3 are Ability Enhancement Compulsory Course each of having 2 credit and full marks 100 (Internal: 20 + End Term: 80).
- The courses mentioned at serial number 4 & 5 are Generic Elective (GE) each of having 6 credit and full marks 100 (Internal: 20 + End Term: 80).

IMD Chemistry (UG)

THIRD SEMESTER

Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Inorganic Chemistry-II	CC-V	• This course aims to impart to the student, knowledge of: Fundamental aspects of Metallurgy and Acids & Bases, including chief modes of occurrence of metals and acid-base theories. • Understanding of s and p block elements, their reactions, properties, and diagonal relationships. Preparation, Properties, Structure & Uses of some Compounds of p-Block Elements. • Noble Gases and Inorganic Polymers, including their occurrence, nature bonding in noble gas compounds etc. Iodo / Iodimetric Titrations, including the estimation of Cu(II) using sodium thiosulphate solution. • Understanding of Inorganic preparations, including the preparation of Cuprous Chloride, Cu_2Cl_2, Manganese(III) phosphate, $MnPO_4.H_2O$, Aluminium potassium sulphate $KAl(SO_4).12H_2O$(Potash alum or Chrome alum), and Borax/Boric acid.
2	Organic Chemistry-II	CC-VI	• This course aims to impart to the student, knowledge of: Fundamental aspects of Chemistry of Halogenated Hydrocarbons and Organometallic compounds, including the preparation and reactions of Alkyl halides, Aryl halides, and Organometallic compounds. • Understanding of Alcohols, Phenols, Ethers and Epoxides, including their methods of preparation, properties, and specific named reactions. • Preparation and reactions of Carbonyl Compounds. Active methylene compounds and Carboxylic Acids and their Derivatives, including the preparation, properties, and synthetic applications of Ethyl acetoacetate and Diethyl malonate. • Understanding of Carboxylic Acids and their derivatives, including methods of preparation, physical properties, and reactions of monocarboxylic acid.
3	(Skill Enhancement Course) SEC – I	SEC – IA	• This course aims to impart to the student, knowledge of: Computer Fundamentals: Introduction to computers, hardware, memory, I/O devices, user-computer interaction, free and open-source software, operating systems, viruses, and antivirus software. • Operating System Basics: Definition, objectives, types, functions of operating systems, and working with Windows.

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			• Business Communication Tools: Use of Windows applications like Paint, Notepad, WordPad, Calculator. • HTML Introduction: Basics of HTML, including tags and attributes.
4		SEC – IB	• This course aims to impart to the student, knowledge of: Fundamental aspects of Pesticide Chemistry, including a general introduction to pesticides (natural and synthetic), benefits and adverse effects, changing concepts of pesticides, structure activity relationship, synthesis and technical manufacture and uses of representative pesticides in various classes.
5		SEC – IC	• This course aims to impart to the student, knowledge of: Fuel Chemistry: Energy sources, fuel classification, and calorific value. • Coal: Its uses, composition, carbonization, gasification, and refining. • Petroleum and Petrochemical Industry: Composition and refining of crude petroleum, petroleum products, petrochemicals, and synthetic fuels.
6	THERMAL PHYSICS AND STATISTICAL MECHANICS	GE3 (Phy)	• This course aims to impart to the student, knowledge of: Fundamental aspects of thermodynamics, including Zeroth Law, First Law, and Second Law. • Thermodynamical Processes and Applications of First Law. • Isothermal and Adiabatic Processes, Compressibility & Expansion Coefficient, Reversible & irreversible processes. • Entropy computations & diagrams, Temperature cycles, Third law of thermodynamics, Unattainability of absolute zero.
7	REAL ANALYSIS	GE3 (Math)	• This course aims to impart to the student, knowledge of: Algebraic and Order Properties of R, including bounded sets, uncountable sets, supremum and infimum of R. • Intervals and neighborhoods of a point in R, interior points, open set and its properties, limit point and isolated point of a set. • Sequences, including bounded sequence, convergent sequence, limit theorems, monotone sequences, monotone convergence theorem.

Remarks:

- The courses bearing serial number 1 & 2 are CORE COMPULSORY COURSES each of having 6 credit and full marks 100 (Internal: 30 + End Term: 70).
- The course mentioned at serial number 3-5 are Skill Enhancement Course (SEC) each of having 2 credit and full marks 100 (Internal: 20 + End Term: 80).
- The courses mentioned at serial number 6 & 7 are Generic Elective (GE) each of having 6 credit and full marks 100 (Internal: 20 + End Term: 80).

IMD Chemistry (UG)

FOURTH SEMESTER

Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Organic Chemistry III	CC-VII	• This course aims to impart to the student, knowledge of: Methods of preparation and chemical reactions of nitro-, nitriles, isonitriles and amines; amides, animes with R[illegible] reaction carbanylamine reaction.

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			• Phenanthrene structures, synthesis including coal tar methods Friedel Craft catalysis Eliot Bacon baron-Sundberg synthesis Bogert-Cook synthesis Diels Alder reaction. • Alkaloids, terpenoids, and dyes – Classification, importance, synthesis, structure elucidation. Determining the melting point of the given compound. Performing a solubility test. • Detecting special elements (nitrogen, sulphur and halogens). Detecting functional groups (—COOH, phenolic –OH, —CHO, —C=O, —NH_2, —NO_2, —$CONH_2$, —C=C, anilide).
2	Physical Chemistry III	CC-VIII	• This course aims to impart to the student, knowledge of: Electrochemistry – I: Applications of conductance measurement, degree of dissociation of weak electrolytes. • Electrochemistry – II: Electrochemical and electrolytic cells, Electromotive force, Cell thermodynamics. • Electrodes, Concept and types of Concentration cells. Systems of Variable Composition & Chemical Equilibrium: Partial molar quantities, Gibbs Duhem equation, Chemical potential for real gases and Fugacity. • Chemical Equilibrium: Law of mass action, Criteria of Chemical equilibrium, Thermodynamic derivations of Equilibrium expressions. Le Chatelier principle.
3	(Skill Enhancement Course) SEC – II	(SEC-2A) Analytical Chemistry	• This course aims to impart to the student, knowledge of: Introduction to Analytical Chemistry and its interdisciplinary nature. • Analysis of soil: Composition of soil, Concept of pH and pH measurement, Complexometric titrations, Chelation, Chelating agents, use of indicators. • Analysis of water: Definition of pure water, sources responsible for contaminating water. Water sampling methods, water purification methods. • Analysis of food products: Nutritional value of foods idea about food processing and food preservatives and adulterants.
4		(SEC-2B) Clinical Biochemistry	• This course aims to impart to the student, knowledge of:Carbohydrates: Biological importance of carbohydrates and metabolism. • Proteins: Biological importance of proteins classification of proteins primary secondary tertiary structures α-helix β-plated sheets isolation characterization denaturation. • Enzymes: Nomenclature classification characteristics active site mechanism enzyme action factors affecting enzyme action stereospecificity enzyme action.
5		(SEC- 2C) Pharmaceutical Chemistry	• This course aims to impart to the student, knowledge of: Drugs & Pharmaceuticals: Drug discovery, design and development; basic retrosynthetic approach. • Fermentation: Aerobic and anaerobic fermentation, production of ethyl alcohol and citric acid; Antibiotics.
6	Waves, Fluids, Sound And Optics	GE4 (Phy)	• This course aims to impart to the student, knowledge of: Superposition of Two Collinear Harmonic Oscillations: Linearity and Superposition Principle. • Waves Motion-General: Transverse waves on a string. Travelling and standing waves on a string. Normal Modes of a string.

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			• Wave Optics: Electromagnetic nature of light. Diffraction and polarization. • Practical – Coupled oscillators, tuning fork, refractive index, resolving power of prism, Cauchy constants, wavelength of laser light.
7	Algebra	GE4 (Math)	• This course aims to impart to the student, knowledge of: Complex numbers: Polar representation of complex numbers, nth roots of unity, De Moivre's theorem. • Theory of Equations: Polynomials in one variable and the division algorithm. Relations between the roots and coefficients. Transformation equations Descartes rule signs Solution cubic biquadratic (quadratic) equations. • Group Theory: Group semi group quasi group properties examples groups Subgroup properties examples subgroups Cyclic group property. • Ring Field Theory: Rings Properties Examples Rings Integral Domain Properties Field Properties Examples Fields Sub-Ring Properties Examples Sub-Ring Sub-Field Properties Examples Sub-Field.

Remarks:

- The courses bearing serial number 1 & 2 are CORE COMPULSORY COURSES each of having 6 credit and full marks 100 (Internal: 30 + End Term: 70).
- The course mentioned at serial number 3-5 are Skill Enhancement Course (SEC) each of having 2 credit and full marks 100 (Internal: 20 + End Term: 80).
- The courses mentioned at serial number 6 & 7 are Generic Elective (GE) each of having 6 credit and full marks 100 (Internal: 20 + End Term: 80).

IMD Chemistry (UG)

FIFTH SEMESTER

Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Inorganic Chemistry-III	CC-IX	This course aims to impart to the student, knowledge of: • Fundamental aspects of IUPAC nomenclature, ligands, isomerism, Werner's theory, stereochemistry, and magnetic properties in coordination compounds. • Understand crystal field theory, energy splitting, John-Teller theorem, molecular orbital theory, and properties of labile and inert complexes. • Learn about electronic configuration, properties of d & f block elements, and their stability. • Understand the role of metal ions in biological systems, metallo-enzymes, and anemias related to metal deficiency. • Acquire practical skills on gravimetric analysis, inorganic preparations, and chromatography of metal ions.
2	Organic Chemistry-IV	CC-X	This course aims to impart to the student, knowledge of: • Synthesis, properties of α-Amino acids. • Peptide synthesis, Protein structure, Amino acid reactions. • Determination of amino acid residues. • Structure of nucleic acids, DNA. • Enzyme classification, Enzyme action mechanism. • Role of coenzymes, cofactors, Enzyme action specificity. • Lipid classification, Analysis of fats, oils. • Energy in biosystems, Electron transfer agents. • Drug, pesticide classification. • Drug synthesis, uses, Medicinal values of compounds. • Pesticide preparation, uses, Plant insecticides.

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			• Pesticide effects, Glycine estimation. • Acquire practical skills on glycine titration curve, Protein estimation, Aniline estimation, Saponification, Iodine number.
3	Physical Chemistry-IV	CC-XI	This course aims to impart to the student, knowledge of: • Fundamental aspects of Clausius-Clapeyron equation and Distribution Law. • Phase diagrams for one-component systems. • Salt solution and Cryohydric point. • Reaction order, rate laws, and kinetics. • Additive and constitutive properties of molecules. • Definition, types, properties, and uses of macromolecules. • Degree of polymerization and molar mass distribution. • Polymerization reaction types, mechanism, and kinetics. • Stereochemistry and crystallinity of macromolecules. • Determination of critical solution temperature. • Partition coefficient determination. • Rate constant determination and hydrolysis study. • Kinetics of saponification and iodide-persulphate reaction. • Determination of Equilibrium Constant KI + I2 = KI3.
4	Analytical Methods	DSE1	This course aims to impart to the student, knowledge of: • Fundamental aspects of qualitative and quantitative analysis. • Sampling and evaluation of analytical data. • Understanding of spectroscopy laws. • Principles of instrumentation choice. • Determination of metal ions in solution. • Principles of infrared spectrometry. • Theory of thermogravimetry. • Principles of pH metric, potentiometric, conductometric titrations. • Techniques for determining equivalence points and pKa values. • Classification of chromatography. • Mechanism of separation adsorption partition ion exchange. • Development of chromatograms. • Acquire practical skills on Chromatography, solvent extraction, determination of pH, and Na, Ca, Li in aerated drinks fruit juices, shampoos and soaps, analysis of soil, and ion exchange chromatography.
5	PROJECT WORK – 01 [Introductory Research Methodology/ Industrial gases & Inorganic Chemicals/ Energy / Spectroscopic methods (IR,NMR & UV-Vis)]	DSE2	This course aims to impart to the student, knowledge of: • Fundamental aspects of literature survey and digital resources. • Methods of scientific research writing. • Production and hazards of industrial gases. • Manufacture and hazards of inorganic chemicals. • Energy sources and nuclear waste disposal. • Theory of UV-visible and Infrared Spectroscopy. • Proton NMR spectroscopy and chemical shift. • Spin-spin coupling and characteristic chemical values. • Application of UV, IR, and NMR in structure elucidation. • Preparation of borax/boric acid, Potash alum, and Chrome alum.

Remarks:

- The courses bearing serial number 1-3 are CORE COMPULSORY COURSES each of having 6 credit and full marks 100 (Internal: 30 + End Term: 70).

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- The course mentioned at serial number 4 & 5 are DSE each of having 6 credit and full marks 100 (Internal: 20 + End Term: 80).

IMD Chemistry (UG) SIXTH SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Inorganic Chemistry-IV	CC-XII	This course aims to impart to the student, knowledge of: • Fundamental aspects of cation/anion analysis and solubility products. • Organometallic compounds and the 18 electron rule. • Structures of carbonyls and preparation of Zeise's salts and Ferrocene. • Metal alkyls and industrial processes like Alkene hydrogenation. • Inorganic reaction mechanisms and ligand field effects. • Qualitative semimicro analysis of mixtures. • Chemistry of different reactions. • Principles of group separation and removal of interfering anions. • Preparation of acetylacetonato complexes of Cu"Fe. • Synthesis of ammine complexes of Ni (with acac, glycine, DMG)
2	Organic Chemistry-V	CC-XIII	This course aims to impart to the student, knowledge of: • Fundamental aspects of UV, IR, and NMR Spectroscopy. • Understanding of electronic transitions and molecular vibrations. • Application of spectroscopy in identifying organic molecules. • Electro cyclic reactions and the FMO approach. • Thermal and photochemical reactions including cycloaddition. • Understanding of monosaccharides and their classification. • Introduction and classification of polymers. • Various types of polymerization processes and their applications. • Preparation and applications of thermosetting and thermosoftening polymers. • Understanding of natural and synthetic rubbers.
3	Physical Chemistry V	CC-XIV	This course aims to impart to the student, knowledge of: • Fundamental aspects of binary alloy, solid solutions, and Gibbs-Duhem-Margules equation. • Understanding of Black Body radiation, Photo-electric effect, and quantum mechanics. • Limitations of classical thermodynamics and concept of energy distribution. • Maxwell-Boltzman statistics, Bose-Einstein statistics, and Fary-Dirac statistics. • Partition function and its significance in thermodynamics. • Characteristics of electromagnetic radiation and Lambert-Beer's law.

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			• Laws of photochemistry and quantum yield actinometry. • Interaction of electromagnetic radiation with matter. • Rotation spectroscopy and vibrational spectroscopy.
4	Industrial Chemistry	DSE3	This course aims to impart to the student, knowledge of: • Fundamental aspects of glass properties, ceramics, and cement manufacture. • Understanding of different types of fertilizers and their manufacture. • Preliminary treatment of surface coatings and battery components. • Classification of alloys based on ferrous and non-ferrous alloys. • General principles and properties of catalysts and phase transfer catalysis. • Understanding of chemical explosives and rocket propellants. • Determination of free acidity in ammonium sulphate fertilizer. • Estimation of Calcium in Calcium ammonium nitrate fertilizer. • Estimation of phosphoric acid in superphosphate fertilizer. • Understanding of electroless metallic coatings on ceramic and plastic material.
5	PROJECT WORK – 02 (Environmental Chemistry I & II/ Introductory Nano Chemistry / Green Chemistry)	DSE4	This course aims to impart to the student, knowledge of: • Fundamental aspects of atmospheric regions and reactions. • Air pollutants' types, sources, and nature. • Techniques for estimating CO, NOx, SOx. • Impact of air pollution on life and vegetation. • Concepts of greenhouse effect, global warming, ozone depletion. • Understanding of hydrological cycle, water resources, aquatic ecosystems. • Water pollutants' sources and effluent impact measurement techniques. • Knowledge of treatments for water pollution. • Waste management techniques. • Parameters for assessing water quality. • Development and classification of nanoscale science. • Characterization methods for quantum dots. • Potential medicinal applications of nanotechnology. • Definition and principles of Green Chemistry. • Need for and goals of Green Chemistry. • Understanding of atom economy and environmental factor.

Remarks:

- The courses bearing serial number 1-3 are CORE COMPULSORY COURSES each of having 6 credit and full marks 100 (Internal: 30 + End Term: 70).
- The course mentioned at serial number 4 & 5 are DSE each of having 6 credit and full marks 100 (Internal: 20 + End Term: 80).

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COURSE OUTCOMES

Department of Chemistry

IMD Chemistry (PG)

SEMESTER- VII			
SL. No.	Course Title	Course Code	Course Outcomes (CO)
1	Inorganic Chemistry-VI	ICH 701C	This course aims to impart to the student, knowledge of: • Fundamental aspects of classifying molecules based on various symmetry elements, point groups and constructing character table. • Understand symmetry, group theory, and Stereochemistry • Understand Metal-Ligand bonding involved in Coordination compounds • Utilize this knowledge for complex formation in research interest. • Magnetic and Phtochemical behavior of metal complexes, metal carbonyls and photo induced chemical reactions.
2	Physical Chemistry-VI	ICH 702C	The aim is to motivate and enable a comprehensive knowledge to the students on principles of molecular spectroscopy. By introducing this course student will be able to understand about the – • Molecular spectroscopy in advanced level • The rotational and vibration spectroscopy. • Calculation of bond length and bond energies • About the Raman Effect and rotational vibrational Raman spectra etc. • Student will learn about the polymer chemistry and about the different polymerization techniques
3	Organic Chemistry-VI	ICH 703C	The course helps the students • To understand the concept of chirality in acyclic and cyclic compounds • To know how to do conformational analysis in both cyclic and acyclic systems • To understand the art of inducing asymmetric synthesis • To familiar with advanced organic reaction mechanism • To know the different aspects of pericyclic and photochemical reactions with special reference to orbital symmetry • To know the nature, generation and reactivity of reactive intermediates
4	Inorganic chemistry Lab	ICH 704C	After completion of the course, a student will be • Skilled for Systematic qualitative analysis of mixtures containing 06 (six) radicals with an interfering radical.

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			• Able to gain knowledge about safety and handling of laboratory glassware, equipments, and chemical reagents. • Prepare Inorganic Complexes with various organic ligands. • Able to quantify the presence of metal ions in a sample and estimation hardness of water.
5	Basic Statistics	ICH 705E (DSE 05)	On completion of this course the students will be able to understand: • Importance statistics and statistical data • Statistical Data Analysis, • Computer Programming Basics (FORTRAN) • Python modules, Python Library and Multi-Threading in Pytho.

Remarks:

- The courses bearing serial number 1-4 are CORE COMPULSORY COURSES each of having 4 credit and full marks 100 (Internal: 30 + End Term: 70).
- The course mentioned at serial number 5 are DSE each of having 4 credit and full marks 100 (Internal: 20 + End Term: 80).

IMD Chemistry (PG)

SEMESTER- VIII

SL. No.	Course Title	Course Code	Course Outcomes (CO)
1	Inorganic Chemistry-VII	ICH 801C	The course is aimed to demonstrate • X-ray crystallographic data analysis and solid state chemistry • The chemistry of inorganic polymers • The understanding of the basic principle of all kinds of spectroscopic techniques used in organic chemistry for structural elucidation of inorganic compounds. • To explain the basic concept behind NMR spectroscopy and its application for the structure elucidation. • To understand the chemical shift and coupling constant in relation to stereo-chemical structure of the inorganic compound. • To know the basic concept of Ultraviolet and Visible Spectroscopy, C13-NMR spectroscopic techniques and IR spectroscopy. • To apply various spectroscopic techniques discussed above for solving/determining the structure of compounds
2	Physical Chemistry-VII	ICH 802C	• To introduce the advanced quantum chemistry • Provide knowledge on the Kinetic theory of gases • Discussion on solid state chemistry. • To interrelate the chemical structure and the properties in the design of advanced materials. • To identify the specific synthetic methodologies of materials of interest.
3	Organic Chemistry-VII	ICH 803C	The course helps the students • To know the retrosynthetic analysis and disconnection approach and its application in organic synthesis. • To understand how to design reactions to achieve target molecules.

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			• To familiarize with modern reagents and their applications in organic reactions. • To know the important name reactions that are frequently used in organic synthesis with special reference to their applications in different reaction conditions.
4	Physical Chemistry Lab	ICH 804C	On completion of course, the students will be able to: • Develop their skills for qualitative and quantitative estimation samples • Estimate the order of chemical reactions and solubility product • Demonstrate conduct metric and potentiometric titrations • Find out specific rotation of cane sugars and verification of Beer's law • Estimate CMC of surfactants
5	Biomolecular Chemistry	ICH 805E (DSE 06)	The course will help the students • To provide concept about the trace and essential metals in biological systems and their importance. • To know the different types of chelation therapy in metal ion detoxification and role of metals in biological systems • To know the properties and synthesis of amino acids and peptides • To understand the structures of proteins, properties of enzymes and their mode of action. • To familiarize with the process of enzyme catalyzed reactions. • To understand the importance of essential fatty acid and their biological as well biological importance of prostaglandins
6	Chemistry of Surface	ICH 806E (DSE 07)	The course will motivate and encouraged the students in the following directions- • Isotherms, LB film, membrane equilibrium and micellisation. • In designing a process to removal of toxic compounds from industrial wastewater. • Learn and understand adsorption process and its mechanisms on the surfaces. • Able to analyze understanding the types of adsorption isotherms and its applications in real fields • Equipped to work in the field of Surface science. • Acquire the detailed information about the paints and paint technology, pigments dyes and extenders, • Gathered knowledge about paint formulation, manufacture and application techniques, colour technology, paint properties. • Able to analyze about quality control in paint Industries. • Equipped students to proceed with the advanced studies related paint industry or seek a job in the related fields.

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Remarks:

- The courses bearing serial number 1-4 are CORE COMPULSORY COURSES each of having 4 credit and full marks 100 (Internal: 30 + End Term: 70).
- The course mentioned at serial number 5 & 6 are DSE each of having 4 credit and full marks 100 (Internal: 20 + End Term: 80).

IMD Chemistry (PG)

SEMESTER- IX

Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Inorganic Chemistry-VIII	ICH 901C	On completion of this course the students will be able to understand: • Crystal Field and Ligand Field theory of transition metal complexes. Magnetic, Optical and kinetic properties of metal complexes. Stability of metal complexes. • Metal cluster compounds as well as Metal π-complexes with respect to their classification, synthesis, structure, bonding, properties, and reactions. • Chemistry of rare earth elements and six platinum group metals. • Focuses on recent promising research and novel trends in the field of cross-coupling reactions.
2	Physical Chemistry-VIII	ICH 902C	• The objectives of the Chemical Kinetics course are to acquire and consolidate the fundamental concepts of kinetic, stoichiometry and reaction mechanisms as well as homogenous kinetics and heterogeneous catalytic kinetic. • Developing of general understanding how physical laws govern biological processes. • Acquire basic knowledge about how physical methods can be applied to understand biological processes. • Introduces the concept of entropy production - where it comes from and how it can be use • Introduction of application of group theory in advanced area.
3	Organic Chemistry-VIII	ICH 903C	The course helps the students • To learn the advanced method of analytical techniques for separation and purification of organic compounds with special emphasis on instrumentation of modern analytical equipments. • To understand the method of optical microscopy such as optical rotatory dispersion and circular dichroism. • To know about hetereocycles and heterocyclic compounds of special interests. • To know the important medicinal use of these heterocycles. • Steroids and steroidal hormones with representative examples, transformations in steroids and hormones. • To know about steroidal oral contraceptives. • To learn about macrocylic compounds
4	Organic Chemistry Lab	ICH 904C	The course enables the students • To know the separation, purification and identification techniques of the compounds of binary solid mixture.

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			• To identify organic liquid compounds by distillation followed by systematic qualitative analysis. • To learn how to accomplish more than one step synthesis or multicomponent reactions by hands on experiment. • To estimate various organic compounds in solution.
5	Chemistry Project - 3	ICH 905C	A Project must consist of the following 8 components: 1. Title of the project 2. Abstract 3. Key-words 4. Introduction 5. Methodology 6. Results and Discussion 7. Conclusion 8. References

Remarks:

- The courses bearing all serial number 1-5 are CORE COMPULSORY COURSES each of having 4 credit and full marks 100 (Internal: 30 + End Term: 70).

IMD Chemistry (PG) SEMESTER- X			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Chemistry Project - 4	ICH 1001C	This course enables the students • To know about the chemical research, • To learns about different techniques like monitoring reaction condition, purification and drying of solvents. • Spectral interpretation and identification of compounds. • How to handling of sophisticated instruments like IR, TGA, UV. • An ability to write project report and can present it.
2	Supramolecular and Nano chemistry	ICH 1002E (DSE 08)	The course enables the students • To understand the basic concepts of molecular and supramolecular chemistry. • To understand the underlying principles of molecular recognition of various receptors like crown ethers, cyclophanes, cyclodextrins etc. • To familiarize with self-assembly techniques • To familiarize with molecular scale mechanical devices etc. • To learn about nano-particles, nano-materials, nano-devices etc. • Students can get motivation to go for the advanced courses or career related to nanotechnology and nanomedicine.
3	Medicinal chemistry and Forensic science	ICH 1003E (DSE 09)	The course will help the students • To understand the physicochemical properties of drug and its metabolic pathways, adverse effect and therapeutic value of drugs. • To know the role of enzymes and vitamins in biological action. • To understand the chemistry of various drugs with respect to their pharmacological activity

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			• To know about different National and International Investigative Agencies and their working mechanism. • To know the difference between IPC and CRPC. • To know about different branches of Forensic and allied Sciences. • To know about Advanced Forensic Chemistry, Toxicology and its related branches.
4	Advanced Organic Chemistry	ICH 1004E (DSE 10)	• This course aimed to provide knowledge to the learner to • Understand the advanced organic synthesis using special reagents involving silicon, phosphorous, boron and their applications in organic synthesis. The course also aimed to focus to establish the structure of structure of organic compounds based on their spectral data.
5	Advanced and Industrial Materials	ICH 1005E (DSE 11)	This course focuses on the fundamental aspects of materials science • The course discusses the basic structure of solids, classification of materials based on the structure and properties. • This course introduces students to energy storage systems and provides a broad understanding of such systems. • Units III and IV imparts basic knowledge of chemistry of inorganic and organic materials such as silicates, non-silicates, ceramics, soap, detergents, perfumes and many other industrially important chemicals.
6	Chemistry and Society	ICH 1006E (DSE 12)	On completion of this course, the students will be able to learn: • Develop understanding of various branches of science during different eras in different parts of the world • Analyze the role played by the science in different eras in the evolution of modern day science • Ethics in science outcomes • About history and evolution of the major disciplines of science. • About history of ancient Indian mathematics. • Comprehend about legacy of ancient Indian scientific discoveries. • About green chemistry and sustainability, sustainable chemistry technologies and alternate energy sources. Learning Outcome

Remarks:

- The courses bearing serial number 1 is CORE COMPULSORY COURSES each of having 8 credit and full marks 100 (Internal: 30 + End Term: 70).
- The course mentioned at serial number 2-6 are DSE each of having 4 credit and full marks 100 (Internal: 20 + End Term: 80).

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COURSE OUTCOMES

Department of Integrated Master Degree in Commerce

M.Com in Commerce

FIRST SEMESTER			
Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Financial Accounting	101C	This course aims to provide a first approach to the subject of accounting, its basic concept, and applications in different business like sole proprietorship, partnership, partnership, consignment and joint venture etc.
2	Principles of management	102C	Managing man is the basic concept of management; this subject is dealing with different principles and functions of management in different business as well as non business organizations.
3	Business Regulatory Framework	103C:	A strong knowledge of the legal requirements is the most important requirements for the modern business houses. This subject is covering different business related laws like sale of goods act, contract act etc. Basic legal knowledge is very much pertinent for the students.
4	Micro Economics	104C:	Basic knowledge of the subject economics with its micro perspective covered in this syllabus. Different concept like demand, market, supply, consumer behavior and other basic micro issues are giving a strong basic knowledge to the commerce students.
5	Environmental Studies	105FC: Foundation Course 1	Environment is the most important concern of the business in modern days. To keep the knowledge of environment during business practices is one of the modern thrust of this subject.

Remarks:

- The courses bearing serial number 1 to 4 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- The courses mentioned in Serial No: 5 and 6 are COMPULSORY COURSES that every student has to take in FIRST semester.
- The course as mentioned at serial number 5 would be taken by the FIRST Semester students of the Department of Mathematics as a Compulsory Course. This course has 4 credits and full marks 100 (Internal: 30 + End Term: 70 (Theory: 50, Practical: 20)).
- The course as mentioned at serial number 6 would be taken by the FIRST Semester students of the Department of Mathematics as a Compulsory Course from the Department of English. This course has 2 credits and full marks 100 (Internal: 50 + End Term: 50).

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SECOND SEMESTER			
Sl. No.	*Course Title	Course Code	Course Outcome (CO)
1	Cost Accounting	201C	In manufacturing business ascertaining and analyzing cost is the most important task of the business organizations. This subject is aiming at transferring the knowledge to future entrepreneurs.
2	Business Statistics	202C	Statistics is a subject developed for the development of other subjects like commerce, economics etc. This subject is very much important for the students of commerce for the better analysis and future prediction.
3	Entrepreneurship	203C	Proper knowledge of entrepreneurship is very much inevitable for the students of commerce for developing a sustainable venture.
4	Macro Economics	204C	Economics from the aspect of national and global perspective is the main thrust of this subject. Knowledge of outer world is very is playing a vital role in the business organisation.
5	English Communication	205FC: Foundation Course 2	Communication skill is required for ensuring proper expansion of the business organization. This subject is giving a descriptive knowledge of both written and verbal communication.

Remarks:

- The courses bearing serial number 1 to 4 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70).
- Each student has to opt either the course mentioned in Serial No: 05 or a course offered by the other departments as OPEN ELECTIVE COURSE in SECOND semester.
- The course as mentioned at serial number 5 may be taken by the SECOND Semester students of the Department of Mathematics as an OPEN ELECTIVE COURSE offered by the NSS Cell. This course has 4 credits and full marks 100 (Internal: 30 + End Term: 70 (Theory: 40, Practical: 30)).
- The course as mentioned at serial number 6 may be taken by the SECOND Semester students of the other Departments as an OPEN ELECTIVE COURSE offered by the Department of Mathematics. This course has 4 credits and full marks 100 (Internal: 30 + End Term: 70).

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THIRD SEMESTER

Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Income Tax Law & Practices	301C	Income tax subject is designed to develop the students for a future self reliance work force with a contemporary knowledge tax. Business organization can avail tax benefits properly with sound knowledge of the tax benefits.
2	Business Mathematic	302C	Mathematical knowledge is equally important for the analysis of the business projects properly. This is subject is well designed to equip the students with proper tools and techniques of the analysis.
3	Business Ethics and Governance	303C	Ethical issues like moral values, emotional honesty, spiritual thoughts and other human aspects are studied here to ensure a sound human being for a healthy business environment.
4	Principles of Banking	304C	Different aspects of Banking like its lending, fund creation, its regulations are the most important issues covered in this subject to prepare the students for future banking services and using banking services for developing entrepreneurship.
5	Information Technology and Its Application in Business (Practical)	305C	Using modern hardware and software for the upholding of the business is the most important for modern business. This subject is providing a practical knowledge of the computer uses in business for better understanding and implementation.

Remarks:

- The courses bearing serial number 1 to 3 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). In case of course mentioned at serial no. 2, End Term marks division is Theory: 50 + Practical: 20.
- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any ONE of these DSE courses in THIRD semester.

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FOURTH SEMESTER

Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Corporate Accounting	401C	Accounting knowledge to ensure the requirements of corporate world is the most important part of this subject. After implementation of Companies Act, 2013 lots of changes have been taken place in the practices of accounting. These issues addressed here with proper weight.
2	Auditing: Theory and Practices	402C	Auditing is the subject of commerce developed to ensure accuracy and transparency of the accounts in the business organization. This subject opens another wing of employment with a specialized knowledge.
3	Indian Financial System and Financial Services	403C	Knowledge of different financial aspects of the nation is very much important for the business houses. As the success of the business organization mostly depending upon the different aspects of the macro environment of the country.
4	Principles of Insurance	404C	Insurance service is another important part of the commerce subject. Different aspects of insurance business are discussed here for the students of commerce, so that students can get a better knowledge of risk handling as well as new employment opportunity in this sector.
5	E-Commerce	405C	This is the age of information technology, where these tools are widely used for expansion of business by giving wide opportunities to the seller and also wide options for the buyer. Students can get better ideas of new venture development using internet facility by getting knowledge from this skill enhancement subject.

Remarks:

- The courses bearing serial number 1 to 2 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). In case of course mentioned at serial no. 2, End Term marks division is Theory: 50 + Practical: 20.
- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any TWO of these DSE courses in FOURTH semester.

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FIFTH SEMESTER

Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Management Accounting	501C	This subject has been developed using different tools of financial and as well as cost accounting for a better decision making in the business. Students can be more equipped with the power of analyzing the past performances for future predictions.
2	Financial Management	502C	Managing finance is the most pivotal role of the business organization. This subject will equip the students with the power of different finance decisions like financing, investing, and dividend and working capital management.
3	Marketing Management	503C:	Product placement with its full glory is most important for the business organization. Students can get a better idea for promoting the goods and services in the market and as well as ensure a good employment in the marketing field by getting the knowledge of this subject.
4	Secretarial Practice and Business Communication	504C	Duties of secretaries and different official procedures are covered in this subject properly. Students will be more equipped with the knowledge of this subject by getting the most useful knowledge and techniques for office management.
5	Research Methodology	505C:	For deep studies of the different issues of commerce research should be done with the help of proper research methodologies. This subject is advancing the students for future research and making successful researcher for the corporate sectors.

Remarks:

- The courses bearing serial number 1 to 2 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). In case of course mentioned at serial no. 2, End Term marks division is Theory: 50 + Practical: 20.
- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any TWO of these DSE courses in FOURTH semester.

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SIXTH SEMESTER

Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Accounting Theory	601C	Basic concepts of accounting with its emergence of theoretical aspects are focused in this subject. Importance of this subject is inevitable for the students of commerce.
2	Indirect Taxes: Law and Practice	602C	Indirect Taxation is the important issues of the modern business, especially knowledge of GST, Custom, Excise and other indirect tax practices are needed for the business organization. Students can become a good tax professional with the help this knowledge.
3	Human Resource Management	603C	Managing human resources is a very important issue for the business organizations. Different aspects are covered in this subject like recruitment, promotion, training & development etc. Students are preparing themselves for the future challenges with the help of this knowledge.
4	Financial Analysis and Reporting	604C	Modern professional business organizations and investors are required to be well versed in the preparation and interpretation of the financial statements. This subject gives an insights to the analysis of financial statements for the future decision making process.
5	Dissertation and Viva-Voce	605C	Multiple issues of research in different fields related to commerce and other allied fields are giving focus in this subject. Students get involved in the research activities to address some research objectives using few specific research tools to get a new result for any given problem and hypothesis.

Remarks:

- The courses bearing serial number 1 to 2 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). In case of course mentioned at serial no. 2, End Term marks division is Theory: 50 + Practical: 20.
- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any TWO of these DSE courses in FOURTH semester.

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IMD Programme
MBB University

SEVENTH SEMESTER

Sl. No.	Course Title	Course Code	Course Outcome (CO)
1	Management Principles & Organisational Behaviour	701C	Different principles of management were discussed with a new aspect of organizational behavior covered in this subject. Students will be able to address different management critical situations and making proper decisions for the future challenges.
2	Managerial Economics	702C	Economical knowledge for the business management has been emphasized in this subject properly. Decision making system using different economical and mathematical tool making the students more equipped for the business challenges.
3	Advanced Corporate Accounting	703C	Different corporate accounting issues are discussed here with more advanced topics and tools. Recent developments in the topic made the subject more students oriented to invite future challenges in the corporate service life.
4	International Business	704C	Foreign trade issues and its problems with other related aspects are discussed here to educate commerce students in developing the knowledge of international business transactions their impact in the domestic economy. Students also get the potential sectors of the international business to start their ventures.

Remarks:

- The courses bearing serial number 1 to 2 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). In case of course mentioned at serial no. 2, End Term marks division is Theory: 50 + Practical: 20.
- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any TWO of these DSE courses in FOURTH semester.

06/02/2024
Dr. Bindu Ranjan Chakma
Associate Professor
Department of Political Science
MBB University, Agartala

Coordinator
UMD Programme
MBB University

EIGHT SEMESTER		
Course Title	Course Code	Course Outcome

		(CO)
Advanced Marketing & Human Resource Management	801C	Marketing Study using different Management Information Service (MIS) for better research uses studied in this subject along with ah thorough discussion on the philosophy of marketing including market segmentation and others. Another part of this subject discussed some important issues of Human Resource Management in advance level like Recruitment, selection, Training & Human Resource Planning etc. Marketing & HRM jobs will be more accessible for the students in future for this subject.
Statistics for Business and Operations Research	802C	Statistics for different research purpose of business and other related issues have been studied in this subject named probability, sampling, hypothesis testing, different parametric and non-parametric test, Correlation- Regression, Game Theory and Linear Programming model etc. These will assist the aspirants for future research work properly.
Strategic Cost and Management Accounting	803C	Different advanced level of cost and management accounting has been discussed in this subject in view of the strategic issues of the business including performance management, transfer pricing, responsibility accounting, standard costing & capital budgeting etc for serving the need of corporate sector especially manufacturing industries.
Macro Economics and Business Environment	804C	Different macroeconomic aspects have been properly covered in this subject to ensure a future ready workforce having a comprehensive knowledge of the broader economy of the country including national income, open economic issues and business environmental issues like consumer rights with consumerism etc.

Remarks:

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- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any TWO of these DSE courses in FOURTH semester.

06/12/2024

Dr. Bindu Ranjan Chakma
Associate Professor & Coordinator
Department of Political Science
MBB University, Agartala

06/12/2024

Dr. Bindu Ranjan Chakma
Associate Professor
Department of Political Science
MBB University, Agartala

and Coordinater, IMD Programme MBB University

NINTH SEMESTER

Course Title	Course Code	Course Outcome (CO)
Business Tax Planning and Management	901C	Some tax related issues covered in this subject for the future tax professionals suitable for corporate sectors like tax planning, consideration of tax in different business and strategic decisions for business in different aspects. This subject also covers tax planning for some important transactions like business amalgamation. Practical issues like return filing and submission also covered with proper weight in this subject of IMD.
Computer Applications in Business (Practical)	902C	Some advanced computer and information technology related issues like basic idea, communication tools, operation system, and document formation have been discussed for the professionals of different commerce and management related employees. Different accounting software package and database management system also analysed in this subject for the accounting professionals deeply.
Corporate Legal Framework	903C	Different legal aspects related to corporate affairs deeply discussed in this subject to assist both the commerce, management related workers and also the law professionals to deal with different legislative issues by studying companies act, consumer protection act, the foreign exchange management act, sebi act, negotiable instruments act along with some other policy framework for regulation of FDI etc.
Advanced Banking and Insurance	904C	Most awaiting and promising working places for the students of commerce is banking and insurance sector. This subject gives a proper review with advance knowledge of commercial banking, bank customer relation, and different regulations relating to banking. In Insurance segment proper review of both life and general insurance have given for the professionals.

Remarks:

- The courses bearing serial number 1 to 2 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). In case of course mentioned at serial no. 2, End Term marks division is Theory: 50 + Practical: 20.
- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any TWO of these DSE courses in FOURTH semester.

06/02/2024
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TENTH SEMESTER		
Course Title	Course Code	Course Outcome (CO)
Research Methodology and Statistical Software for Research	1001C	Some important aspects of research methodology like introduction, types, steps and process of research have been discussed in this subject properly along with data processing, research reporting and modern practices of research. Another segment of the subject is statistical software like SPSS, R, STATA covered here with practical education for the advance level researchers.
Dissertation & Viva Voce	1002C	In final semester the students of the IMD Commerce will be engaged in some practical research work in this subject. Students will get opportunity to explore their potentials in advance level research for compete in future Research Eligibility Test (RET).
Accounting Theory & Financial Statement Analysis	1003 Elective (Optional)	Accounting Theory with Financial Statements analysis have been discussed in this optional subject of final semester to equip the students with precise knowledge of basic accounting to serve in the teaching field with proper expertise knowledge like evolution of accounting thought, accounting standards, financial ratios, income and expenses analysis etc.
Auditing and Assurance Services	1004 E	Advance level auditing issues like concept, auditors' role, different standards, analyzing audit evidence, documentation, re-computation, internal control system, audit report & special audit etc. This subject also teaches the computerized auditing process and techniques for future auditors.
Investment Management	1005 Elective (Optional)	Different important issues of a contemporary subject like basic issues of investment management, portfolio management, approaches to security analysis, company analysis components along with capital market theory have been analysed for the future fund managers and investment advisors.
Risk Management	1006 E	Last optional subject for the students of IMD Commerce final semester is giving a proper knowledge of market analysis by measuring risk and studying risk from different aspects like derivative trading, involvement of insurance in this sector, personal risk management etc.

Remarks:

- The courses bearing serial number 1 to 2 are CORE COMPULSORY COURSES each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). In case of course mentioned at serial no. 2, End Term marks division is Theory: 50 + Practical: 20.
- The courses bearing serial number 4 to 10 are DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE) each of having 4 credits and full marks 100 (Internal: 30 + End Term: 70). Each student has to opt any TWO of these DSE courses in FOURTH semester.

06/02/2024

Dr. Bindu Ranjan Chakma
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MAHARAJA BIR BIKRAM UNIVERSITY
College Tilla, Agartala, Tripura
Pin-799004

Programme Outcomes: Master of Science (M.Sc.)

PO1. Knowledge: Increasing in depth knowledge and getting exposure to the recent advanced developments in the field. It will ensure to enrich the analytical, critical and creative thoughts among the students.

PO2. Analysis and solving problems: Inculcating reasoning, logical thinking and creative minds for analyzing and solving problems. It will enable them to formulate hypothesis, evaluate and validate and draw conclusion.

PO3. Communication Skill: Increasing the communication skills and ability to express & explain problems related to the fields. It will enhance writing and designing documentation with effective presentation and communication skills with others.

PO4. Employability and Leadership skills: Enabling the students to be employable in allied fields by developing leadership qualities in academics, entrepreneurship, industry and management.

PO5. Ethics: Developing scientific temperament with ethical responsibility and accountability to professional practices in job role or workplace.

PO6. Environmental awareness and Sustainability: Creating awareness about environmental protection and conservation of resources for sustainable development. It will promote betterment of the living beings on the earth by improving varieties in the bio resources.

PO7. Character building: Inculcating and developing the values of humanism and good behavior among the students. It will enable them to be responsible members of society and responsible citizens of the country.

06/02/2024
Dr. Runu Dhar
Associate Professor & HOD
Department of Mathematics
MBB University, Agartala.

MAHARAJA BIR BIKRAM UNIVERSITY
College Tilla, Agartala, Tripura
Pin-799004

Programme Outcomes: Master of Arts (M.A.)

PO1. Knowledge: Increasing in depth knowledge and getting exposure to the recent developments in various disciplines of the field. It aims to enrich the analytical, critical and creative thinking in diverse areas of humanities and social sciences besides the chosen subject of study among the students.

PO2. Analytical and problem solving skills: Improving reasoning, logical thinking and analytical & problem solving skills among the students. It will enable them to contribute knowledge to identify, formulate hypothesis and draw useful conclusion relevant to the society.

PO3. Communication Skill: Enhancing the communication skills and ability among the students. This will make them more confident to express and explain problems with effective presentation and communication skills with others.

PO4. Employability and Leadership skills: Building leadership qualities among the students to make them employable in academics, industry, entrepreneurship, management and other allied fields.

PO5. Ethics: Building and developing scientific minds with ethical responsibility, confidentiality and accountability to professional practices in job role or workplace.

PO6. Environmental awareness and Sustainability: Increasing environmental awareness among the students to be friendly with the environment. This will promote environmental protection and conservation of resources for sustainable development for betterment of living beings on the earth.

PO7. Character building: It aims to promote and develop human values and build good human behavior among the students for earning self respect. It will make them responsible citizens of the country.

06/02/2024
Dr. Bindu Ranjan Chakma
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Programme Outcomes: Library and Information Science

PO1. Knowledge: Increasing in depth knowledge and getting exposure to the recent developments in the field of Library and Information Science. It will ensure to enrich the analytical, critical and creative thoughts among the students for traditional and modern library system.

PO2. Analysis and solving problems: Inculcating reasoning, logical thinking and creative minds for analyzing and solving problems. It will enable them to formulate hypothesis, evaluate and validate and draw conclusion and to enable students to design and develop modern library system.

PO3. Communication Skill: Enable student to communicate and ability to express & explain problems related to the fields of Library and Information Science. It will enhance writing and designing documentation with effective presentation and communication skills with others to provide enhanced library services.

PO4. Employability and Leadership skills: Enabling the students to be employable in fields by of Library and Information Science developing leadership qualities in academics, entrepreneurship, industry and management. After completion of BLISc degree a student can build their career as Library Assistant, Semi-Professional Assistant, Application Specialist, Consultant/ Reference Librarian and similar other posts. After completion of MLISc degree a student can build their career as Assistant Professor, Assistant Librarian at IITs, NITs, Universities, Professional Assistant, Senior Application Specialist, Senior Consultant/ Reference Librarian etc. While after PGDLAN a student can be Digital Librarian at IITs, NITs, Universities, Digital Professional Assistant, Digital Consultant, Digital Record Manager etc.

PO5. Ethics: Developing ethics of Library and information science professional with ethical responsibility and accountability to professional practices in job role or workplace.

PO6. Environmental awareness and Sustainability: Sustainable library development is one of the major aspects in this field. Creating awareness about environmental protection and conservation of resources for sustainable development. It will promote betterment of the living beings on the earth by improving varieties in the bio resources.

PO7. Character building: Inculcating professional character and developing the values of humanism and good behavior among the students. It will enable them to be responsible members of society and responsible citizens of the country

07/02/2024

Dr. Sudip Bhattacharjee
Assistant Professor & In-charge
Dept. of Library & Info. Science
MBB University, Agartala.

MAHARAJA BIR BIKRAM UNIVERSITY
College Tilla, Agartala, Tripura
Pin-799004

Programme Outcome: Integrated Master's Degree Programme

PO1: **Facilitating Student Progression:** It supports student's progression from undergraduate to post graduation directly. The program develops students' broader understanding of subjects offered by the university in the programme enriching their analytical, critical, creative thinking.

PO2. Analytical and problem solving skills: Improving reasoning, logical thinking and analytical & problem solving skills among the students. It will enable them to contribute knowledge to identify, formulate hypothesis and draw useful conclusion relevant to diverse fields.

PO3. Development of Soft Skills and Communicative Competence: The IMD program emphasizes the importance of effective communication in the rapidly changing world. The program is designed to equip students with both verbal and digital communication skills to improve skilled human resource qualities to make them employable in different sectors following completion of the program.

PO4. Employability and Leadership skills: Building leadership qualities among the students to make them employable in academics, industry, entrepreneurship, management and other allied fields.

PO5. Nurturing Ethics: The IMD program is designed to build and develop scientific minds among the students to work with ethical responsibility and accountability in professional practices of job role or workplace.

PO6. Environmental awareness and Sustainability: The IMD program is aimed to increase environmental awareness among the students to be friendly with the environment. This will promote environmental protection and conservation of resources for sustainable development for betterment of living beings on the earth.

PO7. Character building: It aims to promote and develop human values and build good human behavior among the students for earning self-respect. It will make them responsible citizens of the country.

08/04/2024
Dr. Bindu Ranjan Chakma
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