RABINDRA MAHAVIDYALAYA

Affiliated to The University of Burdwan

Champadanga :: Hooghly :: West Bengal :: Pin. 712401

Estd. -1971

Ref. No…… *Date:……..*

This is to certify that the attached Programme Outcome, Programme Specific Outcome and Course Outcome was followed in the 2017 – 2018 Session onwards at Rabindra Mahavidyalaya, Champadanga, Hooghly, West Bengal.

Dr. Prasanta Bhattacharyya

Principal

Programme, Programme Specific and Course Outcomes

Rabindra Mahavidyalaya

Champadanga, Hooghly

West Bengal, India

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B.A. Programme: Learning Outcome

Acquisition of disciplinary knowledge is the primary objective of the Bachelor of Arts programme. The training of the concepts, methods, theories, etc. will enable learners to apply the domain knowledge in the field. Interdisciplinary understanding of issues allows students to gather diverse knowledge and cognitive skills. Critical thinking capacity, analytical ability, power to explore ideas, argumentative capacity, etc. will develop automatically. Understanding social situations, environmental problems, ethical and gender issues, democratic principles will make students better citizens. The foundation will enrich students to develop basic skills for further specialisation and pursue programmes in other, may be still higher institutions, step into the job market and have a footstep in research activities.

PO 1- Understanding of self and the community: Good Combination of subjects allowing students wide exposure via language, literature and social sciences leading to better understanding of the human and cultural milieu along the sociological, historical, geographical and environmental lines. Envisioning the greater human context, it may help to have an understanding of the self vis-a-vis the larger community.

PO 2- Accomplishing abilities to be a maturer learner: The sustained goal or objective could be seen as a maturer learning and comprehending ability expected of a student after Higher Secondary Level leading to knowledge gathering. The application of such knowledge may further lead to the development of analytical ability and its appropriate application in relevant contexts. Regular way of such application would lead to the next level of learning towards synthesis. Taken together, all these may ideally give rise to evaluation of situations and human contexts as a maturer cognitive and emotional response.

PO 3- Technical aptitude: As separate but a necessary complement to learning of science and commerce, a bachelor student of arts may, due to disciplinary learning, find an appropriate context suited for the applicability of a technical knowhow working to the advantage of a target community.

PO 4- Developing necessary competence for competitive examinations: A better cultural understanding of society may become an advantage for a student pursuing BA in working areas that directly deal in civil services or Human Resource Development.

PO 5- Develop communication skills: Better skill in language as expected and duly complemented by immersive learning of discipline specific literature and also overall cultural understanding may lead to good communication skill deemed necessary in interviews and group discussions.

PO 6- Eligible job market entrant: Potentially, linguistic skills with relevant cultural insight may be combined with developing software technologies to let the student find a niche in the job market pertaining to areas of webpage designing, digital editing, digital book-making and digital archiving.

PO 7- Fit for traditionally attainable jobs: Traditionally, journalism, publication works, compeering, news reading and role as human interpreter are seen to be areas where a student of BA Programme is expected to fare better.

Program Outcome for B.Sc. Degree Courses

The CBCS Course curriculum of the discipline of B.Sc. is well designed and very promising. The core course would help to enrich the subject knowledge of thestudentsandincreasetheirconfidencelevelinthefieldofbothacademiaandindustry. Generic electives make integration among various interdisciplinary courses to fulfill the vision and mission of designing the course. The introduction of Skill Enhancement Courses (SEC) would help to gain more powerful knowledge not onlyin their coresubjects but also in interrelated multidisciplinary subjects both theoretically and practically. The inclusion of Discipline Specific Courses (DSE) has brought an opportunity in front of students to gain knowledge on various naturallyand industrially important useful materials and also helps them to familiar and expert in handling different software after proper training. In brief the students graduated with this type of curriculum would be able to disseminate subject knowledge along with necessary skills to suffice their capabilities for academia, entrepreneurship and industry.

PO-1: Disciplinary knowledge and skill: A graduate student is expected to be capable of demonstrating comprehensive knowledge. Students can solve their subjective problems very methodically, independently and finally draw a logical conclusion.

PO-2: Skilled communicator: The course curriculum incorporates basics and advanced training in order to make a graduate student capable of expressing the subject through technical writing as well as through oral presentation.

PO-3: Critical thinker and problem solver: The course curriculum also includes components that can be helpful to graduate students to develop critical thinking.

PO-4: Sense of inquiry: It is expected that the course curriculum will develop an inquisitive characteristic among the students through appropriate questions, planning and reporting experimental investigation.

PO-5: Team player: The course curriculum has been designed to provideopportunity to act as team player by contributing in laboratory, field-based situation.

PO-6: Skilled project manager: The course curriculum has been designed in such a manner as to enabling a graduate student to become a skilled project manager by acquiring knowledge about project management, writing, planning, study of ethical standards and rules and regulations pertaining to scientific project operation.

PO-7: Digitally literate: The course curriculum has been so designed to impart a good working knowledge in understanding and carrying out data analysis, use of library search tools, use of software and related computational work.

PO-8: Ethical awareness: A graduatestudent requires understanding and developing ethicalawarenessorreasoningwhichisadequatelyprovidedthroughthecourse curriculum. Students can also create awareness on the environment, society, and also make development outside the scientific community.

PO-9: Environmental Awareness: As an inhabitant of this green planet, a B.Sc. Graduate student should have many social responsibilities. The course curriculum is designed to teach

agraduate student to find out new greener routes for sustainable development. The course also helps them to understand the causes of environmental pollution and thereby applying environmentally friendly policies instead of environmentally hazard ones in every aspect.

PO-10: **Lifelong learner:** The course curriculum is designed to inculcate a habit of learning continuously through use of advanced ICT technique and other available e- techniques, e-books and e-journals for personal academic growth.

PO-11: Analytical skill development and job opportunity: The course curriculum is designed in such a way that B.Sc. graduate students can handle many software, decent instruments and advanced technologies. Such a wonderful practice in the graduate level will bring a good opportunity to the students for getting job in industries besides academic and administrative works.

Department of Commerce

PROGRAMME OUTCOMES

The College is affiliated to the University of Burdwan, West Bengal. Thus, the College follows the guidelines and syllabus prescribed by the Affiliated University.

PROGRAMME:COMMERCE [Accounting &Finance] Programme Outcomes [POs]

PO1-Enables learners to get theoretical and practical exposure in the commerce sector which includes Financial Accounts, Cost Accounting, Management Accounting, Direct Taxation, Indirect Taxation, Commerce, Marketing Management, Business Law, Economics, Business Ethics, Environmental studies etc.

PO2- Develops communication skills and build confidence to face the challenges of the corporate world.

PO3- Enhances the capability of decision making at personal and professional levels.

PO4- Makes students industry ready and develops various managerial and accounting skills for better professional opportunities.

PO5- Develops entrepreneurial skills amongst learners.

PO6- Strengthens their capacities in varied areas of commerce and industry aiming towards holistic development of learners.

PO7-Thus,after completing graduation the learners develop a thorough understanding of the fundamentals in Commerce and Finance.

Program Specific Outcomes [PSOs]

PSO1- Learner's venture into Managerial positions, accounting areas, banking Sectors, Auditing, Company Secretarial functions, teaching, Professionals Stock Agents, Insurance agents, Government Employment etc.

PSO2- Enables learners to prove themselves in different Professional examinations like CA, CMA, CS, WBA&A, CAT, GRE, MPSC, UPSC etc.

PSO3-Learners further move towards research in the field of Commerce.

PSO4- Enables students to demonstrate Progressive learning of various tax issues and tax forms related to individuals and businessmen and setting up their own business startup.

PSO5 -The vast syllabi cover various fields of commerce and accountancy which helps students grasp practical and theoretical knowledge.

- **Accounting, Taxation and Finance areas:**

PSO1 - The course helps aspirants to acquire knowledge in the field of accounting, taxation, auditing, risk management, financial accounting, managerial economics, business law and business communications.

PSO2 - Learners can pursue careers as financial experts and also develop a better understanding of the markets as this course gives an in-depth understanding of the essential qualities and areas of expertise required for such jobs.
PSO3 - Students get opportunities to explore many career paths like investment and portfolio management, stock market, security analysis, mutual fund and capital market analysis, accounting field, financial field etc.
PSO4 - The programme aims to develop professional skills among students and build a strong foundation in accounts, Finance and Ethics which will benefit themselves as well as the society.

- **Banking, Insurance, Risk management areas:**

PSO1 -B. Com in Banking and Insurance is developed as per the requirements of the Banking and Finance Industry where students learn banking operations, regulations, monetary auditing, selling of financial products and services.
PSO2 – The specially designed syllabus creates trained professionals who can handle various financial activities associated with banking and insurance sectors.
PSO3 – Specialization in Banking and Insurance helps students to operate efficiently in the Banking and Insurance environment in the financial service sector and handle various technologies employed in the field of Banking and Insurance.
PSO4 - It gives students theoretical and application-based knowledge in the banking and financial sector and analytical skills to work with various financial tools, such as regulatory agencies and global markets.

Name of the Department: Bengali

System: CBCS/Part

Programme Specific Outcome:

PSO 1. The syllabus focuses on the ancient, medieval and modern history of Bengali literature.
PSO 2. Students are getting to know about the heritage of Bengali literature and its culture.
PSO 3. Their knowledge of other subjects besides Bengali has also increased.
PSO 4. Their knowledge is increased to learn about Bengali language, linguistics and grammar.
PSO5. As they had the opportunity to study English, they gained knowledge about this language.
PSO6. The opportunity has been created to enter the world of work after completing the course.
PSO7. Getting a chance to read about every field of literature.
PSO 8. He also learned to compare literature with other languages.
PSO9.The field for taking critical lessons in literature has been prepared.
PSO10.They are prepared for Post-Graduation and research work from this course.

Course Outcome:

Semester /Part	Course Type	PaperDescription	Course Outcome
1	CC1	Bangla Sahityer Itihas (Prachin & Madhyayug)	• Special ideas are being made about the history of ancient and medieval Bengali literature. • Knowledge of ancient and medieval Society and religious history is being created.
1	CC 2	Chhando, Alankar	• They learn about rhythm and rhetoric. . • Realizing the importance of rhythm and rhetoric in Bengali literature.
1	GE1	Any discipline other than Bengali	• Students of subjects other than Bengali are studying Bengali literature. • Their knowledge of Bengali literature and language is being created.
1	AECC1	ENVS	• Environmental awareness is being created among them through reading environmental Science.

2	CC 3	Baishnab Padabali, Sakto Padabali	• A large part of Bengali literature is 'Vaishnava Padabali' and Vaishnava religion. They also known about this 'Vaishnava Padabali' and Vaishnavareligion in medieval period. • They have learned to determine the relationship between history of Eighteenth-century society and 'Shakta Padabali'.
2	CC4	Ramayana, Annadamangal	• They have gained knowledge about Bengali and Indian traditions by reading Krittibas's 'Ramayana' which is the wealth of Bengali literature. • There is an opportunity to determine the importance of 'Annadamangal' poetry in aspect of social history in eighteenth century. • They also learn about the history of medieval society.
2	GE2	Any discipline other than Bengali	• Gradually, depth is being created about Bengali Literature among students of other subjects
2	AECC2	Communicative English/MIL	• The knowledge of students of Bengali literature about English language and Literature is increasing. • They are learning about English literature and Western literary theory.
3	CC 5	They are learning about English literature and Western literary theory.	• They are taking lessons about history of Nineteenth and twentieth century's literature and society. • Learning to understand about the development of Bengali literature.

3	CC 6	Bhasatattwa	• Basic knowledge about linguistics is being created. • Learning about different aspects of modern linguistics.
3	CC 7	Unishataker Kabya	• They have taken a lesson about history of Bengali poetry in nineteenth century. • They learned to read the history of Bengali poetry. • They have learned to understand the nineteenth century renaissance by taking the initial lessons of 'Meghnadha Badh Kabya'.
3	GE3	Any discipline other than Bengali	• Their knowledge about the history of Bengali literature is being formed.
3	SEC 1	Bangla Byakaran	• Reading different aspects of Bengali grammar has increased their idea about the structure of Bengali language.
4	CC 8	Kabita	• Their ideas about Rabindranath's poetry are being formed.
			• They have learned to analyze to Modern poetry.
4	CC 9	Upanyas	• Learned to take lessons in Bengali novels. • Learned to critical lessons in the novel.
4	CC 10	Natak	• Students have learned to discuss the structure of Bengali drama. • They have learned to relate the society with the subject of drama.

4	GE4	Any discipline other than Bengali	• Students of other subjects are getting to know about Bengali linguistics. • They have learned the formation of Bengali language.
4	SEC 2	Rachanashaktir Naipunya	• Writing skills have increased. • Learned how to write letters, reports and essays.
5	CC 11	Galpo	• They have created an idea about short stories by reading Rabindranath's short story. • They gained knowledge about Rabindranath's literature and philosophy. • By reading modern short stories, students have learned to know the interrelationship of contemporary society and literature.
5	CC 12	Prabandha O Prachya Kabyatattwa	• They have been introduced with the essay literature. • Gained knowledge about ancient poetry theory in India.
5	DSE 1	Unish Sataker Bangla Kabya O Prabandha	• Gained knowledge of the history of nineteenth-century poetry. • They have come to know the dynamics of essays literature in Nineteenth-century.

5	DSE 2	Unish Sataker Bangla Natak O Kathasahitya	• Gained knowledge of the development of novels and short stories in nineteenth century. • They have known about the history of the origin and development of Bengali drama in nineteenth century.
6	CC 13	Sanskrita O Ingreji Sahityer Itihas	• Students learn about the history of Sanskrit literature • They are able to realize the great tradition of Sanskrit literature. • They knew about the history of English literature.
6	CC 14	Sahityer Rup-Riti O Sangrup	• Their knowledge has been created about various forms of modern literature. • Early knowledge about modern literary theory has been created. • Gained knowledge about the structure of different forms of literature.
6	DSE 3	Bishsataker Swadhinata-Purbabarti Bangla Kathasahitya	• They got a chance to know about the development of Bengali novels in twentieth century. • Knowledge has been created about the history of short stories of this period.
6	DSE 4	Sahitya Bisayak Prabandha O Lakasahitya	• They have learned about Twentieth century essay literature. • Preliminary ideas about folklore and folk culture have been formed.

Name of the Department: Bengali

System: CBCS/Part

Programme Specific Outcome:

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PSO5. As they had the opportunity to study English, they gained knowledge about this language.

PSO6. The opportunity has been created to enter the world of work after completing the course.

PSO7. Getting a chance to read about every field of literature.

PSO 8. He also learned to compare literature with other languages.

PSO9. The field for taking critical lessons in literature has been prepared.

PSO10. They are prepared for Post-Graduation and research work from this course.

Course Outcome:

Semester /Part	Course Type	Paper Description	Course Outcome
1	CC-1A CC-2A CC-(L1-1) AECC-1	(Prabandha Sahitya : Bankimchandra & Rabindranath) Discipline 2 (Other than Bengali) English Language (L1-1) Environmental Studies	• They gained the ideas about the essay of Bankim Chandra and Rabindranath. • Among other subjects, there is an opportunity to increase knowledge about Bengali language and literature. • There are opportunities to learn about English language and literature. • Increase awareness about the environment.
2	CC-1B CC-2B CC-(L2-1) AECC-2	(Galpo : Pravat Kumar O Saratchandra) Discipline 2 (Other than Bengali) Hindi/MIL (L2) Bangla Chhoto galpo Communicative English /MIL	• There is an opportunity to form ideas about Bengali short stories. • Gradually getting acquainted with Bengali literature. • There was an opportunity for critical discussion on Bengali short stories. • Further knowledge of English language and literature is increased.

3	CC-1C CC-2C CC-(L1-2) SEC-1	(Bangla Sahityer Itihas) Discipline 2 (Other than Bengali) English Language (L1- 2) (BanglaByakaran)	• Preliminary ideas about the history of Bengali literature are being formed. • Knowledge of English language and its structure is increasing. • There is an opportunity to increase knowledge about the structure of Bengali language by reading Bengali grammar.
4	CC-1D CC-2D CC-(L2-2) SEC-2	(Bhasatattwa) Discipline 2(Other than Bengali) (Bangla Kabita) (Rachanashaktir Naipunya)	• Knowledge about Bengali linguistics is developing. • They are learning to take analytical lessons of Bengali poetry. • There are opportunities to improve their writing skills.
5	DSE-1A DSE-2A GE-1	(Unish Shataker Bangla Upanyas) OR,	• The idea of critical lessons of Bengali novels has been formed. • There is scope for analytical discussion of short stories.
	SEC-3	(Unish Shataker Bangla Galpo) Discipline 2(Other than Bengali) Unish Sataker Bangla Prabandha (Prabandha O Pratibedan Rachana)	• Knowledge about Bengali essay literature has increased. • There are opportunities to increase report, essay writing skills.
6	DSE1B DSE-2B GE-2 SEC-4	(Unish Shataker Bangla Natak) OR (Unish Shataker Bangla Prabandha)	• They knew about the history of Bengali drama. • Anopportunity has been created to know about the history of Bengali essays. • They Learn about Bengali travel literature. • Knowledge about translation is increasing.

		Discipline 2 (Other than Bengali) (Unis Shataker BanglaBhramansahitya O Chithipatra) (Byabaharik Bangla Charcha O Anubad Charcha)	

Name of the Department: **UG Department of Botany**
Institution: **RabindraMahavidyalaya, Champadanga, Hooghly**
Programme: **B.Sc. Honours (3Year)**
System: **Choice Based Credit System (CBCS) *w.e.f.* AcademicYear 2017-2018**
AffiliatingUniversity: **The University of Burdwan**

Course outline for B.Sc. Honours in Botany under CBCS

Semester	CoreCourse (14)	Ability Enhancement Compulsory Course(AEC) (2)	Skill Enhancement Course(SEC) (2)	Discipline Specific Elective: (DSE) (4)	Generic Elective: (GE) (4)
I	Microbiologyand Phycology Archegoniatae	ENVS			GE-1
II	Mycologyand Phytopathology Morphology& Anatomy	Communicative English /MIL			GE-2
III	PlantEcology& Phytogeography Plant Systematics EconomicBotany		SEC-1 Agricultural Botany		GE-3
IV	Palaeobotany & Palynology Biomolecules& CellBiology Molecular Biology		SEC– 2 Herbal Technology		GE -4
V	Plant Physiology Plant Metabolism			Reproductive Biology of Angiosperms Bioinformatics	
VI	Genetics &Plant Breeding Genetics &Plant Breeding			Plant Evolution & Biodiversity Horticulture Practices & Post-Harvest Technology	

PROGRAMME SPECIFIC OUTCOME (PSO):

PSO 1: Knowledge accumulation: The entirespecific program helps in knowledge accretion of different fields of plant biology which starts from learning about the life forms and their metabolism of acellular life forms (viruses) to multicellular complex higher order plants.

PSO 2: Critical thinking and logical interpretational skills: The specific programs help students nurture and enhance their critical thinking ability by interpreting the conclusions obtained from different results of physiology, metabolism, genetics, biostatistics and ecology and etc.

PSO 3: Practical skills: The program helps the students develop hands on training skills, efficiency, time management and accuracy while performing experiments related to anatomy, histology, cytology, physiology, metabolism, ecology, plant systematics etc.

PSO 4: Collaboration and management skills: The program offers opportunity to students to acquire life skills during excursion visits coupled with almost all the semesters where they learn to collaborate and attain organizational and managerial skills and also develop interpersonal communication skills within peer groups.

PSO 5: Application minded outlook:The programs offers scope to students where they learn advance application oriented subjects like molecular biology, cell biology, biochemistry, metabolism, bioinformatics, horticulture, agricultural botany, herbal and medicinal botany etc.

PSO 6: Conservation and ecosystem preservation: The program offers prospects for understanding of nature and natural resources under the study of ecology and archegoniate, microbiology, systematics. Besides, this program gives an idea of the importance of natural conservation and its significance in building up sustenance of life on earth.

PROGRAMME OUTCOME (PO):

PO 1: The undergraduate programme provides the comprehensive knowledge and understanding of broad range of plant diversity in terms of organization, role, interrelationships and evolution. The programme is envisioned to prepare students with requisite knowledge and practical skills that they study plants and their role in a holistic manner.

PO 2: The course content furnishes the student with in-depth logical knowledge and promotes research aptitude. Students acquire academic and research ethics, sharing, plagiarism, scientific misconduct, etc., along with leadership qualities and effective communication skills.

PO 3: The programme comprehends the role of the plant as a natural resource for sustainable development.

PO 4: The programme provides the understanding of a variety of analytical techniques in plant sciences and the use of plants as industrial resources or as human livelihood support systems and is well-versed with the use of transgenic technologies for basic and applied research in plant sciences.

COURSE OUTCOMES (CO): On completion of the course, students are able to:

Semester	Course Type	Course Title	Credits	Course Outcome
I	**CC-1 (Theory + Practical)**	**Microbiology and Phycology**	4+2=6	✚ Learn about the diversity of viruses, bacteria, and algae and their classification. ✚ Know the structure, function, reproduction methods, and growth cycle of different bacteria and viruses. ✚ Learn about general characteristics, life cycle, vegetative and reproductive structure of different algal species belonging to Cyanophyta, Xanthophyta, Chlorophyta, Charophyta, Phaeophyta, Rhodophyta. ✚ Be aware of the economic importance of bacteria with reference to their role in agriculture and industry (fermentation and antibiotics).
	CC-2 (Theory + Practical)	**Archegoniatae**	4+2=6	✚ Understand identifying features of archegoniates, their transition and adaptation to land habit and their alternation of generations. ✚ Learn about general characteristics & classification, evolutionary trends, ecological and economic importance of various bryophytes, pteridophytes, and gymnosperms genera. ✚ Learn about morphology, anatomy, reproduction of *Riccia, Marchantia, Pellia, Anthoceros, Sphagnum* and *Funaria*. ✚ Learn about morphology, anatomy and reproduction of *Lycopodium, Selaginella, Equisetum, Pteris* and *Marsilea* ✚ Learn about Morphology, anatomy and reproduction of *Cycas, Pinus* and *Gnetum*
II	**CC-3 (Theory + Practical)**	**Mycology and Phytopathology**	4+2=6	✚ Know general characteristics, affinities with plants and animals, thallus organization, classification of true fungi. ✚ Learn about the characteristic features, thallus organization, Life cycle of different species belong to Chytridiomycota, Zygomycota, Ascomycota, Basidiomycota, Allied Fungi and Oomycota.

				✚ Learn about the structural and functional aspects of various symbiotic associations, such as lichens, mycorrhiza, etc. ✚ Be aware of industrial applications of different fungal genera. ✚ Acquire knowledge on a brief account of plant pathology with special emphasis on the life cycle of different pests and pathogens.
	CC-4 (Theory + Practical)	**Morphology & Anatomy of Angiosperms**	4+2=6	✚ Acquire knowledge on brief account of internal organization, classification of tissue systems, and development of plant body. ✚ Learn about the fundamental structures of different cell types. ✚ Understand the structural organization of root, shoot, and leaf tissue of dicot and monocot. ✚ Study the structure, function, and seasonal activity of vascular and cork cambium. ✚ Understand the morphological structures of leaves, inflorescence, flower, fruit, and seed.
III	**CC-5 (Theory + Practical)**	**PlantEcology & Phytogeography**	4+2=6	✚ Know basic concepts of ecology, inter-relationships between living world and the environment, their components, dynamism and homeostasis. ✚ Composition, variation, and importance of physical factors, such as, Soil, Water, Light, temperature, wind and fire. ✚ Understand the brief account of structural and Functional aspects of ecosystem. ✚ Learn about the concept of plant communities and population ecology ✚ Characteristic features of major Phytogeographical division of lndia with a special emphasis on the Vegetation characteristics of Eastern Himalaya and Sunderbans.
	CC-6 (Theory + Practical)	**Plant Systematics**	4+2=6	✚ Understand the Introduction and significanceof Plant systematic for Plant identification, classification, Nomenclature ✚ Know the concept of Taxonomichierarchy and Botanical nomenclature ✚ Study the plant classification based on Bentham and Hooker [1862-83] and Takhtajan [1997] and APG System of classification. ✚ Be aware about the fundamental concept of

				Biometrics, numerical taxonomy and cladistics
				✓ Know the origin and evolutionary trends of angiosperms based on phylogenetic tree construction
	CC-7 (Theory + Practical)	**Economic Botany**	4+2=6	✓ Gain brief knowledge on origin of cultivated plants and evolution of new crops/varieties, importance of germplasm diversity ✓ Learn about the origin, morphology, processing and economic importance of various plants used as a source of cereals, legumes, sugars and starches, spices, beverages, oils and fats, natural rubber, drugs, timber, and fibers
	SEC-1 (Theory)	**Agricultural Botany**	2	✓ Lean about fundamental physiological processes of plants. ✓ Gain knowledge on brief account of organic farming using microbes, cyanobacteria and mycorrhiza ✓ Study the importance of plant breeding, tissue culture and biotechnology approaches to improve agriculture.
IV	**CC-8 (Theory + Practical)**	**Palaeobotany & Palynology**	4+2=6	✓ Study the concise introduction and scope of palaeobotany ✓ Understand the process of fossilization and their types based on mode of preservation ✓ Learn about the earth age, Geologic Time Scale, major events of plant life through geologic time. ✓ Study the brief account on Microsporogenesis, megasporogenesis and Pollination techniques

	CC-9 (Theory + Practical)	**Biomolecules and Cell Biology**	4+2=6	✚ Study the structural, functional features and types of various biomolecules, such as, carbohydrates, lipids, proteins, nucleicacids ✚ Study the laws of the rmodynamics, concept of ATP, Enzymes classification and function ✚ Chemistry, structure and function of plant cell wall and cell membrane ✚ Structural organization and functional features of different cellular organelles, such as, nucleus, cytoskeleton, chloroplast, mitochondria, peroxisomes, endomembrane system
	CC-10 (Theory + Practical)	**Molecular Biology**	4+2=6	✚ Study the structural organization of DNA and RNA ✚ Learn about the basic molecular mechanism related to central dogma; replication, transcription and translation.
				✚ Acquire enough knowledge regarding the transcriptional and post transcriptional processing and modification of RNA,post- Translational modifications of proteins
	SEC-2	**Herbal Technology**	2	✚ Understand brief history, importance and scope of using herbal medicines in siddha systems emphasizing their cultivation - harvesting - processing-storage-marketing and utilization. ✚ Learn about medicinal uses of the following herbs, like, Tulsi, Ginger, Fenugreek, Indian Goose berry and Ashoka. ✚ Gain knowledge on active principles and utilizationofvariousplantsusedascardiotonic, drugs acting on nervous system, anti- rheumatic, memory booster ✚ Study the drug adulteration types, methods of drug evaluation, biological testing of herbal drugs
V	**CC-11 (Theory + Practical)**	**Plant Physiology**	4+2=6	✚ Learn about elaborative physiological processes related to plant water relationship, mineral nutrition, nutrient uptake ✚ Gain knowledge on the sugar translocation mechanism in phloem, structure and function of plant growth regulators, flowering mechanism of plants ✚ Understand the chemical nature of phytochrome, cryptochrome and phototropins and their role in photomorphogenesis.

	CC-12 (Theory + Practical)	**Plant Metabolism**	4+2=6	✚ Know elaborative metabolic processes of carbohydrate, lipid and nitrogen ✚ Learn about broad outline of carbon oxidation processes ✚ Learn about ATP synthesis mechanism ✚ Understand brief account of signal transduction mechanism
	DSE-1 (Theory + Practical)	**Reproductive Biology of Angiosperms**	4+2=6	✚ Learn about genetic and molecular aspects of flower development ✚ Understand the structure and function of anther and pollen wall emphasizing NPC system of classification, microsporogenesis and microgametogenesis ✚ Learn about detailed ovule structure, types, megasporogenesis and megagametogenesis organization and ultrastructure of mature embryo sac ✚ Acquire knowledge on different types and significance of pollination and fertilization, brief concept of self-incompatibility, structure and types of embryo, endosperm and seed, polyembryony and apomixis
	DSE-2 (Theory + Practical)	**Bioinformatics**	4+2=6	✚ Acquire knowledge on brief introduction, aim, scope, research areas and different branches of Bioinformatics ✚ Study classification of nucleic acid and protein Databases and its Retrieval System Learn about Basic Local Alignment Search Tool (BLAST) ✚ Learn about Sequence Alignments tool with special emphasis on Percent Accepted Mutation (PAM), Blocks of Amino Acid Substitution Matrix (BLOSUM) ✚ Learn about different methods of Molecular Phylogeny and software tools for Phylogeny construction ✚ Know the applications of Bioinformatics emphasizing QSAR techniques in Drug Design, Microbial genome applications, Crop improvement

VI	**CC-13 (Theory + Practical)**	**Genetics & Plant Breeding**	4+2=6	✢ Learn about history, principles of inheritance of Mendelism and its Chromosome theory of inheritance, various allelic and non-allelic interactions, pedigree analysis ✢ Acquire knowledge on linkage, crossing over and chromosome mapping based on two-factor and three-factor crosses, concept of Interference and coincidence ✢ Learn about number and structural variation of chromosomes, types and Molecular basis of gene mutations of various physical and chemical mutagens, fine structure of gene, population and evolutionary genetics ✢ Learn about plant breeding systems, methods of crop improvement, Inbreeding depression and heterosis
	CC-14 (Theory + Practical)	**Plant Biotechnology**	4+2=6	✢ Learn about Plant Tissue Culture techniques, Composition of culture media, concept of Totipotency, organogenesis, embryogenesis, protoplast culture and plant tissue culture applications in various fields ✢ Learn about various Restriction Endonucleases and Cloning Vectors ✢ Know about gene Gene Cloning techniques and different Methods of gene transfer, concept of selectable marker and reporter genes ✢ Learn about applications of Biotechnology for producing Pest resistant and herbicide resistant plants, transgenic crops with improved quality traits, improved horticultural varieties etc.
	DSE-3 (Theory + Practical)	**Plant Evolution & Biodiversity**	4+2=6	✢ Gain knowledge about earliest forms of plant life ✢ Learn about evolutionary trends from green algae to angiosperm, land adaptation processes, evolution of photosynthetic pathways ✢ Learn about phylogeny of basal flowering plants and Eumagnoliids, Monocots, Eudicots, Core eudicots ✢ Understand the evolutionary theories Learn about plant diversity around the world and their adaptive features based on existing environmental conditions

	DSE-4 (Theory + Practical)	**Horticulture Practices & Post-Harvest Technology**	4+2=6	✦ Learn about the types, classification, identification and salient features of some ornamental plants ✦ Learn about the production, origin and distribution, description and economic products, management and marketing of vegetable and fruit crop plants ✦ Know about different horticultural techniques, landscaping and garden design, concept of floriculture and post-harvest technology in horticultural crops ✦ Understand the disease control and management strategies of different horticultural crops

Name of the Department: **UG Department of Botany**
Institution: **Rabindra Mahavidyalaya, Champadanga, Hooghly**
Programme: **B.Sc.General (3 Year)**
System: **Choice Based Credit System (CBCS) *w.e.f.* Academic Year 2017-2018**
AffiliatingUniversity: **The University of Burdwan**

Course outline for B.Sc. General in Botany under CBCS

	DISCIPLINE CORE COURSE (6)	**Ability Enhancement Compulsory Course (AECC) (4/2)**	**Skill Enhancement Course (SEC) (2)**	**Discipline Specific Elective DSE (6)**
SEM-I	Discipline- 1 (BOT) CC- 1A:Biodiversity (Microbes, Algae, Fungi and Archegoniate) Discipline- 2 (Other) Discipline- 3 (Other)	ENVS		
SEM-II	Discipline- 1 (BOT) CC- 1B:Plant Ecology and Taxonomy Discipline- 2 (Other) Discipline- 3 (Other)	Communicative English /MIL		
SEM-III	Discipline- 1 (BOT) CC- 1C:Plant Anatomy and Embryology Discipline- 2 (Other) Discipline- 3 (Other)		SEC – 1	
SEM-IV	Discipline- 1 (BOT) CC- 1D:Plant Physiology and Metabolism Discipline- 2 (Other) Discipline- 3 (Other)		SEC - 2	
SEM-V			SEC – 3	DSE – 1A(BOT) :Economic Botany and Biotechnology/ Analytical Techniques in Plant Sciences/ Bioinformatics DSE – 2A(Other) DSE – 3A(Other)
SEM-VI			SEC – 4	DSE – 1B (BOT) :Cell and Molecular Biology/ Research Methodology/ Dissertation DSE – 2B (Other) DSE – 3B (Other)

PROGRAMME SPECIFIC OUTCOME (PSO):

The specific program offers the following outcomes to students at the end of the program:

PSO 1: They learn about the nature and its natural biodiversity and the intra and inter communication within the different components of the ecosystem.

PSO 2: Students learn about the details of the life cycles of different plant groups ranging from lower to higher order plants.

PSO 3: Students gain hands-on training skills, efficiency and accuracy while dealing with practical classes.

PSO 4: Students obtain communication and managerial skills during excursion trips.

PSO 5: Students learn application-oriented subjects such as biotechnology, cell biology and genetics, ecology, physiology, medicinal botany which they can utilize for their specific job-oriented higher studies as well as entrepreneurship skills.

PROGRAMME OUTCOME (PO):

PO 1: Demonstrate and apply the fundamental knowledge of the basic principles of major fields of biology.

PO 2: Apply knowledge to solve the issues related to plant sciences with the help of computer technology.

PO 3: Apply knowledge for conservation of endemic and endangered plant species.

PO 4: Apply the knowledge to develop the sustainable and eco-friendly technology in Industrial Botany.

COURSE OUTCOME: On completion of the course, students are able to:

Semester	CourseType	Course Title		Credits	Course Outcome
I	**CC-1A** **(Theory + Practical)**	**Biodiversity (Microbes, Algae, Fungi and Archegoniate)**	Microbes	4+2=6	1. Know the structure, function, reproductive methods and growth cycle of different bacteria and viruses. 2. To become aware of economic importance of bacteria.
			Algae		1. Learn about General characteristics, lifecycle, vegetative and reproductive structure of different algal species like *Chlamydomonas*, *Oedogonium*, *Chara*, *Fucus*, *Polysiphonia* 2. EconomicimportanceofAlgae
			Fungi		1. Studythe general characteristics, ecology, thallus organization, classification of Fungi. 2. life cycle of *Rhizopus* (Zygomycota), *Ascobolus*(Ascomycota), *Puccinia*, *Agaricus* (Basidiomycota) 3. Symbiotic associations like lichen, mycorrhiza and its significance.
			Archegoniate		1. Understanding the identifying features of archegoniates, their transition and adaptation to land habit and their alternation of generations. 2. Learn about general characteristics & classification and economic importance of various bryophytes, pteridophytes, and gymnosperms genera. 3. Ecological importance of Bryophytes. 4. Learn about morphology, anatomy, reproduction of *Riccia*, *Marchantia* and *Funaria*. 5. Learn about morphology, anatomy reproduction of *Lycopodium*, *Selaginella*, *Equisetum* and *Pteris* 6. Learnaboutmorphology, anatomy and reproduction of *Cycas* and *Pinus*

II	**CC- 1B** **(Theory + Practical)**	**Plant Ecology and Taxonomy**	Plant Ecology	4+2=6	1. To learn about adaptation of hydrophytes, halophytes and xerophytes. 2. Learn about succession, ecotone and edge effect, biogeochemical cycles 3. Concept about different biogeographical zones and endemism
			Plant Taxonomy		1. Learnaboutscientificapproachto classify and identify a plant specimen 2. Taxonomic evidences from palynology, cytology, phytochemistry and molecular data 3. Learnaboutartificial, natural and phylogenetic classification. 4. LearnaboutICN 5. Learnaboutnumericaltaxonomy alongwithbiometricsandcladistics.
III	**CC- 1C** **(Theory + Practical)**	**Plant Anatomy and Embryology**	Plant Anatomy	4+2=6	1. Learn about different types of plant tissue along with shoot and root apical meristems 2. Learnaboutsecondarygrowth 3. Learn about role of epidermis, cuticle and stomata in plant adaptation and protection. 4. General idea abou adaptations in xerophytes and hydrophytes.
			Embryology		1. Learn about different structures associated with plat reproduction like anther, pollen, ovules, embryo sacs etc. 2 .Pollination mechanisms and adaptations, double fertilization. 3. Seed dispersal mechanisms and significance of seed dispersal in plant life. 4. Learn about different types of endosperms and dicot and monocot embryo. 5. Learn about apomixis and polyembryony.

	Skill Enhancement Course (SEC-1) (Theory)	**Herbal Technology**	2	1.Learn about entire process of cultivation of medicinal plants. 2.Role of tulsi, ginger and Indian Gooseberry in treatment of different disease. 3.Learn about Phytochemistry and phytochemical screening tests for secondary metabolites (alkaloids, flavonoids, steroids, triterpenoids, Phenolic compounds) 4. Application of Tissue Culture technique in some important Medicinal plants such as neem and tulsi. 5.Learn about drug alteration and different methods of drugs evaluation. 6.Learn about role of *Catharanthus roseus* as cardiotonic, *Withania somnifera* as drugs acting on nervous system and *Centella asiatica* as memorybooster.
Semester IV	**CC- 1D (Theory + Practical)**	**Plant Physiology and Metabolism**	4+2=6	1. Learn about different Physiological process of plant like transpiration, photosynthesis, respiration. 2. Learn about essential elements, its role and transportation. 3. Translocation in phloem. 4.Learn about structure, properties and mechanism of actions along with its inhibition. 5.Learn about nitrogen metabolism with emphasize on biological nitrogen fixation; Nitrate and ammonia assimilation. 6.Learn about plantregulators (auxins, gibberellins, cytokinins, ABA, ethylene) 7.Learn about Plant response to Light and temperature.
	Skill Enhancement Course (SEC-2) (Theory)	**Medicinal Botany**	2	1. Learn about indigenous and traditional medicinal sciences Ayurveda, Siddha and Unani. 2.Conservation of endangered and Endemic medicinal plants. 3. Concise knowledge about Ethno botany and Folk medicines. 4.Application of natural product

					cure certain diseases like Jaundice, cardiac, infertility, diabetics, Blood Pressure and skin diseases.
V	**Discipline Specific Elective (DSE 1A)** **(Theory + Practical)**	**Economic Botany and Biotechnology**	Economic Botany	4+2=6	1. Origin of cultivated plants with reference toVavilov's work 2. Learn about origin , morphology and uses of wheat (cereals) 3. Legumes (gram , soybean) , spices (clove, black pepper), beverages (Tea) , oils and fats (emphasize on ground nut), fibre yielding plants (emphasize on cotton)
			Biotechnology		1. Introductory discussion on Biotechnology. 2. Contribution of Indian scientists in the field of Biotechnology. 3. Learn about micropropagation; haploid production through androgenesisandgynogenesis; brief account of embryo & endosperm culture with their applications in plant tissue culture part. 4. Can get knowledge about enzymes in recombinant DNA technology, cloning vector, DNA library, PCR, DNA fingerprinting and application of recombinant DNA technique.

VI	**Discipline Centric Elective (DSE 1B)** **(Theory + Practical)**	**Cell Biology, Genetics and Molecular Biology**	4+2=6	1. Learn about different techniques like Light Microscopy, Phase contrast microscopy, Fluorescence microscopy, Confocal microscopy, Electron microscopy to study cell. 2. Basic concepts about cells 3. Study about cell wall, cell membrane and different cell organelles. 4. Learn about Linkage and Crossing over. 5. Learn about mutations and chromosomal aberrations. 6. Study of mitosis, meiosis and different phases of cell cycle with its control mechanism. 7. Learn about genetic material i.e. DNA 8. Learn about Central Dogma of Molecular Biology i.e. replication, transcription and translation both in Prokaryotes and Eukaryotes. 9. Learn about regulation of gene expression in both prokaryotes (Lac and Tryptophan Operon) and eukaryotes.

Name of the Department: Chemistry
System: CBCS/Part

Programme Outcome:

PO 1 : Disciplinary knowledge and skill: A graduate student is expected to be capable of demonstrating comprehensive knowledge and understanding both theoretical and practical knowledge in all disciplines of Chemistry. Students can solve their subjective problems very methodically, independently and finally draw a logical conclusion. Further, the student will be capable of applying modern technologies, handling advanced instruments and Chemistry related soft-wares for chemical analysis, characterization of materials and in separation technology.

PO-2: Skilled communicator: The course curriculum incorporates basics and advanced training in order to make a graduate student capable of expressing the subject through technical writing as well as through oral presentation.

PO-3: Critical thinker and problem solver: The course curriculum also includes components that can be helpful to graduate students to develop critical thinking and to design, carryout, record and analyze the results of chemical reactions. Students will be able to think and apply evidence based comparative chemistry approach to explain chemical synthesis and analysis.

PO-4: Sense of inquiry: It is expected that the course curriculum will develop an inquisitive characteristics among the students through appropriate questions, planning and reporting experimental investigation.

PO-5: Team player: The course curriculum has been designed to provide opportunity to act as team player by contributing in laboratory, field based situation and industry.

PO-6:**Skilled project manager:** The course curriculum has been designed in such a manner as to enabling a graduate student to become a skilled project manager by acquiring knowledge about chemistry project management, writing, planning, study of ethical standards and rules and regulations pertaining to scientific project operation.

PO-7: Digitally literate: The course curriculum has been so designed to impart a good working knowledge in understanding and carrying out data analysis, use of library search tools, use of chemical simulation software and related computational work.

PO-8: Ethical awareness: A graduate student requires understanding and developing ethical awareness or reasoning which is adequately provided through the course curriculum. Students can also create an awareness of the impact of chemistry on the environment, society, and also make development outside the scientific community.

PO-9: Environmental Awareness: As an inhabitant of this green planet a Chemistry graduate student should have many social responsibilities. The course curriculum is designed to teach a Chemistry graduate student to follow the green routes for the synthesis of chemical compounds and also find out new greener routes for sustainable development. The course also helps them to understand the causes of environmental pollution and thereby applying environmental friendly policies instead of environmentally hazard ones in every aspect.

PO-10: Life long learner: The course curriculum is designed to inculcate a habit of learning continuously through use of advanced ICT technique and other available e-techniques, e-books and e-journals for personal academic growth.

PO -11 : Analytical skill development and job opportunity: The course curriculum is designed in such a way that Chemistry graduate students can handle many Chemistry based software, decent instruments and advanced technologies to synthesize, characterize and analyze the chemical compounds very skillfully. Such a wonderful practice in the graduate level will bring a good opportunity to the students for getting job in industries besides academic and administrative works.

Programme Specific Outcome:

PSO 1:Core competency: The chemistry graduates are expected to gain knowledge of the fundamental concepts of chemistry and applied chemistry through theory and practical. These fundamental concepts would be reflected in the latest understanding of the field to keep continues its progression.

PSO-2: Communication skills: Chemistry graduates are expected to possess minimum standards of communication skills to read and understand documents so that they can solve their problems very methodically, independently and with logical argument. Graduates are expected to build good communication skill so that they can easily share their idea/finding/concepts to others.

PSO-3: Critical thinking: Chemistry graduates are expected to achieve critical thinking ability to design, carry out, record and analyze the results of chemical reactions. They can have that muchpotential and confidence that they can overcome many difficulties with the help of their sharp scientific knowledge and logical approaches. performing, observing and giving conclusion of a particular reaction. It is also important for selfcompassion, self reflection, interpersonal relationships, and emotional management.

PSO-4: Psychological skills: Chemistry graduates are expected to possess basic psychological skills so that they can deal with individuals and students of various socio-cultural, economic and educational levels. Psychological skills are very important for proper mind setting during performing, observing and giving conclusion of a particular reaction. It is also important for self-compassion, self-reflection, interpersonal relationships, and emotional management.

PSO-5:Problem solving: Graduates are expected to be well trained with problem philosophical approaches that are pertinent across the disciplines.

PSO-6: Analytical skill development and job opportunity: Chemistry graduates are expected to possess sufficient knowledge how to synthesize a chemical compound and perform necessary characterization and analysis in support of the formation of the product by using modern analytical tools and advanced technologies. Because of this course curriculum chemistry graduates have lot of opportunity to get job not only in academic and administrative field but also in industry.

PSO-7: Research motivation: Chemistry graduates are expected to be technically well trained with modern devices and Chemistry based software and has powerful knowledge in different disciplines of Chemistry so they can easily involve themselves in theory and laboratory based research activities.

PSO-8: Team work: Graduates are expected to be team players, with productive co operations involving members from diverse socio-cultural backgrounds.

PSO -9: Digital Literacy: Graduates are expected to be digitally literate for them to enroll and increase their core competency via e-learning resources such as MOOC and other digital tools for lifelong learning. **PSO-10: Social Awareness:** As an inhabitant of this green world it is our duty to make our planet clean and suitable for living to all. In this context Chemistry graduates are expected to be more aware about finding green chemical reaction routes for sustainable development. They are expected to maintain good laboratory practices and safety

Course Outcome **(Chemistry Hons.)**

Semester/ Part	Course Type	Paper Description	Course Outcome
SEM-1	CC-1	*Bonding and Physical Properties*	CO-1: To understand Valence Bond Theory
			CO-2: To know Electronic displacements
			CO3: To study the modern approaches of chemical bonding MO theory
			CO4: To learn Physical properties for example BDE, bond angles; melting point/boiling point and solubility of common organic; polarity of molecules and dipole moments
		General Treatment of Reaction Mechanism I	CO-1: To know the concept, types, reaction mechanism and examples of elimination, free-radical and nucleohilic substitution reactions
			CO-2: To understand about the formation and stability of reaction intermediates and their electrophilic and nucleophilic behaviour
		Stereochemistry-I	CO-1: To learn Bonding geometries of carbon compounds
			CO-2: To understand the Concept of chirality and symmetry
			CO-3: To study Relative and absolute configuration
			CO-4: To learn the Optical activity of chiral compounds, different rotation, racemic compounds, racemisation
	CC-2	*Kinetic Theory and Gaseous state*	CO-1**:** To understand the basic concept of kinetic theory of gases and know how to solve numerical problems related to that topic
			CO-2: To study Maxwell's distribution of speed and energy
			CO-3: To understand the behavior of Real gas and virial equation, Intermolecular forces
		Chemical Thermodynamics	CO-1: To study Zeroth and 1st law of Thermodynamics calculations of q, w, U and H for reversible, irreversible and free expansion of gases
			CO-2: To learn Thermochemistry
			CO-3: To study Second Law, Entropy and Auxiliary

			state functions (G and A) and their variation with T, P and V. Criteria for spontaneity and equilibrium
			CO-4: To understand the calculations of q, w, U and H for reversible, irreversible and free expansion of gases
		Chemical kinetics	CO-1: To study Rate law, order and molecularity
			CO-2: To understand Role of Temperature and theories of reaction rate
			CO-3: To learn the role of Homogeneous catalysis
			CO-4: To understand Autocatalysis; periodic reactions
SEM-2	CC-3	*Extra nuclear Structure of atom*	CO-1: To learn the basic concept, terms and equations of Atomic Structure
		Chemical periodicity	CO-1: To study Chemical Periodicity, Group trends and periodic trends in these properties in respect of s-, p- and d-block elements
		Acid-Base reactions	CO-1: To understand the Acid-Base concept, pH, buffer. Acid-base neutralisation curves; indicator
		Redox Reactions and precipitation reactions	CO-1: To learn Ion-electron method of balancing equation of redox reaction, Solubility product principle
	CC-4	*Stereochemistry II*	CO-1: To understand Chirality arising out of stereoaxis
			CO-2: To study Concept of prostereoisomerism
			CO-3: To know about the conformational nomenclature
			CO-4: To learn conformation of conjugated systems
		General Treatment of Reaction Mechanism II	CO-1: To understand Reaction thermodynamics
			CO-2: To learn the Concept of organic acids and bases
			CO-3: To study Tautomerism of organic compounds
			CO-4: To know Reaction kinetics of organic compounds, principle of microscopic reversibility.
		Substitution and Elimination Reactions	CO-1: To understand Free-radical substitution reaction, halogentaion of alkanes, mechanism and stereochemical features
			CO-2: To study Nucleophilic substitution reactions, role of crown ethers and phase transfer catalysts;
			CO-3: To know Elimination reactions, regioselectivity (Saytzeff/Hofmann) and stereoselectivity
SEM-3	CC-5	*Transport Processes*	CO-1: To understand Fick's law: Flux, force different examples of transport properties
			CO-2: To study Viscosity of liquids and Comparison with that of gases.
			CO-3: To know Conductance, Conductometric titrations
			CO-4: To learn Transport number
		Application of Thermodynamics – I	CO-1: To know Partial properties and Chemical potential
			CO-2: To study Chemical Equilibrium
			CO-3: To learn Nernst's distribution law
			CO-4: To understand Chemical potential and other properties of ideal substances- pure and mixtures, Condensed Phase
		Foundation of Quantum Mechanics	CO-1: To understand the Beginning of Quantum Mechanics

			CO-2: To know the concept of Wave function
			CO-3:Helps to understand the Concept of Operators
			CO-4: To learn Particle in a box:
			CO-5: To understand Simple Harmonic Oscillator
	CC-6	*Chemical Bonding-I*	CO-1: To understand about Ionic bonding
			CO-2: To know about Covalent bonding
		Chemical Bonding-II	CO-1: To learn Molecular orbital concept of bonding
			CO-2: To study Metallic Bonding
			CO-3: To know basic concept of Weak Chemical Forces
		Radioactivity	CO-1: To understand about the concept of radioactivity and radioactive compounds, nuclear stability
			CO-2: To study nuclear reactions, artificial radioactivity
			CO-3:Helps to understand radio carbon dating, hazards of radiation and safety measures.
	CC-7	*Chemistry of alkenes and alkynes*	CO-1: To understand in detail about the synthesis, properties, chemical reactions and reaction mechanisms of alkenes
			CO-2: To study about the synthesis, properties, chemical reactions and reaction mechanisms of alkynes
			CO-3: To know
		Aromatic Substitution	CO-1: To understand about different types of electrophilic aromatic substitution reactions, reaction intermediates and their mechanisms
			CO-2: To study different types of nucleophilic aromatic substitution reactions, reaction intermediates and their mechanisms
		Carbonyl and Related Compounds	CO-1: To learn addition reactions of carbonyl compounds
			CO-2: To understand about Exploitation of acidity of α-H of C=O:
			CO-3: To know about Aldol reactions
			CO-4: To understand about Nucleophilic addition to α,β-unsaturated carbonyl system
			CO-5: To study the Substitution at sp2 carbon
		Organometallics	CO-1: To study different types of *Organometallics* reactions
	SEC-1	IT skill in Chemistry	CO-1: To learn mathematical Fundamentals, Uncertainty in measurement, Algebraic operations on real scalar variables, Differential calculus, Numerical integration
			CO-2: To learn basic Computer Programming, Handling numeric data
SEM-4	CC-8	*Application of Thermodynamics – II*	CO-1: To know the applications of Thermodynamics in Colligative Properties
			CO-2: To study Phase rule and Phase Equilibrium
			CO-3: To understand First order phase transition and Clapeyron equation

			CO-4: To learn Three component systems
			CO-5: To know about Binary solutions
		Electrical Properties of molecules	CO-1: Ionic equilibria, Chemical potential, Activity and activity coefficients of ions in solution
			CO-2: To study Electromotive Force, oxidation/ reduction of ions based on half-cell potentials, Chemical cells, Nernst equation
			CO-3: To understand Concentration cells, potentiometric titrations
		Quantum Chemistry	CO-1: To learn Helps to understand the fundamental concept, basic terms, derivation and application of Quantum Mechanics
			CO-2: To know Qualitative treatment of hydrogen atom and hydrogen-like ions
			CO-3: To study LCAO and HF-SCF method
	CC-9	*Inorganic Chemistry III*	CO-1: To understand General Principles of Metallurgy
			CO-2: To learn Chemistry of s and p Block Elements
			CO-3: To know preparation, Structure, properties and nature of bonding of Noble Gases
			CO-4: To study synthesis, structural aspects and applications of inorganic polymers
		Coordination Chemistry-I	CO-1: To understand the science of Double and complex salts
	CC-10	*Nitrogen compounds*	CO-1: To learn in detail about the preparation, properties, chemical reactions and mechanisms of amines
			CO-2: To know in detail about the preparation, properties, chemical reactions and mechanisms of Nitro compounds (aliphatic and aromatic):
			CO-3: To study in detail about the preparation, properties, chemical reactions and mechanisms of Alkyl nitrile and isonitrile
			CO-4: To understand the preparation, properties, chemical reactions and mechanisms of Diazonium salts and their related compounds
		Rearrangements	CO-1: To learn Mechanism with evidence and stereo chemical features for Rearrangement to electron-deficient carbon
			CO-2: To know Mechanism with evidence and stereo chemical features for Rearrangement to electron-deficient nitrogen

			CO-3: To study Mechanism with evidence and stereo chemical features for Rearrangement to electron-deficient oxygen
			CO-4: To understand Aromatic rearrangements
			CO-5: To learn the science of Migration from nitrogen to ring carbon
			CO-6: To know Rearrangement reactions by green approach
		The Logic of Organic Synthesis	CO-1: To study Retrosynthetic analysis
			CO-2: To understand Strategy of ring synthesis
			CO-3: To learn Asymmetric synthesis
		Organic Spectroscopy	CO-1: To study UV-Visible spectroscopy in detail
			CO-2: To study IR Spectroscopy in detail
			CO-3: To understand NMR Spectroscopy in detail
			CO-4: To learn Applications of IR, UV and NMR spectroscopy for identification of simple organic molecules
	SEC-2	Drugs & Pharmaceuticals	CO-1: To know Drug discovery, design and development
			CO-2: To study about Aerobic and anaerobic fermentation
SEM-5	CC-11	*Coordination Chemistry-II*	CO-1: To know in detail about Crystal Field Theory
			CO-2: To study about General comparison, Chemical bonding and Molecular structure, Transition Elements
			CO-3: To understand General comparison, Chemical bonding and Molecular structure of Lanthanoids and Actinoids
	CC-12	Carbocycles and Heterocycles	CO-1: To learn in detail about Polynuclear hydrocarbons and their derivatives
			CO-2: To know in detail about Heterocyclic compounds
		Cyclic Stereochemistry	CO-1: To study the science of Alicyclic compounds
		Pericyclic reactions	CO-1: To understand Mechanism, stereochemistry, regioselectivity of Electrocyclic reactions
			CO-2: To learn Mechanism, stereochemistry, regioselectivity of Cycloaddition reactions

			CO-3: To know Mechanism, stereochemistry, regioselectivity of Sigmatropic reactions
		Carbohydrates	CO-1: To study in detail about the preparation, properties, chemical reactions and mechanisms of Carbohydrates
		Biomolecules	CO-1: To understand in detail about the preparation, properties, chemical reactions mechanisms of Amino acids
			CO-2: To learn in detail about the preparation, properties, chemical reactions mechanisms of Peptides
			CO-3: To know in detail about the preparation, properties, chemical reactions mechanisms of Nucleic acids
		Alkaloids and Terpenoids	CO-1: Depicts General studies on terpenoids and alkaloids
	DSE-1	Crystal Structure	CO-1: Helps to know the Bravais Lattice and Laws of Crystallography
			CO-2: To learn Crystal Planes
			CO-3: To know Determination of crystal structure
		Statistical Thermodynamics	CO-1: To know about the necessary laws, rules, terms, expressions and derivations statistical thermodynamics
			CO-2: To understand Boltzmann distribution
			CO-3: To learn about Partition function
		Special selected topics	CO-1: To know Specific heat of solid
			CO-2: To study 3rd law of thermodynamics
			CO-3: To understand the nature and structure of polymers, determination of molecular weight of polymers and thermodynamics of polymer solution.
			CO-4: To learn about the fundamental concepts, important equations, properties and applications of polarizability and dipole moment.
	DSE-2	Qualitative and quantitative aspects of analysis	CO-1: To know Sampling, evaluation of analytical data, errors, accuracy and precisio
		Optical methods of analysis	CO-1: To study Origin of spectra, fundamental laws of spectroscopy and selection rules, validity of Beer-Lambert's law
			CO-2: To understand UV-Visible Spectrophotometry
			CO-3: To learn Basic principles of quantitative analysis

			CO-4: To know the Basic principles of instrumentation of Infrared Spectroscopy
			CO-5: To study Flame Atomic Absorption and Emission Spectroscopy
		Thermal methods of analysis	CO-1: To understand Theory of thermogravimetry (TG), basic principle of instrumentation
		Electroanalytical methods	CO-1: To learn Classification of electroanalytical methods, basic principle of pH metric, potentiometric andconductometric titrations
		Separation techniques	CO-1: To know the method of Solvent extraction
			CO-2: To study Technique of extraction
			CO-3: To understand Qualitative and quantitative aspects of solvent extraction
			CO-4: To learn Chromatography
			CO-5: To know Development of chromatograms
			CO-6: To study Qualitative and quantitative aspects of chromatographic methods
			CO-7: To understand Stereoisomeric separation and analysis
			CO-8: To learn Role of computers in instrumental methods of analysis
	DSE-2	*Molecular spectroscopy*	CO-1: To know Infrared spectroscopy
			CO-2: To study UV-Visible and fluorescence spectroscopy
		Separation techniques	CO-1: To understand Chromatography
			CO-2: To learn Detection of Gas and liquid, Detection using IR and Mass spectroscopic techniques
		Elemental analysis	CO-1: To know Mass spectrometry
			CO-2: To study Atomic absorption, Atomic emission, and Atomic fluorescence
			CO-3: To understand Atomization techniques
		NMR spectroscopy	CO-1: To learn in detail Principle, Instrumentation, Applications of NMR spectroscopy
		Electro analytical Methods	CO-1: To know Elementary ideas Potentiometry & Voltammetry
		Elementary idea as advanced spectroscopic	CO-1: To study X-ray analysis and electron spectroscopy

		techniques	
SEM-6	CC-13	Bioinorganic Chemistry	CO-1: To understand about Bioinorganic Chemistry, Elements of life
		Organometallic Chemistry	CO-1: To learn Definition and classification of organometallic compounds on the basis of bond type
		Catalysis by Organometallic Compounds	CO-1: To Study of industrial processes
		Reaction Kinetics and Mechanism	CO-2: To study the inorganic reaction mechanisms
	CC-14	Molecular Spectroscopy	CO-1: To understand the Interaction of electromagnetic radiation with molecules
			CO-2: To learn Principles, applications of Rotation spectroscopy
			CO-3: To know Principles, applications of Vibrational spectroscopy
			CO-4: To study Principles, applications of Raman spectroscopy
			CO-5: To understand Principles, applications of Nuclear Magnetic Resonance (NMR) spectroscopy
		Photochemistry	CO-1: To learn Lambert-Beer's law
			CO-2: To know Photochemical Processes
			CO-3: To study Rate of Photochemical processes
		Surface phenomenon	CO-1: To understand Surface tension and energy
			CO-2: To learn Classification, Adsorption Isotherms and applications of Adsorption;
			CO-3: To know Classification, rules and properties of Colloids
	DSE-3	Green Chemistry	CO-1: To study about green chemistry and its necessity.
			CO-2: To study about the principles of green chemistry and designing the green synthetic routes.
			CO-3: To understand about the examples of green reactions and future trends in green reaction.
			CO-4: To learn use of microwaves and ultrasonic energy in green processes
			CO-5: To know how to perform green synthesis of a number of organic compounds in the laboratory.

	DSE-4	Inorganic materials of industrial importance	CO-1: Helps to understand about the manufacture, properties, compositions, classes and applications of silicate materials such as glasses, ceramics, ceramics
			CO-2: To understand the manufacture, properties, compositions, classes and applications of industrially important materials such as fertilizers
			CO-3: To study the manufacture, properties, compositions, classes and applications of surface coating materials
			CO-4: To understand the manufacture, properties, compositions, classes and applications of batteries
			CO-5: To learn the manufacture, properties, compositions, classes and applications of alloys
			CO-6: To know the manufacture, properties, compositions, classes and applications of catalysis
			CO-7: To study the manufacture, properties, compositions, classes and applications of chemical explosives

Course Outcome (Chemistry General) :

Semester/Part	Course Type	Paper Description	Course Outcome
SEM-1	CC-1A/GE-1	Atomic Structure	CO-1: To learn the basic concept, terms and equations of Atomic Structure
		Chemical Periodicity	CO-1: To study Chemical Periodicity, Group trends and periodic trends in these properties in respect of s-, p- and d-block elements
		Acids and Bases	CO-1: To understand the Acid-Base concept, pH, buffer. Acid-base neutralisation curves; indicator
		Redox Reactions	CO-1: To learn Ion-electron method of balancing equation of redox reaction, Solubility product principle
		Fundamentals Of Organic Chemistry	CO-1: Preliminary ideas of Organic Chemistry
		Stereochemistry	CO-1: To learn Bonding geometries of carbon compounds
			CO-2: To understand the Concept of chirality and symmetry
			CO-3: To study Relative and absolute configuration
			CO-4: To learn the Optical activity of chiral compounds, different rotation, racemic compounds, racemisation

		Nucleophilic Substitution and Elemination Reactions	CO-1: To understand Free-radical substitution reaction, halogentaion of alkanes, mechanism
			CO-2: To study Nucleophilic substitution reactions
			CO-3: To know Elimination reactions, regioselectivity (Saytzeff/Hofmann) and stereoselectivity
		Aliphatic Hydrocarbons	CO-1: To learn preparation procedure and reactions of Aliphatic hydrocarbons
		Alkanes	CO-1: To learn preparation procedure and reactions of Aliphatic hydrocarbons
		Alkenes	CO-1: To learn preparation procedure and reactions of Aliphatic hydrocarbons
		Alkynes	CO-1: To learn preparation procedure and reactions of Aliphatic hydrocarbons
		Reactions	CO 1: To study formation of metal acetylides and their reactions
SEM 2	CC-1B/GE-2	Kinetic Theory Of Gases and Real Gases	**CO-1:** To understand the basic concept of kinetic theory of gases and know how to solve numerical problems related to that topic
			CO-2: To study Maxwell's distribution of speed and energy
			CO-3: To understand the behavior of Real gas and virial equation, Intermolecular forces
		Liquids	CO-1: To study surface tension, viscosity and trelated tropics
		Solids	CO-1:
		Chemical Kinetics	CO-1: To study Rate law, order and molecularity
			CO-2: To understand Role of Temperature and theories of reaction rate
		Chemical bonding and Molecular Structure	CO-1: To understand Valence Bond Theory
			CO-2: To know Electronic displacements
			CO-3: To study the modern approaches of chemical bonding MO theory

		Comperative Study Of P-block Elements	CO-1: To learn about-block elements, inert pair effects.
			CO-2: To study important compounds of P-block elements
SEM 3	CC-1C	Chemical Energetics	CO-1: To study thermodynamic parameters, laws of thermodynamics.
			CO-2: To study intensive and extensive properties, concept of heat, work, internal energy
			CO-3: To study Carnot cycle, heat engines' Laws of thermochemistry
		Chemical Equilibrium	CO-1: To know thermodynamic conditions for equilibrium
			CO-2: To study definitions of K_P, K_C, K_X and relations among them
			CO-3: To understand Le Chatelier's principle
		Ionic Equilibria	CO-1: To study various types of electrolytes, degree of ionization
			CO-2: To learn pH scale, common ion effect, Buffer solutions
			CO-3: To know about solublity product and application
		Aromatic Hydrocarbons	CO-1: To know structure of Benzene and its reactions
		Organometallic Compounds	CO-1: To study preparation and reactions of Grignard reagents
		Aryl Halides	CO-1: Preparation of Chloro, Bromo, Iodobenzene from phenol and their reactions
		Alcohols, Phenols, and Ethers	CO-1: To study their preparations and reactions
		Carbonyl Compounds	CO-1: To study their preparations and reactions
	SEC-1	Carbohydrates	CO-1: To know biological importance of carbohydrates, metabolism, alcoholic and lactic acid fermentation, Kerbs cycle
		Proteins	CO-1: To study biological importance of proteins, classification, structures
		Structure of DNA and RNA	CO-1: To understand structures, generic code, Biological role

		Enzymes	CO-1: To study Classification, effect of PH, temperature on enzyme activity
		Biochemistry Of Disease: A diagnostic approach by blood/urine analysis	CO-1: To know composition and structure of blood, blood coagulation, blood collection and preservation of sample
			CO-2: To study about collection and preservation of urine sample

SEM 4	CC-1D	Solutions	CO-1: To understand the idea of Ideal solutions and Roult's law, deviation from Ideal solutions –(non-ideal solution)
			CO-2: To study critical solution temperature, Nernst distribution law
		Phase Equilibria	CO-1: To study Phases, components, degrees of freedom
			CO-2: To study Gibbs Phase rule, Clausius-Clapeyron equation and its importance, Phase diagram.
		Conductance	CO-1: To know cell constant, specific conductance, molar conductance.
			CO-2: To understand Kohlrausch's law Ostwald's dilution law and application of conduction measurement
		Electromotive Force	CO-1: To know Faraday's laws of electrolysis, application of electrolysis in industry
			CO-2: To know electromotive force of a cell and Nernst equation
		Chemical Analysis	CO-1: To know gravimetric analysis, solubility product and common ion effect and gravimetric estimation
			CO-2: To know about volumetric analysis, acid-base oxidation, complexometric titrations.
			CO-3: Chromatographic methods of analysis, column and thin layer chromatography
		Environmental Chemistry	CO-1: To know composition and structure of atmosphere, troposphere, stratosphere, mesosphere, thermosphere
			CO-2: To know major air pollutants, their origin and harmful effects
			CO-3: To know about green house effect, acid rain, photochemical smokes

			CO-4: To know about natural water sources, water treatments, thermal pollution, radioactive pollution,water pollution and their harmful effects
			CO-5: To understand about DO, BOD,COD, TDS and hardness parameters
	SEC-2	Pharmaceutical Chemistry	CO-1: To know Drug discovery, drug design, to understand antibiotics (Chloramphenicol); antibacterial and antifungal agents
			CO-2: To understand Central Nervous System agents
SEM 5	SEC-3	Basics & Application of Computer in Chemistry:	CO-1: (Mathematics) To learn mathematical functions, polynomial expressions, logarithms, the exponential function, equation of a straight line, plotting graphs.
			CO-2: (Uncertainty in measurement) To learn Types of uncertainties. Statistical treatment: Mean, standard deviation, calculation of relative error.
			CO-3: (Differential calculus) To learn The tangent line and the derivative of a function, numerical differentiation
	DSE-1A	Transition Metal	CO-1: To know general group trends, variable valancies, color, magnetic properties of transition elements
			CO-2: To know Electronic configurations, oxidation states, colour, magnetic properties, lanthanide contraction, separation of lanthanides.
		Coordination Chemistry	CO-1: To know Werner's coordination theory, Valence Bond Theory
			CO-2: To learn drawbacks of VBT; IUPAC system of nomenclature.
		Crystal Field Theory	CO-3: To understand crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong field ligands.
SEM 6	DSE-1B	Carboxylic acids and their derivatives	CO-1: To learn strength of organic carboxylic acids, comparative study with emphasis on factors affecting pK values and their Preparation procedures.
		Amines and diazonium salts	CO-1: To learn preparations and reactions
		Amino acids and Carbohydrates	CO-1: To learn preparations and reactions

B.Com (Hons.) CBCS Course & Course Outcomes

Subject: Commerce

Semesters	CBCS Course	Paper Nature	Course Outcomes
Sem-1	Financial Accounting-I	CC-1	Students have revisited the theoretical framework of accounting along with their applications through Single Entry and Double Entry Accounting System, Self and Sectional Balancing Ledger System, the dimensions of accounting like Consignment Accounting, Accounting for Sale on Approval basis, Insurance Accounting and Partnership Accounting etc.
Sem-1	Business Management	CC-2	Students have revisited the organization of business and the different elements of it like Planning, Organizing, Staffing and Controlling in details.
Sem-1	Business Mathematics	GE-1	Students have learnt as well as revisited the introductory algebra like indices, logarithms and set theory. They have been introduced with the Matrix Algebra and Determinants, preliminary applications of Calculus like derivatives and integrations. They have also learnt the business applications of Linear Programing.
Sem-2	Cost Accounting-I	CC-3	The students have learnt introductory concepts in Cost Accounting and techniques used in ascertainment of costs of production under different heads of costs like Materials, Labour and Overheads. They have also understood the methods of book keeping used in Cost Accounting.
Sem-2	Business Law	CC-4	The pupil have learnt the applications of different laws or Acts used in business organizations like Indian Contract Act 1872; Negotiable Instruments Act 1881; Sale of Goods Act 1930; Partnership Law 1932 and Limited Liability Partnership Act2008 and Consumer Protection Act 2019.
Sem-2	Business Statistics	GE-2	The outcomes that students have learnt fundamental of statistics used in business and the techniques used in different statistical analysis of sample data like the central tendency measures, dispersion and shape measures, correlation and regression analysis and the use of index numbers and time series analysis as well.
Sem-3	Computer Applications in Business	CC-5	The students have learnt the basics of computer applications in business like organization of computer, the use and utility of number system and logic gates, the use of internet, and the data-based management system etc. Through practical classes, they also have learnt the text process applications like MS Word, presentation applications like MS Power Point, calculation application like MS Spread Sheet and accounting applications likeTally etc.
Sem-3	Cost Accounting-II	CC-6	In this course, the students have learnt specific branches of cost accounting like Job Costing, Batch Costing, Contract Costing, Standard Costing and Marginal Costing etc.
Sem-3	Financial Accounting-II	CC-7	Here, the students have learnt the special branches of accounting applications like Accounting for Hire Purchase and Installment Payment System, Branch Accounting and Departmental Accounting, Royalty Accounting, Advance level partnership

			accounting and Company Accounts.
Sem-3	E-Commerce	SEC-1	Students have visited the introductory understanding about E-Commerce, E-customer relationship management,digital payment system, Enterprise resource planning, and the recent trends in E-Commerce like digital marketing and social media marketing etc.
Sem-3	Principles of Economics	GE-3	The students have learnt the different principles of economics specifically related to the demand and supply framework and the equilibriums in the markets, the concepts of production functions and cost functions, the different structures of the markets, the role of income distribution and factor pricing along with general macroeconomic principles related to income, savings, and investment etc.
Sem-4	Indian Economy	GE-4	The pupil has learnt about the basic issues in economic development, features of Indian economy, different policy regimes, the growth, development and structural changes of the Indian economy and its sectoral trends and issues of changes for agricultural, industry and service sectors and financial sectors as well.
Sem-4	Financial Accounting- III	CC-8	The students have learnt the advance levels of financial account like accounting of share capital and debentures, final accounts, goodwill valuations of a company and its share's valuations and their different methods and their uses as well. Besides learning different reconstruction procedures of a company,they have also learnt about the holding company accounts.
Sem-4	Marketing Management & Human Resource Management	CC-9	The students become acquainted about the new branches of management viz., marketing management and human resource management. They have learnt about the consumer behaviors and product management as well.
Sem-4	Entrepreneurship	SEC-2	In this SEC paper, students have learnt about introductory ideas about entrepreneur and entrepreneurship as well as the different dimensions for micro, small, medium and women entrepreneurship. They have learnt about the role of government and institutions in entrepreneurship development besides learning about sources of different business ideas and its feasibility tests and finally, mobilization of resources etc.
Sem-4	Corporate Laws	CC-10	In Corporate Laws, students learnt the Companies Act 2013, procedure for formation of a Company, company administration, different issues of share capital and debenture, and corporate meetings, etc.
Sem-5	Taxation-I	CC-11	The pupil has learnt the basic tenets of taxation, heads of income, exempted incomes, derivation of tax for different assesses as per their residential status besides learning about agriculture income.
Sem-5	Auditing	CC-12	In auditing, students have learnt about basic concepts and principles that are used in auditing, different issues in Company Audits, details in audit report and contents in audit certificates. They have learnt about audit procedures of different institutions

			and special audit areas as well.
Sem-5	Management Accounting / Fundamentals of Banking and Insurance	DSE-1	The students were offered Management Accounting as their DSE-1 paper. The students have learnt the concepts of management accounting, tools used in analysing comparative financial statements and common size financial statements besides learning the use and technique of ratio analysis, cash flow statement and budgets and budgetary control as well.
Sem-5	Indian Financial System / Advertising	DSE-2	The students were offered Indian Financial System as their DSE-2 paper. They have learnt about the financial system and its components in India. They have learnt about financial markets, financial institutions and financial services as well. Besides, they have learnt about lease financing and hire-purchase financing.
Sem-6	Fundamentals of Financial Management	CC-13	The students have learnt about fundamentals of financial management, sources of corporate finance, corporate capital structure analysis, cost of capital, capital budgeting decisions, working capital management and firms' dividend decision policies as well.
Sem-6	Taxation-II	CC-14	The pupil has learnt advanced levels in taxation, calculations of taxable incomes, different set off and carry forward provisions in Income Tax Act 1961, different deductions provisions, rebates u/s 87A, basic concepts of GST, its procedures etc.
Sem-6	Fundamentals of Investment / Tax Procedures and Management	DSE-3	In DSE-3, the students were provided with Tax Procedure and Management. They have learnt about the concepts of tax planning, tax evasion, tax avoidance and tax management and identified the differences amongst them. They have also learnt about different advanced aspects for tax management.
Sem-6	International Business/ Project Work	DSE-4	Students were given Project Work at their choice subject to feasible intervention of the available teachers in the department. The students have learnt to apply their basic understanding in different subjects and link the same to the real-world issues like macroeconomic issues, effects of COVID-19 on the Business World etc.

DEPARTMENT OF DEFENCE STUDIES

Programme specific outcome:

- Defence studies as a subject and degree cover all strategic aspects that can have bearing on the learning of security issues in the defence of the country.
- Encourage leadership qualities amongst students and raise ability to work as a team.
- Gain an understanding of professional ethics and apply it in the field of national security rather than replicate the curriculum content knowledge.
- Demonstrate the ability to apply one's disciplinary knowledge and skills to new frontiers and be a partner ensuring global competitiveness.
- Undertake mechanism to periodically review of teaching programmes including adoption of teaching and learning techniques.

COURSE OUTCOME

Semester	Paper	Teacher concerned	Units	Courseoutcome
I	CC-1A FUNDAMENDALS OF WAR	DJ	1. Definition and meaning, objectives and types of war 2. Historical evolution of Warfare, causes of Warfare, principles of Warfare	➢ Students are taught general concepts about war. ➢ Students understand how important the basic Principal of warfare. ➢ There are certain international rules of war that must be obeyed in order to wage war. ➢ Teaching how to make wastactics. ➢ Prepared battle plans are taught.
		SA	3. Conventional and unconventional wars, Land War, War 4. Nuclear War, NuclearWeapons treaties	

II	CC-1B Military Geography and Map Reading	DJ	1.Scope of Military Geography, Frontiers and boundaries, communication routes, India's borders,Indian Ocean territory and strategic significance 3.Practical (Prismatic Compass, setting of map, point to point march)	➢ In this subjects acquired knowledge of military geography and map. ➢ Though this subject students become a mental soldier. ➢ ThereisanincreaseinthetendencyofstudentstoServe in the army. ➢ Learn to quality to join the army.
		SA	2. Introduction of map, conventional signs,scales,Grid system, Relief Contours and Gradients,Cardinal points,finding North, types of bearing and use of service protector 3.Practica l (Prismatic Compass, setting of map, point to point march)	
III	CC-1C World Military History	DJ	1.Warfare in the middle ages, Crusades, Mongol Military Systems, Advent of Gun Powder and Impact on Warfare 4. Development of Warfare during inter War period • Practical (Preparation of different stages of battle on a Sand model or to draw sketches of the same on plain paper-Chilinwals, Plassey,	➢ Students can learn about the military history of the world. ➢ Victory in war can be known as the cause of defeat. ➢ Students are defend the mentally prepared to our country. ➢ Students learn about the strategies of the world's Warriors. ➢ Students learn to build a strong.
		SA	2. Nepoleonic Warfare, French revolution, rise of Nepoleon, Nepoleons art of warfare, Battle of Waterloo 3. World war First and Second, causes, strategies and tactics, trench warfare in World war, Consequences.	

			Practical (Preparation of Different stages of battle on a Sand model or to draw sketches of the same on plain paper-Chilinwals, Plassey, Panipath)	
	SEC-1 Constitutionof India	DJ	1.Nature of Indian constitution- Federal, Unitary, Essential characteristics, Preamble of the Indian constitution- purposes, objectives 4.Emergency provisions-National, state, financial emergency, amendment of the constitution	• An idea about the constitution of India is born. • Students get an idea about the administration of the country. • Very useful in this regard to establish yourself in the future. .
		SA	2. Fundamental Rights, directive principles of state policies, Fundamental duties 3. Parliament, the union judiciary	
	CC-1D Introduction to small arms, Field engineering ,field craft & Battl ecraft		3. Digging tools, Knots, Lashes, Field defences, Mines,Minelaying, Waterman ship, Hydrogen Bomb, Atom Bomb, Chemical and Bio-chemical war 4. Concealment, Camouflage, Judging distance, Indication of target,	• Acquires general knowledge of small and big arms. • Learn about modern weapons systems. • Acquires practical and the oretical knowledge about small states. • Student sprepare themselves for the army by acquiring knowledge. • Beside The state administration creates morale fort he

IV		DJ	Field Signal, Section formation • Practical (Digging tools, Knots, Lashes, Field defences, Mines, Mine laying, Concealment, Camouflage, Judging distance, Indication oftarget, Field Signal, Section formation)	departmental jobs.
		SA	1. Characteristics and different parts of the followings- .303 Rifle, 7.62 mm SLR, LMG, INSAS, Pistol and Revolver 2. Functions and Mechanisms of- Tank, Submarine, Air craft carrier, Grenade, 2 inches Mortar • Practical (Digging tools, Knots, Lashes, Field defences, Mines, Mine laying, Concealment, Camouflage, Judging distance, Indication oftarget, Field Signal, Section formation)	
	SEC-2 India & Her Neighbouring Countries	DJ	1. Study of Geo Strategic Factors 2. Emergence of Pakistan as an independence State Policy & relation of India .	• In this subject the students gain knowledge about neighboring states. • Gain knowledge about the geographical environment of neighboring countries.

		SA	3. EmergenceofChina. 4. StrategicrelationsofIndia.	• Above all, knowledge of international relations related to defense is gained.
V	DSE-1A National Security of India - I	DJ	1. Introduction, Concepts, Definition, Fundamental Factors. 2. Geo strategic aspects of Defence& security of India .	• Students are informed about the security of our country. • Gain an understanding of the country's defense problems and their solutions. • Prepare mentally for joining the defense department. • Physically prepare for defense jobs through practical experience. • Willing to participate in internal and external security affairs of the country.
		SA	3. ThreatsofNational Security. 4. Approaches of National Securities.	
	SEC– 3 Human Rights	DJ	1. Introduction, Concepts &Development of Human Rights 2. International Human Rights Laws & Treaties	• Students learn about their constitutional rights. • They are made not to be deprived of their rights. • This right is absolutely necessary to establish oneself in the future.
		SA	3. The protection of Human Rights act 1993 4. Statutory bodies protecting Human Rights of the vulnerable section	
VI	DSE– 1B National Security of India - II	DJ	1. StrategicEnvironmentofIndia 2. Foreign policy &Defence Policy of India • Practical – Tank,Submarine, Battle ship, Missile	• Students concentrate on India's national security. • Learn to understand the good and bad of the country. • Prepare physically and mentally for military work. • Try to join work related to national and state level security. • Students complete this course and are ready for security jobs. •
		SA	3. Introduction of Military Technology in India 4. ArmsControls&disarmament • Practical – Tank, Submarine, Battle ship, Missile	

	SEC– 4 Terrorism & Conflicting Ideology	DJ	1. Introduction, Definition, Meaning, History, Role of Ideology – Terrorism 2. Terrorism & Ideology in Perspective	• Students take the vow of a terror-free country. • Efforts are being made to eradicate terrorism. • Learn to protect yourself from terrorist ideologies.
		SA	3. Terrorism&India 4. Terrorism in International relations	

Name of the Department: Economics System: CBCS

Programme Specific Outcome:

At the end of this programme learners should be able todemonstrate following things:

1. Aggregative and individual economic variables and their role in economic theory.
2. Mathematical and statistical tools and their applications in economic theory.
3. Problems of Indian economy and their solutions.
4. Developmental perspectives and theories related to economic development.
5. Issues related to trade and trade as an engine of growth.
6. Environmental issues of economic nature and economic instruments to control deterioration of environmental amenities.
7. Basic survey methodology and its applications.

Course Outcome:

Semester /Part	Course Type	PaperDescription	CourseOutcome
1	CC-1	Introductory Microeconomics	Basic individual level economic variables and their importance in economic theory. Laws of demand and supply and determination of consumer equilibrium. Marshallian, Indifference curve and Revealed Preference analysis and their effectivity in determination of equilibrium. Markets of different forms with special emphasis to perfect competition.
1	CC-2	Statistics-I	Understand basic concept of Statistics. Collection and description of data. Specially emphasis on Single and Bivariate Data. Simple numerical problems for the three variable cases. Simple numerical exercise about Index Numbers and Time Series.
1	GE-1	Microeconomics	Basic individual level economic variables and their importance in economic theory. Laws of demand and supply and determination of consumer equilibrium. Marshallian, Indifference curve and Revealed Preference analysis and their effectivity in determination of equilibrium. Different market forms and their equilibrium. Marginal productivity theory and other theories of distribution. Basic and preliminary concepts of welfare theory.

2	CC-3	Introductory Macroeconomics	Difference of macroeconomics from other branches of economics, historical development of the subject, central questions in macroeconomics and important macroeconomic terminologies/concepts. A detailed understanding about GDP, GNP, NI, PI etc. and the steps of calculation of them. Learners will be able to comprehend income accounting measures that can be used for welfare calculation. Assumptions, features, limitations of SKM and the equilibrium conditions of SKM. Learners will be able to identify factors such as consumption, investment, government spending that determine level of income and how changes in investment, government expenditure affect changes in equilibrium income. In this connection, learners will be able to find out values of investment multiplier, government expenditure multiplier, tax multiplier, balanced budget multiplier etc. An in-depth knowledge about changes in Keynesian system when interest rate and money market are introduced. Learners will be able to draw IS and LM curves, identify factors influencing IS and LM curves and use IS and LM curves to find simultaneous equilibrium in commodity and money market. When factors like government expenditure or money supply change, a multiplier effect occurs. Learners will be able to assess the process of the effect.
2	CC-4	Mathematical Economics-I	Learn about the application of Mathematics in Consumer Behaviour and Producer Behaviour. Mathematically learn about the relationship between AP and MP & AC and MC. Learners will be able to solve the Unconstrained and Constrained Optimization. Mathematically derive the Total function from marginal function. Mathematically analyze the Domer's and Cobweb Model.
2	GE-2	Macroeconomics	Difference of macroeconomics from other branches of economics and important macroeconomic terminologies/concepts. A detailed understanding about GDP, GNP, NI, PI etc. and the steps of calculation of them. Assumptions, features, limitations of SKM and the equilibrium conditions of SKM. Learners will be able to draw IS and LM curves, identify factors influencing IS and LM curves and use IS and LM curves to find simultaneous equilibrium in commodity and money market. Classical economic theory and its difference with

			Keynesian theory. Theories of inflation, banking etc.
3	CC-5	Intermediate Microeconomics	Characteristics and optimum of a monopolist, different forms of price discrimination and equilibrium of a discriminating monopolist. Learners will be able to differentiate monopoly, monopsony and bilateral monopoly and make graphical exposition of respective equilibriums. A monopolistically competitive market is then considered and equilibrium condition of the market is also considered. A detailed understanding about oligopolistic features, different oligopolistic markets and their equilibrium. Specific models such as Cournot's, Bertrand's, Stackelberg's, Sweezy's will be investigated. Marginal Productivity Theory – its assumptions, theme and limitations. Different concepts of rent and Ricardian and Modern theory of rent while discussing payments to land, wage determination and role of trade unions in wage determination while discussing payments to labour, Classical, Loanable fund and Liquidity Preference Theory while discussing payments to capital, Risk Bearing Theory, Uncertainty Bearing Theory, Rent Theory, Innovation Theory etc. while discussing payments to profit. An in-depth knowledge of Edgeworth box, contract curve, Pareto optimality and other concepts/conditions related to welfare theory.
3	CC-6	Intermediate Macroeconomics	Further detailed analysis of IS-LM model. Classical system of macroeconomic solution and its tidbits. Keynesian investment function and economic equilibrium as per complete Keynesian model. Difference between Classical and Keynesian system. Different theories of inflation and remedial measures to control inflation. Growth models of traditional nature. Adaptive and rational expectation model. Mundell-Fleming model and open economy macroeconomics.

3	CC-7	Mathematical Economics-II	Mathematically derive and implication of IS-LM model. Comparative Static analysis – Specially the derivation of Slutsky Equation. Solution of Maximization and Minimization problems by using Graphical and simplex method of Linear Programming. Basic concept about Input-Output Analysis. Find out the Nash Equilibrium for Zero or Non-Zero Sum Game. Take the Optimal decisions under Uncertainty.
3	SEC1	Insurance Market and its Products	Basic concept about the classification of insurance. Comparison of Life Insurance with other Insurance. Learn about the Basic Principles of Insurance. Concept about different Claims under various classes of insurance.
4	CC8	Selected Features of Indian Economy	Know about the Economic Development since Independence in respect of Indian Economy. Learn about the Demographic trends and issues, Education, Health and Malnutrition. Trends and policies in poverty including Sen's Entitlement Analysis. Gain knowledge about the RBI's monetary policy. Policies and Performance in Indian agricultural Sector. Policies and Performance in Indian Industrial Sector.
4	CC9	Statistical Methods-II	Basic idea about Set Theory and its application in Consumer Preference & Budget. Learn about the Theory of Probability. Understand different Distributions such as Uniform, Binomial, Poisson and Normal. Understand the analysis and inference of conclusions from the quantitative data.
4	CC10	Development Economics	Great knowledge about Sustainable Development. Learn about Development and Underdevelopment as a Historical Process. Understand the characteristics of underdevelopment. Especially emphasis on Low-Level Equilibrium Trap, Lewis Model. Concept about different Development Strategies. Big Idea about Migration and Development (Harris-Todaro Model). Knowledge about Poverty and Inequality.

4	SEC2	Basic Computer Applications	Understand computer basics, hardware and software, file and folder, and computer analogy. Writing text in word document and further complex operations on word. Managing data with Excel, use functions, statistical and mathematical tools, and diagrammatic representation using Excel. Will learn how to present materials through PowerPoint presentation.
5	CC11	International Economics	How arbitrage leads to internal and external trade? Understand the gains that can be obtained from trade and their decomposition in different parts. Understand Smith and Ricardian and Heckscher-Ohlin theory of trade, their difference in approach. Policies related to trade and policies related to export promotion, import substitution etc. Understand accounting related to trade and how correction can be made to solve balance of payments problem.
5	CC12	Money & Banking	Relevance of study of Money and Banking. Large concept about Money. Knowledge about Financial Institutions, Markets, Instruments, and Financial Innovations. Concrete idea about Interest rates in India. Changing role & Structure in Indian Banking System. Central Banking & Monetary Policy.
5	DSE1	Rural Development	Background & Concept about Rural Development. Different Government Policies and Programmes for Rural Development. Know about the Role of NGOs for Rural Development. Resources and Livelihoods in Rural Areas. Rural Development Approaches in other selected Countries such as Bangladesh/China, Brazil/Mexico.

5	DSE2	Environmental Economics	Learn interaction between man, nature, economy, ecology, and environment. Understand externality effects, their types, effects, correction methods etc. To know about property rights and how property rights can be used to address problems related to common property resources. Policies related to environment that can control generation of environmental bads. To know about transboundary environmental problems, organizations to deal with them, and ways to ensure sustainable development.
6	CC13	Basic Econometrics	Learn about Definition, Nature, and Scope of Econometrics. Estimation of Two and Three Variable Linear Regression Model. Concept about Qualitative (dummy) independent variables. Sources, Consequences, and Detection for Multicollinearity, Heteroscedasticity, and Autocorrelation. Sources and Simple Indicator of Specification Problems.
6	CC14	Field Survey and Project Report	Understand basic survey methodology. To know about steps and obstacles while conducting a primary survey. Designing a questionnaire. Implementation of survey. Collection, tabulation, and interpretation of data. Presentation of result and dissemination..
6	DSE3	Political Economy	Knowledge about Economic thoughts of Adam Smith, Ricardo, and Marx. Basic features and functioning of Physiocracy, Mercantilism, Feudalism. Learn about Marxian theory of Value. Great concept about Circuit of Capital, Simple Reproduction Scheme, Law of Falling Rate of Profit, Reserve Army of Labour, and Theories of Crisis.
6	DSE4	Entrepreneurship Development	Learn about the Basic features and Growth of Entrepreneurship in India. Role of Entrepreneurship in Economic Development. Knowledge about motivation for Entrepreneurship. Concept of Planning Commission's Guidelines for formulating a project Report. Find the Financial Resources for New Ventures. Types of Growth Strategies and also Sickness in small business.

Name of the Department: Education System: CBCS

Programme Specific Outcome:

At the end of this programme learners should be able to demonstrate following things:

1. Meaning, Nature and Scope, Functions, Factors of Education and Educational Psychology.
2. Western Schools of Philosophy, Philosophers and their Educational Implication, Introduction to Intelligence, Personality, Memory.
3. Concept, Nature and Scope of Educational Sociology, Education in Ancient & Medieval India and Education in British India, Value Education.
4. Concept of Educational Sociology, Development of Education in Post-Independence Period, Educational Management and Administration, Great Indian Educators.
5. Educational Guidance and Counselling, Introduction to Educational Technology, Current Issues in Indian Education, Concept of Teacher Education.
6. Concept of Measurement and Evaluation in Education, Basics Concept of Comparative Education, Basics of Educational Research and Statistics.

Course Outcome:

Semester /Part	Course Type	PaperDescription	CourseOutcome
1	CC-1	Educational Philosophy-I	Students will learn about basic concepts of Education. Introduction to Philosophy of Education. Students will know about Introduction of Child Centric and Life Centric Education and their function in society. Students will acquire vast knowledge about Great idea about the Indian Educators.
1	CC-2	Educational Psychology-I	It will help to know about Introduction to Psychology for Students' personal Life. Students will collect basic knowledge about Growth and Development in Human life. Basics Concepts about learning among students.
1	GE-1	Principles of Education	Students will learn basic knowledge about Education and their importance in Society. It will help to learn about Introduction of Child Centric and Life Centric Education and their function in society. Student will know about concepts of Freedom and Discipline and application of Discipline in Educational Institution. Concepts about Curriculum and application in Society.
2	CC-3	Educational Philosophy-II	Students will learn about Western Schools of Philosophy and their Educational Implication. Students will know about contribution of Western Great Educators to Education. It will help to know about introduction of current issues in Education.

2	CC-4	Educational Psychology-II	Students will learn about various concepts of Intelligence. Introduction to Psychology for students' personal Life. It will help to know what is the Process of Memorization
2	GE-2	Educational Psychology	Basic knowledge about Psychology and its importance in Society. Various concepts of Intelligence. Basic knowledge about Growth and Development in Human life. Students will gain more knowledge about concepts and types of Individual Differences.
3	CC-5	Educational Sociology-I	Students will learn about concept, nature and scope of Educational Sociology. Students will learn what are the Components of Education and community. It will help to know about concept and nature, Factors and problems of social change in India. Introduction to Social equity and equality of educational opportunities.
3	CC-6	Education in Ancient & Medieval India	Students will learn about concepts, Aims, Curriculum, Method of teaching, Role of Teachers and Salient features for Vedic period in Education. Students will collect more knowledge about concepts, Aims, Curriculum, Method of teaching, Role of Teachers and Salient features for Bramanic period in Education. Students will be aware of concepts, Aims, Curriculum, Method of teaching, Role of Teachers and Salient features for Buddhistic period in Education. It will help to know what are the concepts, Aims, Curriculum, Method of teaching, Role of Teachers and Salient features for Medieval India in Education.
3	CC-7	Education in British India	It will help to know about Indian Education during early British Period. Introduction to Western Education. Recommendations of Indian Education Commission (1882), students will learn about educational reforms of Lord Curzon, National Education Movement, Gokhale's compulsory primary education bill.
3	GE–3	Educational Sociology	Concept, Nature and Scope of Educational Sociology. Concept and nature, Factors and problems of social change in India. Introduction to Meaning, process and factors of

			socialization. Social Agencies of Education and their educative role.
3	SEC1	Value Education	Introduction to Meaning and Concept, Needs of Value Education. Concepts of Values in a Pluralist Society. Concept, Needs of Morality. Role of Parents to Facilitate Children's Moral Development. Importance of Values in the Classroom. Inculcation of Values among the students. Role of the teachers to facilitate moral development among the pupils.
4	CC8	Educational Sociology-II	Introduction to meaning, process and factors of socialization. Role of the Parents and the Teachers in the process of socialization. Students will learn meaning and types of social control, Agencies of Social Control. Introduction to meaning, types, causes and factors of Social Mobility and Mobility in Indian Society.
4	CC9	: Development of Education in Post-Independence Period	Introduction to Aims, Curricula, Rural University and Other Recommendations of University Education Commission (1948-49). Students will learn about aims, Structure, Curricula and Other Recommendations of Mudaliar Commission (1952-53). Introduction to Objectives, Structure, Curricula, Technical and Professional Education, Recommendations on different areas of education of Kothari Commission (1964-66).
4	CC10	Educational Management and Administration	Introduction to Meaning, nature and scope, Need of Educational Management in Modern Education, Process of Educational Management and Administration, Role of Educational Manager. Students will know the meaning and principles, School Organization and its Principle. Students will learn about meaning, need and functions, Factors influencing Educational supervision, Difference between inspection and supervision, Styles of leadership.
4	SEC2	Educational Thoughts and Ideas of Great Indian Educators	Introduction to Philosophy of life, Activities, Ideas on Education and Women Education of Raja Rammohan Roy (1772-1883). It will help to know about Educational Philosophy, Aims of Education, Method of Instruction, Activities & Ideas on Women Education of Iswar Chandra Vidyasagar (1820-1891). It helps to introduce among students Educational Philosophy, Aims of Education, Method of Instruction, Curriculum of Education, Women Education & Concept of Teacher of Swami Vivekananda (1863-1902).

5	CC11	Educational Guidance and Counselling	Students will learn about Meaning, Definition Concept, Scope, Needs and Importance of Educational Guidance. Students will know about Essentials of good Guidance programme. Students will learn about meaning, Nature, & Scope, Types of counselling, Tools and techniques of Counselling. It helps to understand the Difference between Guidance and Counselling, Counselling process - relationships & its characteristics, role of parent, teacher & counselor in guidance programme.
5	CC12	Educational Technology	It will help to know about concept and meaning, nature, scope, needs and limitations of Educational Technology, Components of Educational Technology - Hardware & Software. Students will know about concept and characteristics, Components of instructional system, Uses and limitations of system approach. It helps to understand among students about concept, nature and scope of programmed learning, Principles of programming. It helps to understand about meaning, nature, types and process, Barriers and Significance of Communication. Students can learn Components of communication process, Communication in teaching-learning situation.
5	DSE1	Current Issues in Indian Education	Students will acquire knowledge about Equal opportunity in Education. Students will know about the significance of Education for all and Sarva Shiksha Mission. Students help to understand the Functions of Educational Organizations like UGC, NAAC, NCERT, NUEPA, NCTE, DIET, SCERT.
5	DSE2	Teacher Education	Learn Meaning and Scope, Need, Aims and Objectives of Teacher Education. Students can understand the historical background Development of Teacher Education in India before and after independence. It helps to know about various Agencies of Teacher Education like NCTE, NCERT, SCERT, DIET.
6	CC13	Measurement and Evaluation in Education	Students will know about Measurement and Evaluation, Difference between Measurement and Evaluation, Types of Evaluation. It will help to know among students about different Tools and Techniques of Assessment in education. Students will acquire knowledge about types of Educational data; Collection and processing of data, Tabulation of data, Graphical representation of data that is Frequency Polygon, Histogram, Bar Diagram, Pie chart, Ogive, Computation of diagrams and Uses. Students will know and collect vast knowledge about Measures of Central tendency and its uses, Measures of Variability and its uses, Computation of Correlation

			Coefficient by Product moment and Rank difference Methods and interpretation of results.
6	CC14	Comparative Education	Students will learn about Meaning and Concept, Scope and Objectives, Factors of Comparative Education like Geographical, Economic, Cultural, Philosophical, Sociological, Linguistic. It will help to know about Study in Comparative Education like Descriptive, Historical, Sociological, Analytical and Synthetic. Understand Basic structure of the Formal Education System of U.S.A, U.K and India. It will help to know what is Educational Objectives and curriculum of Primary & Secondary Education of U.S.A, U.K and India.
6	DSE3	Basics of Educational Research and Statistics	Students will understand about meaning, nature and scope of Educational Research, Types of Research like Fundamental, Applied and Action research, Qualitative and Quantitative Research, Research Problems, Objectives and Hypotheses. Students will gather vast knowledge about Major Approaches of Research like Historical, Descriptive, Experimental, Survey. It will help to know about basic Statistics and their uses, Central tendency and Dispersion, Graphical representation of data, Correlation and its uses, Co-efficient of Correlation Computation by Product moment and Rank Difference.
6	DSE4	Special Education	Students will gather knowledge about Education of Children with Visual Impairment and Hearing Impairment (with special reference to prevalence, etiology, identification, intervention, education and prevention of each category). It will help to understand about Education of Children with Speech and Language Disorders and Learning Disabilities (with special reference to prevalence, etiology, identification, intervention, education and prevention of each category). Students will learn more about Education of Children with Multiple Disabilities (with special reference to prevalence, etiology, identification, intervention, education and prevention of each category).

DEPARTMENT OF ENGLISH

COURSE OUTCOMES

CC-01: INDIAN CLASSICAL LITERATURE

CO01: The course content of CC-1 in the first semester of English (Hons) introduces the students to the Indian Classical Literature.

CO02: This course will expose the students to the rich tradition and heritage of Indian classical literature which includes classical drama of Kalidasa, Banbhatta, Sudrak and Vyasa.

CO03: The students get ideas about the conventions of classical Indian literature.

CO04: They also get information about the Indian society during the classical period.

CO05: The texts will make the students aware of the culture and values of Indian society of that contemporary period.

CO06: The students will be able to compare and contrast the contribution of classical writers in the History of Indian classical literature.

CC-02: EUROPEAN CLASSICAL LITERATURE

CO01: The course content of CC-2 in the first semester of English (Hons) introduces the students to the European Classical Literature.

CO02: The course encourages the students to find out the thematic and technical innovations of European classical dramas.

CO03: The students will identify the major issues, debates, and features of European classical dramas.

CO04: The students will be able to compare and contrast the contribution of classical writers in the Indian classical literature and the European Classical Literature.

CC-03: INDIAN WRITINGIN ENGLISH

CO01: The course gives a brief sketch of the impact of the socio-political and cultural aspects on the development of Indian writing in English.

CO02: The students get an idea about the representation of women and society as portrayed by the Indian English women poets and novelists.

CO03: The students will come to know about the Indian Partition from the texts like Desai's *Clear Light of Day*.

CO04: The students will be familiar with Indian English drama as a medium of rewriting Indian myths.

CO05: Write a note on the technical and strategical innovations of Indian English drama.

CC-04–BRITISH POETRY, DRAMA (16th-17thCENTURIES), RHETORIC & PROSODY

CO01: Students will come to know about sonnet - its origin and types.

CO02: They will be introduced to the specifics of Shakespeare's sonnet.

CO03: Students will develop ideas and concepts about metaphysical poetry, especially of John Donne.

CO04: Students will be familiar with the two great dramatists of the Elizabethan period - William Shakespeare and Christopher Marlowe.

CO05: Students will gain knowledge about topics like Renaissance Humanism, Royal Stage and City Life, Religion, and Politics.

CO06: Students will be introduced to rhetoric (the art of speaking) and prosody.

CO07: This course helps the students to be enriched with the British poetry and drama written in the Elizabethan period.

CC-05–AMERICAN LITERATURE

CO01: Students will be introduced to the history of American literature from earliest to present time.

CO02: Students will be able to compare and contrast between the poets and writers of British literature and American literature.

CO03: Students will be introduced to Commonwealth literature.

CO04: Students will be enriched with topics like transcendentalism, psychoanalysis, quest for mystery, and adventure.

CCVI-Popular Literature

1. After reading this module, the students are introduced to the genre of children's literature.
2. After reading this module, the students are introduced to the genre of detective fiction.
3. Students are introduced to the genre of graphic novels after reading this module.
4. Students are introduced to the concepts of caste after reading this module.
5. Students become acquainted with the concepts of gender and identity after reading this module.

CCVII- British Poetry and Drama (17^{th}-18^{th}Centuries)

1. By reading this module, students will be introduced to reading an epic and its features.
2. By reading *The Rape of the Lock*, which is a component of the module, the students are introduced to the concepts of Mock Epic and Satire.
3. Students will be aware of the position of women in the 17th century.
4. The students will be introduced to the genre comedy of manners.
5. By reading *The Shoemaker's Holiday*, students will be aware of the features of the sub-genres of city comedy.

CCVIII- British Literature (18thCentury)

1. The course acquaints the students with the literary traditions that prevailed in 18th-century England.
2. The students are acquainted with what a Restoration Comedy is and its features and characteristics after reading this module.
3. By reading *Grey's Elegy*, the students become aware of the inevitable fate of humanity regardless of wealth, power, and status.
4. By reading *Ode to Evening*, students will be formally introduced to the style of Collins' writing, which is formally Neoclassical but presages the themes of the Romantic period.
5. By reading *Gulliver's Travels*, students will read a travelogue and get introduced to travel writing.

CCIX- British Romantic Literature

- The students will be introduced to the concepts of Nature. The students will read about the traits of the Romantic period expressed through the poems of Wordsworth and Coleridge.

- The students will get acquainted with the concepts of Reason and Imagination after reading this module.

- The students will be introduced to the Gothic traditions of English literature after reading this module.

- The students will learn about Romantic Lyrics through the poems of the module.

- The students will learn about classicism, English adaptations, imitation, imagination, and pleasure.

CC-X: British Literature (19thCentury)

- The students will learn about the characteristics of the 19th-century novel after reading this module.

- The students will be aware of the themes of fact vs. fancy, industrialism and its evils, and femininity after reading *Hard Times*.

- The students will learn about dramatic monologue by reading the poem *My Last Duchess*, which is a part of this module.

- By reading this course, the students will learn about how the poet Rossetti critiqued the unfairness of society's double standards, showing how they put women at a disadvantage.

- The students are acquainted with the themes of marriage and sexuality, faith and doubt after reading this module.

DSE1-MODERN INDIAN WRITING IN ENGLISH TRANSLATION

CO01.Students will be able to know about the translated version of the source texts.
CO02.Students will compare between the source text and the translate done.
CO03.Students will be enriched with the canonical Bengali texts and their translated versions in English.

DSE2-PARTITION LITERATURE

CO01.Students will get an idea about the partition of India.
CO02.Students will be introduced with the after math of partition of India and its reflection in literature.
CO03.Students will be enriched with topics like colonialism, anti-colonial nationalism,the notion of identity, home and homelessness and communalism.

DSE-3: Literary Theory

1) After reading this course students will be acquainted with the terms Class, Base and Superstructure, dialectics and Interpellation.
2) After reading this course students will be acquainted with the term logocentrism, Binaries, Deconstruction, Hyperreal-Simulation.
3) After going through this course the students will be acquainted with the concepts of phallocentrism, androgyny, sex and gender, ecriture feminine.
4) After undertaking this course the students will be acquainted with terms like Imperialism and Colonialism, Orientalism, Nation and Nationalism, Diaspora.
5) After reading this course the students will be acquainted with termslike language,and representation, the State and Culture.

DSE-4: Literary Criticism and History of the English Language.

1) After reading this course the students will be acquainted about the history of English language.
2) After reading this course the students will be aware about the Semantic Change, Standardization, Outgrowing gender Bias.
3) After reading this course the students will be aware about the Latin, French, Scandinavian, Biblical and Shakespearean influence.
4) After reading this course the students will be acquainted with word formation, Indian English and American English.
5) The students will learn about classicism, English adaptations,imitation,imagination and pleasure after the completion of this course.

CC-11(Women's Writing):

1)This course helps to understand literature from women'sperspective and makes students aware that writing is an importanttool for women to voice their experiences of identity, sexuality, marriage, love, family and life-using traditional forms of writing and literary convention to convey these personal experiences.

2) This course gives the student a clear view about women writers' Confessional Mode, their experiences about Sexual Politics, Race, Caste, Gender, and the Social Reforms that took place keeping in view their Rights in the society.

CC-12(British Literature):

1) This course courages students to philosophical debate and diplomatic responses to a wide variety of issues like- Rise of the Novel , Gender and Sexuality , Politics and Religion , Georgian Society, Theatre and Entertainment, Travel, Colonialism and Slavery ,etc.

2) Beside instilling a love for literature among the students , this course also helps to understand the main characteristics of modern British Literature like-Individualism, Experimentation, Symbolism, Absurdity and Formalism.

3) Topics like- Modernism , Post-Modernism and Non-European Cultures , the Women's Movement in the earliest 20th century, Psychoanalysis and the Stream of Consciousness and the Uses of Myth etc - gives students a rich scope to exercise their ability to think and understand these clearly

CC-13(Modern European Drama):

1) Like all thearts, drama allows students to communicate with and understand others innew way, and hence, this course helps students to be trained in the practical aspects of communication, so necessary in today's increasingly information-centered world.

2) This course provides the students a clear perception about the main characteristics of Modern European Drama like-Realism, Industrialization, Romanticism, Impact of the First World War, Poetic Plays, Irish Movements, Impressionism and Expressionism…etc.

3) This course introduces as well as brings students close to the famous dramatists like Henrik Ibsen , Samuel Backett ,and Geroge Bernard Shaw andmakes them familiar with the wide variety of their writings.

CC-14(Post-Colonial Literature):

1) This course helps students to understand there sidual effects of Colonialism on Cultures and that the ultimate goal of Post-Colonialism is accounting for and combating this effect.

2) This course gives the students a scope to understand that Post-Colonialism is not simply concerned with salvaging past worlds, but learning how the world can move beyond this period together, towards a place of mutual respect.

3) This course involves the discussion of experiences such as -Slavery, Migration, Suppression and Resistance, Difference, Race, Gender and Placeas well as responses to the discourse of Imperial Europe.

4) This course makes students aware about how Post-Colonialism deals with the conflicts and issues of the current world.

SEC -1(Translation Studies):

1) This course helps the students to understand the significance of translation in a multi-linguistic and multi-cultural society like India.

2) This course introduces the basic concepts and terms used in translation studies like-Equivalence, LanguageVariety, Dialect, Idiolect, Register, Style,Mode,Code-Mixing etc.

3) This course helps to understand issues like Gender and Translation.

4) This course helps students to define the process of translation.

SEC-2 (Film Studies):

1) This course allows students to explore texts they love, as they learn how to analyze and tell stories in written and visual form.

2) This course builds bridges between literature and cinema by looking into forerunners and analyzing themutual relationship between these two spheres. Students learn about this through this course.

3) This course gives the scholars of the Humanities a rich scope to become actively involved in generating analysis of films, particularly through the critical lens of literary theory .

4) This course advocates the necessary and widespread application of Film Philology in literature departments.

UG Department of Geography
Programme: B.A./B.Sc. (Under CBCS)
Affiliating. University: The University of Burdwan
Institution: Rabindra Mahavidyalaya, Champadanga

Geography is "a science that interprets the realities of area differentiation of the world as they are found, not only in terms of the differences in certain things from place to place, but also in terms of total combination of phenomena in each place, different from those at every other place." (Hartshorne, 1939).

Geography is the study of space and human-nature relationships. It examines the physical characteristics of the earth's surface as well as the diverse human societies that call it home. They also look at how human culture and the environment interact, as well as how those places and places might affect people. Geography aims to comprehend the locations of objects, their reasons for existing, and the processes through which they evolve and change over time, the investigation of the various settings, locations, and areas found on Earth's surface, as well as how they interact. It aims to provide explanations for why things are the way they are in the present situation. The current academic field of geography has its roots in ancient practise and is focused on the traits of places, particularly their natural environments and peoples, as well as the relationships between the two.

COURSE STRUCTURE UNDER CHOICE BASED CREDIT SYSTEM FOR BA/B.Sc.HONOURS IN GEOGRAPHY

Semester-wise course structure (Honours)

SEMESTER	CORE COURSE(CC) (14)	ABILITY ENHANCEMENT COURSE(AECC) (2)	SKILL ENHANCEMENT COURSE(SEC) (2)	DISCIPLINE SPECIFIC ELECTIVE (DSE) (4)	GENERIC ELECTIVE (GE) (4)
I	CC-1.GEOTECTONICSAND GEOMORPHOLOGY CC-2.CartographicTechniques And Geological Mapstudy	ENVIRONMENTAL STUDIES			GE-1 (Anydiscipline otherthan Geography)
II	CC-3.HUMANGEOGRAPHY CC-4.CARTOGRAMSAND THEMATICMAPPING	COMMUNICATIVE ENGLISH/MIL			GE-2 (Anydiscipline Other than Geography)
III	CC-5.CLIMATOLOGY CC-6.STATISTICAL METHODS IN GEOGRAPHY CC-7.GEOGRAPHY OF INDIA		SEC-1.COMPUTER BASICS AND COMPUTER APPLICATIONS OR REMOTESENSING		GE-3 (Anydiscipline otherthan Geography)
IV	CC-8.REGIONAL PLANNING AND		SEC-II		GE-4

			ADVANCED SPATIAL		
	DEVELOPMENT		STATISTICAL		(Anydiscipline
	CC-9.ECONOMICGEOGRAPHY		TECHNIQUES		otherthan
	CC-10.ENVIRONMENTAL		OR		Geography)
	GEOGRAPHY		FIELDWORK		
V				DSE – 1	
				URBAN	
				GEOGRAPHY	
	CC-11.RESEARCH			OR	
	METHODOLOGYANDFIELD			CULTURALAND	
				SETTLEMEMT	
	WORK			GEOGRAPHY	
	CC-12.REMOTESENSINGAND			DSE – 2	
				POPULATION	
	GIS			GEOGRAPHY	
				OR	
				SOCIAL	
				GEOGRAPHY	
VI				DSE – 3	
				FLUVIAL	
				GEOMORPHO-	
				LOGY	
	CC-13.EVOLUTIONOF			OR	
	GEOGRAPHICAL THOUGHTS			RESOURCE	
				GEOGRAPHY	
	CC-14. DISASTER MANAGEMENT			DSE – 4	
				SOILANDBIO	
				GEOGRAPHY	
				OR	
				AGRICULTURAL	
				GEOGRAPHY	

COURSE OUTCOMES (CO)

The main goal of this new curriculum is to provide students with a comprehensive understanding of the topic by giving the fundamental ideas and methods of geography. The curriculum makes an effort to place equal emphasis on the physical and human components of geography. Another purpose of this curriculum is to provide fundamental understanding of geography as a spatial science and to prepare undergraduates for careers in mapping, surveying, and geospatial analysis.

The course outcomes of the different papers offered are presented below. After completion of the course the student will be able to:

Course Code	Course Title	Credits	Course Outcomes
CC-1	Geotectonics and Geomorphology	6	1. Students will understand Earth's tectonic and structural evolution with reference to geological time scale and also know about Earth'sinterior. 2. Acquire knowledge aboutIsostasy from the theories of Airy and Pratt 3. Develop understanding of Plate Tectonics: Processes at constructive, conservative, destructive boundaries and hotspots:

			resulting and forms 4. Students will acquire knowledge about various degradational processes and associated landforms; such as weathering, mass wasting. 5. Knowing how does landscape evolved according to Davis, Penck and Hack and how does slope developed according to Wood. 6. Students will able to understand how river network and landforms developed on uniclinal and folded structures. 7. Knowledge about the types and mineralogical composition of rocks and landforms evolution on igneous rocks will enhance. 8. Processes and associated landforms on Karst, Glacial and fluvio-glacial region will be known. 9. Understanding the Aeolian and fluvio-aeolian processes and land forms.
CC-2(Theory + Practical)	Cartographic Techniques and Geologicalmap study	4+2=6	1. Students will gather knowledge about Classification, Types and Components of a Map and they will be able to Construct Plain, Comparative, Diagonal and Vernier Scale and also various map projections. 2. Know about Survey of India Topographical Maps and Reference scheme of Old and Open series 3. They can Construct and Interpret Relief Profiles (Superimposed, Projected and Composite), Relative Relief Map, Slope map (Wentworth), and Stream Ordering (Strahler) on a Drainage Basin. 4. Get general understanding of Bedding Plane, Unconformity and Non-conformity, thickness of Bed, Dip, Throw, Hade, heave and able to draw Geological Map (Problems related to Horizontal, Uniclinal, Folded and Faulted structure) and can Interpret the Map.
CC-3	Human Geography	6	1. Students will have a general understanding of Nature, scope and recenttrends of Human Geography and Evolution of humans, concept to frace and ethnicity and about Major Racial Groups of the world. 2. Enhanced the view about Space,society and cultural regions (language and religion) by knowing the Concept of Culture,Cultural Diffusion ,Convergence,Cultural Realms of the world. 3. Get the answer how does human societies evolved and get knowledge about Hunting and gathering, Pastoral nomadism, Subsistence farming, Industrial and urban societies; also understand Human - environment relations with special reference to Arctic and hot desert regions 4. Understanding Population growth and distribution, population composition; demographic transition model and Population–Resource regions and the relation between human, population and environment. 5. Enhanced the idea of social morphology and rural house types in India, Types and patterns of rural settlements and the functional Classification of urban settlements

CC-4(Theory + Practical)	Cartograms, Survey and Thematic Mapping	4+2=6	1. Able to Learn the Concepts of Cartograms, Thematic Maps, Isopleths and Choropleth 2. Understand the Concept andutility of various climatic chart 3. Prepare and interpret demographic charts and diagrams also can represent data on map by proportional circles, dots and spheres, isolines and Choropleth method. 4. Enhance the concepts of surveying and survey equipments: Abneys Level, Clinometer, Prismatic Compass, Dumpy Level, Transit Theodolite and go through hands on exercise by Dumpy Level and Prismatic Compass and Transit Theodolite.
CC-5	Climatology	6	1. Acquire knowledge about the atmosphere, Insolation and Heat budget and the temperature distribution along with the contemporary effect of Greenhouse and the importance of ozone layer 2. Know the process and forms of Condensation also the Mechanism and Forms of precipitation. 3. Obtain the idea and origin of Air mass, Fronts and know about stability and instability of weather. 4. Get familiar with the Circulation in the atmosphere, monsoon, Tropical and mid-latitude cyclones and climate change. 5. Students will read Climatic classification after Köppen and Thornthwaite (1948)
CC-6(Theory + Practical)	Statistical Methods in Geography	4+2=6	1. Develop understanding Importance and significance of Statistics in Geography, Collection of data and formation of statistical tables and can Construct data matrix. 2. Gather knowledge about the need, types, significance and methods of sampling and learn how to Distribute frequency and cumulative frequency. 3. Learn about Central tendency and Measures of dispersion range, mean deviation, standard deviation, coefficient of variation 4. Built the capacity to represent Rank correlation, product moment correlation, Linear Regression and time series analysis.
CC-7	Geography of India	6	1. Enhanced knowledge about Geology and physiographic divisions, Climate, soil and vegetation, Population Distribution and growth by race, caste, religion, language, tribes of India 2. Get idea on agricultural regions, Green revolution, Mineral and power resources distribution and utilization of iron ore, coal, petroleum and the Industrial development since independence. 3. Study the regionalization of India according to Spate and Bhatt. 4. Be familiar with physiographic divisions, forest and water resources, Population Growth, distribution and human development, Mining, agriculture and industries and Regional Development of West Bengal.

CC-8	Regional Planning and Development	6	1. Develop understanding concept and classification of regions, principles, techniques and needs of Regional Planning and MultilevelP lanning in India and the concept of Metropolis, Metropolitan Areas,Metropolitan Region 2. Gain idea of Development and various Models for Regional Development: Growth Pole (Perroux) and Core Periphery (Hirschman) also the Model for Regional Development in India: Growth Foci (R.P.Misra) 3. Know about the Concept of Regional Inequality and Disparity and the Significance, Indicators and Measurement of Human Development 4. Get the knowledge of Regional Imbalances in India and the strategies for Regional Development in India and be aware about NITI Aayog and its Functions
CC-9	Economic Geography	6	1. Acquire the knowledge of Economic Geography and various concepts in Economic Geography along with Factors Influencing Location of Economic Activity and Forces of Agglomeration and the Determining Factors of Transport Cost 2. Know the Concept and Classification of Economic Activities and be familiar with Primary, Secondary and Tertiary Activities 3. Get the idea of Location Theories of VonThünen and Alfred Weber and the Agricultural Systems in India and Mixed Farming in Europe 4. Generate awareness about Highways: Roles in Economic Development of India since 1990s and also the International Trade Blocs: WTO and OPEC
CC-10 (Theory + Practical)	Environmental Geography	4+2=6	1. Be familiar with the Approach to Environmental Studies and the Changes in Perception of Environment in different stages of Human Civilization 2. Learn about Ecosystem, Environmental Degradation and Pollution, Environmental Issues related to Agriculture, Urban Environmental issues related to Waste Management and the Issues related to Bio-diversity 3. Enhance knowledge about Environmental Programs and Policies on Forest and Wetland Students will Prepare questionnaire for perception survey on environmental problems. 4. Built the capacity to Assess Environmental Impact by Leopold Matrix; to assess of soil Quality using field kit: pH and NPK; to interpret air quality using CPCB / WBPCB data

SEC-2	Advanced Spatial Statistical Techniques	2	1. Develop understanding the Concept of Probability and Normal Distribution and their Geographical Applications, Skewness 2. Student will learn the Differences between Spatial and non-Spatial data 3. Able to construct Nearest Neighbour Analysis, Correlation and Regression Analysis, t-test, Spearman's Rank Correlation, Product Moment Correlation; Linear Regression and Time Series Analysis
CC-11 (Theory + Practical)	Research Methodology and Field work	4+2= 6	1. Understanding significance of Literature review in research, research problem, objectives and hypothesis, Research materials and methods 2. Be capable of writing scientific reports, Preparing notes, references, bibliography (APA Style), abstract and keywords. 3. Gather idea about fieldwork in Geographical studies, Selection of study area and objectives, Ethics of fieldwork and Field techniques and tools 4. Got the ability of Landscape survey using transects and quadrants, constructing a sketch, photo and video recording and Collection of samples, Preparation of inventory from field data. 5. Students will prepare a field report based on primary data collected form field survey and secondary data collected from different sources.

CC-12 (Theory + Practical)	Remote Sensing and GIS	4+2=6	1. Students will know the Concepts and Principles of Remote Sensing, Types of Air Photo, RSsatellites,sensors and platforms, EMR Interaction with Atmosphere and Earth Surface, Sensor resolutions 2. They will do Georeferencing of Scanned Maps, can prepare of FCC and LULC Map by Supervised Image Classification (Maximum Likelihood) using IRS LISS-III or Landsat (ETM+) data 3. Enhance the practical knowledge of Digitization of Point, Line and Polygon Features and Preparation of Thematic Map (using bar, pie and choropleth method) 4. Will know the Principles of preparing attributetables and overlay analysis and the Principles of GNSS positioning-Use sand Waypoint Collection Methods
DSE-1	Urban Geography	6	1. Understanding the Nature, Scope and Approaches and Development of Urban Geography, Urban Economy: Basic and Non-Basic Concepts, 2. Student will study the Settlement Hierarchy, Christaller's Central Place Theory, Rank Size Rule; Concept of Primate City and the Theories of City Structure: Concentric Zone Theory, Sector Theory and Multiple Nuclei Theory 3. Acquire knowledge about Ecological Processes of Urban Growth, City Region, Patterns and Trends of Urbanization in India, Major Urban Issues in Mega Cities of India, Policies on Urbanization in India: After 1990s, Characteristics of Urbanization in Developed and Developing Countries
DSE-2	Population Geography	6	1. Knowing the Development of Population Geography; Determinants of Population DynamicsDistribution, Density and Growth of Population in India since 1951, Population Composition and Characteristics: Age-Sex; Female-Male Ratio 2. Develop the understanding of population growth theories, Measures of Fertility and Mortality, Occupational Structure as per Census of India 3. Enhance the knowledge of Migration, Human Development Index, population-resource regions, Population policies in Selected Countries: Sweden and China 4. Able to know the Contemporary Issues in Population like Health and Unemployment

CC-13	Evolution of Geographical Thought	6	1. Students will know about Geography in Ancient Period (Greek and Roman), Medieval period (Arabian) 2. Able to know how does the Mapping and Knowledge Developed about the World Regional Geography in the Age of Explorations 3. Learn about Classical Geography in 19 Century, Quantitative Revolution along with German, French and American School of Thought 4. Acquire knowledge about Indian Contribution to Geography, Determinism, Possibilism and Neo-Determinism; Systematic and Regional geography.
CC-14 (Theory + Practical)	Disaster Management	4+2=6	1. Get the idea about Classification of hazards and disasters, Risk perception and vulnerability assessment, Hazard paradigms 2. Will understand better about Responses to hazards, Preparedness, trauma and aftermath, Resilience and capacity building, Hazards mapping: Data and techniques. 3. Get familiar with the factors, vulnerability, consequences and management of Earthquake, Landslide, Cyclone and Fire 4. Students will able to prepare a Project Report based on any disasters incorporating preparedness, mitigation and management plan.
DSE-3	Resource Geography	6	1. Acquire knowledge about Resource Geography, Functional Theory of Resource, Resource Depletion, Resource Conservation and the Concept of 'Limits to Growth' 2. Knowing the distribution and Utilization of Metallic and Non-Metallic and Energy Resource in Indian Context 3. Got the idea of Power resources and problems, Contemporary Energy Crisis and Future Scenario and Sustainable Resource Development
DSE-4	Soil and Bio Geography	6	1. Gather knowledge about Factors of Soil Formation, Development and Characteristics of an ideal Soil Profile, Physical and Chemical Properties of Soil with special reference to Texture, Structure, Organic Carbon and pH 2. Enhanced the Concept of Zonal, Azonal and Intrazonal Soil; Formation and Profile Characteristics of Laterite and Podsol and Classification of Soil and develop idea of Soil Degradation and Management 3. Learn about the concept and Scope of Bio-geography,

	Biosphere, Ecology, Ecosystem, Environment, Communities, Habitats, Niche, Ecotone and Biotopes 4. Develop understanding the Biosphere and Energy, Laws of Energy Exchange, Food Chain, Food Web and Energy Flow, Bio-Geo Chemical Cycle 5. Students will able to know the Factors of Plant Growth: Light, Heat, Moisture, Wind, Soil and Topography, Concept and Classification of Biomes and the Threat to Biodiversity; Causes, Consequences and Conservation

Programme Outcome (PO):

Students of all undergraduate general degree Programmes at the time of graduation will be able to

PO1: Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives;

PO2.Effective Communication: Make meaning of the world by connecting people, ideas, books, media and technology;
PO3. Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings;

PO4. Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life throughvolunteering.

PO5. Ethics: Recognize different value systems includingyour own, understand the moral dimensions of yourdecisions, and accept responsibility for them.

PO6. Environment and Sustainability: Understand theissues of environmental contexts and sustainabledevelopment.

PO7. Self-directed and Life-long Learning: Acquire theability to engage in independent and life-longlearning in the broadest context socio-technologicalchanges.

Programme Specific Outcome (PSO):

PSO 1: Students will learn about the core ideas of the disciplines of Geography and will have a basic knowledge of the creation and process of geomorphology and Geotectonics. acquiring knowledge, skills, and a comprehensive understanding of the Earth, its atmosphere, oceans, and landforms via an examination of crustal movement and tectonics, landform creation, and climate change.

PSO 2: Students will develop establishing a sustainable strategy for the ecosystem and the biosphere with the goal of protecting natural systems and preserving ecological sustainability. As the principles of sustainable development are integrated with the physical environment, human societies, and local and/or global economic systems.

PSO 3: Students will foster a sensitive attitude and approach towards India's enormous sociocultural heterogeneity by researching and exploring vibrant dynamics in social and cultural geography, and also interpreting natural and planning areas to describe and analyse the regional diversity of India.

PSO 4: Unfolding human settlements and population dynamics in order to analyse the varied habitation patterns on Earth is also an explorative area of the students learning Geography. Understanding the effects of human development, inequalities, regional inequalities, poverty, and unemployment is another arena of Geography the pupils will comprehend.

PSO 5: To map the spatial diversity of events in different administrative units at macro, meso and micro levels, gaining skills in cartography, geospatial software is inevitable.

PSO 6: For many applications and decision-making processes, including surface and subsurface resources, environment and disaster management, river valley planning, industrial hazards, land use planning, urban and regional development, along with climate change mitigation and adaptation, etc., the core of modern geography is the identification of critical problems and spatial issues. The current syllabus aids in our pupils' development of problem-solving skills of this nature.

PSO 7: To comprehend the reality on the ground, spatial patterns, and processes, field experience is necessary. The current curriculum aids in acquiring knowledge of the real world. Utilizing statistical methods and tools enables accurate and impartial spatial investigation and interpretation of challenging phenomena.

PSO 8: As a course participant, students will develop their capacity for close observation through extensive fieldwork, which will develop an analytical mind in them to assess the socio-environmental issues in their surroundings. The preliminary knowledge of research methodologies will help them to enter into the world of research in Social Science, Behavioural Science and last but not least, in Applied Science.

Name of the Department: History System: CBCS/Part

Programme Specific Outcome:

- Understand the nature and basic concepts of ancient Indian glorious past.
- There is a prospect of getting administrative jobs after studying history because a lion's portion of the questions is set from history.
- Students may get preference in further study particularly in archaeology, tourism, museology, heritage etc.
- Students of history honours may get job in journalism especially the editorial writings and other descriptive writings.
- Students may become script writers, especially with regard to historical theme, episode & drama etc.
- Pedagogical jobs are always open to them if Govt. Provides opportunities.
- Students may get involved into preservation of historical sources as well as history.
- Builds a better understanding of the world.
- Helps understanding humanity.
- Helps to being better citizens.
- Helps to make better decisions.
- Helps to improve critical citizens.

Course Outcome:

Sem.	Course Type	Paper Description	Course Outcome
	CC 1	History of India From Earliest time to 600 A.D.	• Students would be able to understand from this paper the root of their culture, • They will aware their origin, their glorious past
I			• They will learn about the sources of History • Harappan and Vedic culture, economic condition and condition of women, cultural developments of ancient India.
	CC 2	Social Formations and Cultural Pattern of the Ancient World	• Students would learn from this paper that howthe human society transformed from nomadic to civilized society in ancient world • Students will understand how society goes through the process of constant intellectual and technological developments. • Students will get knowledge of rich cultural and political heritage of ancient Greece & Rome.

	CC 1A/2A	History of India From earliest times upto 300 C.E.	• Students would be able to learn from this paper on the pre historic and proto historic cultures in Ancient India, the Harappan period, the Vedic culture, the Mauryan dynasty, the Sunga and Kushana influences in Indian culture, • Asokan polity etc. • This study will enhance their sphere of knowledge.
III	CC 5	History of India 1206 C.E. to circa1525 C.E.	• Students would learn about the sources for interpreting the history of the Delhi Sultanate, Persian tarikh tradition, vernacular histories, epigraphy, foundation, consolidation and expansion of the Delhi Sultanate, • Theories of Kingship, ruling elites, • Sufis,Ulema,society, economy,culture, art • Architecture and religion of the period.
	CC 6	Rise of the Modern West 15^{th} to 16^{th} centuries	• Transition from Feudalism to Capitalism, the basic differences of feudal system in between Europe & India. • Renaissance, its routes, city states of Italy, origin courses and results of Reformation • Commercial revolution will enhance the students' sphere of knowledge.
	CC 7	History of India 1526-1757 C.E.	• Students would learn from this Paper about the sources of history for this period, • Historiography, establishment of Mughal rule • Mughal Empire under AURANGZEB • Mughal ART, architecture, paintings, and pattern of regional politics.
	SEC 1	Archives and Museums in India	• This skill enhancement course introduces students to the institutions that house and maintain documentary, visual material remains of the past. • This course will provide the students an opportunityto get job apart from academic field. • This will provide the students an understanding of preserving history in any forms. • New generation will be aware of the significance of preserving history.

	CC 1C/2C/GE3	History of India from 1206-1707	• Students would learn about the political history of the Sultanate, foundation, expansion and consolidation of the Sultanate, • State, society,U lema, economic reforms • Regional political formations, Bengal • Vijaynagar and Bahmani kingdoms • Akbar"s reign, post Akbar era Mughal supremacy • Sufi and Bhakti movements.
V	CC 11	History of Modern Europe 1789-1870	• Students would learn from this paper about the French Revolutions and its European repercussions. • Napoleon Bonaparte and the French Revolution • Restoration and Revolutions of 1815-48 • industrialization and socio-economic transformations, • Age of Nationalism • The Eastern Question, The Crimean war and the Balkan Nationalism.
	CC12	Studying history writing: Indian and Western	• Students would learn from this paper how to write history. • Space and Human agency, importance of sources in history • Philosophy and theory of History • Indian and Western Historiography • Relation between History and other disciplines. • The methods of researchin History.
	DSE1	Life and Culture in Pre Colonial Bengal: Pre historic times to Mid 18th century Bengal	Students would learn from this paper on the land environs and places in Bengal, people and society • Political developments of Bengal, economic life, • Religions and art of Bengal, • Literature and traits of regional culture of Bengal.
	DSE 2	Life and Culture in Colonial Bengal 1757- 1947	• The students would learn specifically about Bengal because the subsequent course of history was very much influenced by Bengal, both from national & regional perspective. • Changes in social and economic life up to 19th century which is the base of consequent socio-economic development of the country. • Students will get knowledge of the origin of nationalismthatcomesundergreatdebatein these days.

	DSE 1A	Some Aspects of Society and Economy of Modern Europe 15th to 18th Century	• Students would learn from this Paper about the political and economic structure of the feudal era • Renaissance and the role of Modern Europe • European Reformation, • European Economyin the 16th century, • Scientific and technological development • They would also learn about the process of transition from Feudalism to Capitalism.
	SEC 3	Understanding Popular Culture	• Students would be able to know about popular culture from this Paper. • They would learn about the differences between the elite and popular culture • Changing traditions of folk music, song, literature and dances. • They would acquire knowledge on audiovisual mode of presentations like cinema and T.V. • Expressions of popular culture in dance, drama, films and painting.
II	CC 3	History of India 600-1206 A.D.	• Students would learn from this paper onhistorical geography of medieval India, • Its sources, text, epigraphic and numismatic data debates etc. • Evolutions of political structures in North India taught- Harsgha, Sasanka,Pala, Pratihara, Chalukya, Chola, Rashtrakutas Their administrations, rise of the Rajputs, legitimization of kingship, Brahmans and temples • Role genealogies and rituals are taught in this paper.
	CC 4	Social Formation and Cultural Pattern of the Medieval World	• Students will learn from this paper about Ancient Roman republic, Roman religion, culture, literature and philosophy. • They will learn about the crises of the Roman Empire, economic developments in Europe from 7th to 14th centuries • Religion and culture in medieval Europe. • Students will acquire knowledge about societies and central Islamic lands.

	CC 1B/2B	History of India 300-1206 C.E.	• Students would be taught on early medieval Indian history • The rise and growth of the Guptas, Harsha and his times, • Therise of the Pala, Sena Pratiharas, • Therise of the Rajputs, • Society, economy and culture inearly medieval India • Arrival of Islam in India is also taught.
	CC 8	Rise of the ModernWest 17th and 18th centuries	• Students will learn from this paper on 17th century European crises in Economic, Social and Political dimensions • The English revolution • Absolutism • The rise of modern science in relation to European society from the Renaissance to the17th century • Mercantilism, European politics in the 17th century • Preludeto the Industrial revolution.
	CC 9	History of India 1758-1857	• Students will learn from this paper on the foundations of Company's rule, • Legitimization of Company'srulein India • Ruraleconomyand society, tradeand industry • Deindustrialization,tradeandfiscalpolity • Renaissance and reforms • Popular resistance like Santaluprisings etc.and its nature.
IV	CC 10	History of India 1858-1964	• The students will learn from this paper about our country's history from 1858 to 1964, which included the aftermath of 1857 • The early phase of Indian freedom movement,the Gandhian era • India's journey towards freedom • India'scommunalpolitics, and • Nehruera-non alignment • India's relation with her neighbours.

	SEC 2	Art Appreciation: An Understanding to Indian Art	• This is a skill enhancement course which would teach our students on pre historic and proto historic art rock art, Harappan art and craft • UNESCOWorld Heritagesites situatedinIndia, • Late medieval temple architectures, paintings, sculptures • Sultanate and Mughal period art and architecture, and modern Indian art.
	CC 1D/2D/GE4	History of India from 1707-1950	• Students would learn from this paper on Indian history from the death of Aurangjeb up to 1950, which includes the battle of Plassey and Buxar, Dewani • Anglo Maratha andAnglo Mysore relations • ANGLO Sikh relations • Land revenue systems of the British, • 1857 revolts andits aftermath, • Indian National Movement • Partition of India and the establishment of Indian Republic.
	CC 13	History of Modern Europe 1871-1945	• The students would learn on Imperial expansion • Bismarck'sdiplomacy, • Kaiser William 2 and Welt Politik, • First World War and its aftermath, • League of Nations • Fascism and Nazism, • Theroad toSecond World War, • United Nations organizations, its origin and functions.
	CC 14	Making of the Contemporary World 1946-2000	• Students would learn from this paper the post war developments of the world. • The ideological disagreements between USA led capitalist world & USSR led socialist block.

VI			• Decolonization and the emergence of the third world, • How Cold War escalates & de-escalates the relations among the countries.
	DSE 3	History of Modern East Asia 1840-1919	• Students would learn from this paper about pre- colonial China, • Anglo Chinese relations till the Opium War • Rebellion, Restoration and Nationalism, • Pre Meiji Japan and • Meiji Restoration.
	DSE 4	History of China and Japan 1919-1949	• Students would learn from this paper on the rise of modern China through agricultural reformation & political change. • The changing balances of power in the far-east i.e. the emergence of Japanas colonial power. • Influence of communalism & socialismin Asia. • Students will understand the origin of presentday crisis for aspirations of self-determination & emergence militarism in Asia.
	DSE 2A	Some Aspects of European History, 1789-1939	• The students would learn from this paper on the French revolution • Napoleon Bonaparte, hisrule, aftermath • The revolution of 1830 and 1848 • Age of Nationalism • Crimean War, Eastern Question, • Europe between 1914-1939 • First World War • Second World War, Hitler.

Name of the Department: Mathematics
Rabindra Mahavidyalaya
System: CBCS

Programme Specific Outcome:

PSO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations , terminology.

PSO2: A student should get adequate exposure to global and local concerns that explore them many aspects of mathematical sciences.

PSO3 : Student is equipped with mathematical modeling ability, problem solving skills, creative talent and power of communication necessary for various kinds of employment.

PSO4: Student should be able to apply their skills and knowledge that is translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

PSO5: Enabling students to develop a positive attitude towards mathematics as an interesting and valuable subject of study.

Course Outcome:

Semester	Course Type	Paper Description	Course Outcome
I (Hons.)	CC01	Calculus, Geometry and Differential Equations	On completion of this area of the course, the student will be able to **Calculus**: ● Understand the nature of Hyperbolic functions. ● Find higher order derivatives and apply the Leibnitz rule to solve problems related to such derivatives. ● Plot the graphs of polynomials of degree 4 and 5, the derivative graph, the second derivative graph and compare them. ● Apply the concept and principles of differential calculus to find the curvature, concavity and points of inflection, envelopes, rectilinear asymptotes (Cartesian & parametric form only) of different curves. ● Trace standard curves in Cartesian coordinates and polar coordinates. **Geometry:** ● Transform the co-ordinate system especially by Rotation of axes, thus reducing different second-degree equations to their corresponding simplest forms and also classify the conics using the discriminant. ● Become familiar with the polar equations of conics & their tangents and normal ● Understand the geometrical terminology and have a detailed clear-cut idea of the Planes, Straight lines in 3D, Spheres, Cylindrical

			surfaces, Central conicoids, Paraboloids, Plane sections of conicoids along with the Tangent and normals of the conicoids. ● Have an idea of classification of quadrics. ● Develop an idea of the generating lines. **Differential Equations:** On completion of this course, the student will be able to identify the type of a given differential equation and select and apply the appropriate analytical technique for finding the solution. The students will be well conversant with the following types of differential equations: ● First order differential equations: Exact differential equations and integrating factors, special integrating factors and transformations, linear equations and Bernoulli equations, the existence and uniqueness theorem of Picard (Statement only). ● Linear equations and equations reducible to linear form. First order higher degree equations solvable for x, y and p. Clairaut's equations and singular solution.
	CC02	Algebra	On completion of this course, the student will have a clear-cut understanding of some important concepts of Classical Algebra, Abstract Algebra & Linear Algebra as follows: ● Polar representation of complex numbers, n-th roots of unity, De Moivre's theorem for rational indices and its applications. Exponential, logarithmic, trigonometric and hyperbolic functions of the complex variable. ● Theory of equations: Relation between roots and coefficients, transformation of the equation, Descartes rule of signs, Sturm's theorem, cubic equation (solution by Cardan's method) and bi quadratic equation (solution by Ferrari's method). ● Inequality: The inequality involving AM ≥ GM ≥ HM, Cauchy-Schwartz inequality. ● Linear difference equations with constant coefficients (up to 2nd order). ● Relation: equivalence relation, equivalence classes & partition, partial order relation, poset, linear order relation. ● Mapping: injective, surjective, one to one correspondence, invertible mapping, composition of mappings, relation between the composition of mappings and various set theoretic operations. Meaning and properties of $f^{-1}(B)$, for any mapping $f: X \to Y$ and $B \subseteq Y$. ● Well-ordering property of positive integers

			Principles of Mathematical induction, division algorithm, di-visibility and Euclidean algorithm. Prime numbers and their properties, Euclid's theorem. Congruence relation between integers. Fundamental Theorem of Arithmetic. Chinese remainder theorem. Arithmetic functions, some arithmetic functions such as φ, τ, σ and their properties. ● Rank of a matrix, inverse of a matrix, characterizations of invertible matrices. ● Systems of linear equations, row reduction and echelon forms, vector equations, the matrix equation AX = B, solution sets of linear systems, applications of linear systems.
II (Hons.)	CC03	Real Analysis	After completion of this course, the students will be able to think about the basic proof techniques and fundamental definitions related to the real number system. They can demonstrate some of the fundamental theorems of analysis. The students will gradually develop Analysis skills in sets, sequences and infinite series of Real Numbers covered by the three respective units as follows: ● Intuitive idea of real numbers. Mathematical operations and usual order of real numbers revisited with their properties (closure, commutative, associative, identity, inverse, distributive). Idea of countable sets, un-countable sets and uncountability of R. Concept of bounded and unbounded sets in R. L.U.B. (supremum), G.L.B. (infimum) of a set and their properties. L.U.B. axiom or order completeness axiom. Archimedean property of R. Density of rational (and Irrational) numbers in R. ● Intervals. Neighbourhood of a point. Interior point. Open set. Union, intersection of open sets. Limit point and isolated point of a set. Bolzano Weirstrass theorem for sets. Existence of limit point of every uncountable set as a consequence of Bolzano-Weirstrass theorem. Derived set. Closed set. Complement of open set and closed set. Union and intersection of closed sets as a consequence. No nonempty proper subset of R is both open and closed. Dense set in R as a set having non-empty intersection with every open interval. ● Real sequence. Bounded sequence. Convergence and non-convergence. Examples. Boundedness of convergent

			sequence. Uniqueness of limit. Algebra of limits. ● Relation between the limit point of a set and the limit of a convergent sequence of distinct elements. Monotone sequences and their convergence. Sandwich rule. Nested interval theorem. Limit of some important sequences. Cauchy's first and second limit theorems. ● Sub-sequence, Sub-sequential limits. Every sequence has a monotone sub sequence. Boltzmann-Weirstrass theorem for sequence. Cauchy's convergence criterion. Cauchy sequence.
	CC04	Differential Equations and Vector Calculus	**Differential Equations:** Basic Theory of linear systems in normal form, homogeneous linear systems with constant coefficients: Two Equations in two unknown functions. ● Linear differential equations of second order, Wronskian: its properties and applications, Euler equation, method of undetermined coefficients, method of variation of parameters. ● System of linear differential equations, types of linear systems, differential operators, an operator method for linear systems with constant coefficients. ● Planar linear autonomous systems: Equilibrium (critical) points, Interpretation of the phase plane and phase portraits. ● Power series solution of a differential equation about an ordinary point, solution about a regular singular point (up to second order). **Vector Calculus:** ● Find the Triple product of Products and their Applications ● Deduce the Vector equations subject to different conditions. ● Understand the applications of vector algebra (particularly, vector products) to geometry and mechanics — concurrent forces in a plane, theory of couples, system of parallel forces. ● Learn operations with vector-valued functions. ● Find the limits and verify continuity of vector functions. ● Diffffferentiate and integrate vector functions of one variable
III (Hons.)	CC05	Theory of Real Functions and Introduction to Metric Spaces	**<u>Theory of Real Functions:</u>** After completion of this course, the students will be able to understand the concept of real-

			valued functions, limit, continuity, and differentiability in detail. They can find expansions of real functions in series forms. The students will become conversant with many of the important theorems of ● Limits of functions, sequential criterion for limits. Algebra of limits for functions, effffect of limit on inequality involving functions, one sided limit. Infinite limits and limits at infinity. Some Important examples of limits. ● Continuity of a function on an interval and at an isolated point. Sequential criteria for continuity. Concept of oscillation of a function at a point. A function is continuous at x if and only if its oscillation at x is zero. Familiarity with the figures of some well-known functions: y = x^a, (a = 2, 3, −1, -2), |x|, sin x, cos x, tan x, log x, ex . Algebra of continuous functions as a consequence of algebra of limits. Continuity of composite functions. Examples of continuous functions. Continuity of a function at a point does not necessarily imply the continuity in some neighbourhood of that point. ● Bounded functions. Neighbourhood properties of continuous functions regarding boundedness and maintenance of the same sign. Continuous function on [a, b] is bounded and attains its bounds. Intermediate value theorem. ● Discontinuity of functions, type of discontinuity. Step functions. Piecewise continuity. Monotone functions. Monotone functions can have only jump discontinuity. Monotone functions can have at most countably many points of discontinuity. Monotone bijective function from an interval to an interval is continuous and its inverse is also continuous. ● Uniform continuity. Functions continuous on a closed and bounded interval is uniformly continuous. A necessary and sufficient condition under which a continuous function on a bounded open interval will be uniformly continuous. A sufficient condition under which a continuous function on an unbounded open interval will be uniformly continuous (statement only). Lipschitz condition and uniform continuity. **Metrics Spaces:** On successful completion of the course students will be able to develop conceptual understanding of the following:

			● Definition and examples of metric spaces. Open ball. Open set. Closed set as complement of open set. Interior point and interior of a set. Limit point and closure of a set. Boundary point and boundary of a set. Properties of interior, closure and boundary. Bounded set and diameter of a set. Distance between two sets. Subspace of a metric space. ● Convergent sequence. Cauchy sequence. Every convergent sequence is Cauchy and bounded, but the converse is not true. Completeness. Cantor's intersection theorem. R is a complete metric space. Q is not complete.
	CC06	Group Theory I	On the completion of this course, the students will understand the basic concepts of Group Theory in Abstract/Modern Algebra covered by the following three units: **Unit-1** Symmetries of a square, definition of group, examples of groups including permutation groups, dihedral groups and quaternion groups (through matrices), elementary properties of groups, examples of commutative and non-commutative groups. Subgroups and examples of subgroups, necessary and suffiffifficient condition for a nonempty subset of a group to be a subgroup. Normalizer, centralizer, center of a group, product of two subgroups. **Unit-2** Properties of cyclic groups, classification of subgroups of cyclic groups. Cycle notation for permutations, properties of permutations, even and odd permutations, alternating group, properties of cosets, order of an element, order of a group. Lagrange's theorem and consequences including Fermat's Little theorem. Unit-3 Normal subgroup and its properties. Quotient group. Group homomorphisms, properties of homomorphisms, correspondence theorem and one-one correspondence between the set of all normal subgroups of a group and the set of all congruences on that group, Cayley's theorem, properties of isomorphisms. First, Second and Third isomorphism theorems.
	CC07	Numerical Methods and Numerical Methods Lab	**<u>Numerical Methods:</u>** After completion of this course, the students

			will be able to: • Apply numerical methods to obtain approximate solutions to mathematical problems. • Solve the nonlinear equations, system of linear equations and interpolation problems using numerical methods. • Examine the appropriate numerical differentiation and integration methods to solve problems. • Apply the numerical methods to solve algebraic as well as differential equations. **Numerical Methods Lab:** For any of the CAS (Computer aided software), students are introduced to Data types-simple data types, floating data types, character data types, arithmetic operators and operator precedence, variables and constant declarations, expressions, input/output, relational operators, logical operators and logical expressions, control statements and loop statements, Arrays. The students become expert in solving different numerical problems (listed below) by using computer programming techniques of C.
	SEC1	Logic and Sets	After the completion of these courses the students will acquire skills in thinking more logically in Mathematics, which is very good programming tools for solving many real-life problems. Logic and set theory is very much helpful for the study of computer programming.
IV (Hons.)	CC08	Riemann Integration and Series of Functions	**<u>Riemann Integration:</u>** On completion of this unit of the course, the student will be able to ● Understand Partition and refinement of partition of a closed and bounded interval. ● Conceptualise Upper Darboux sum U(P, f) and lower Darboux sum L(P, f) and associated results. Upper integral and lower integral. ● Understand Darboux's theorem along with Darboux's definition of integration over a closed and bounded interval. ● Learn Riemann's definition of integrability and its Equivalence with Darboux definition of integrability along with the Necessary and suffiffiffficient

			condition for Riemann integrability. ● Conceptualize negligible set (or zero set) defined as a set covered by countable number of open intervals sum of whose lengths is arbitrary small, Examples of negligible sets: any subset of a negligible set, finite set, countable union of negligible sets. ● Learn that a bounded function on a closed and bounded interval is Riemann integrable if and only if the set of points of discontinuity is negligible. ● Develop the capacity to integrate, while understanding the examples of Riemann integrable functions. ● Develop the concept of Integrability of sum, scalar multiple, product, quotient, modulus of Riemann integrable functions & properties of Riemann integrable functions arising from the above results. ● Have an idea of the functions defined by definite integral and its properties, Antiderivative (primitive or indefinite integral) and also the properties of Logarithmic function defined as the definite integral. ● Understand the Fundamental theorem of Integral Calculus & First Mean Value theorem of integral calculus. **Series of Functions:** On completion of this unit of the course, the student will be able to develop a clear-cut idea on sequence and series of functions defined on a set after covering the following: ● Sequence of functions defined on a set, Point wise and uniform convergence. Cauchy criterion of uniform convergence. Weirstrass' M test. Boundedness, continuity, integrability and differentiability of the limit function of a sequence of functions in case of uniform convergence. ● Series of functions defined on a set, Point wise and uniform convergence. Cauchy criterion of uniform convergence. Weierstrass' M-test. Passage to the limit term by term. Boundedness, continuity, integrability, differentiability of a series of functions in case of uniform convergence. ● Power series: Fundamental theorem of power series. Cauchy-Hadamard theorem. Determination of radius of convergence. Uniform and absolute convergence of power series. Properties of sum

			function. Differentiation and integration of power series. Abel's limit theorems. Uniqueness of power series having sum function. ● Fourier series: Trigonometric series. Statement of sufficient condition for a trigonometric series to be a Fourier series. Fourier coefficients for periodic functions defined on $[-\pi, \pi]$. Statement of Dirichlet's condition of convergence. Statement of theorem of sum of Fourier series.
	CC09	Multivariate Calculus	On completion of this course, the student will be able to ● Understand the concept of neighbourhood of a point in Rn (n > 1), interior point, limit point, open set and closed set in Rn (n > 1). ● Identify functions from Rn(n > 1) to Rm(m ≥ 1) ● Develop concepts on limit and continuity of functions of two or more variables, their partial derivatives, total derivative and differentiability, along with the sufficient condition for differentiability, Chain rule for one and two independent parameters, directional derivatives, the gradient, maximal and normal property of the gradient, tangent planes. ● Find Extrema of functions of two variables & understand the use of the method of Lagrange multipliers & solve constrained optimization problems.
	CC10	Ring Theory and Linear Algebra I	**<u>Ring Theory:</u>** Definition and examples of rings, properties of rings, subrings, necessary and sufficient condition for a nonempty subset of a ring to be a subring, integral domains and fields, subfield, necessary and sufficient condition for a nonempty subset of a field to be a subfield, characteristic of a ring. Ideal, ideal generated by a subset of a ring, factor rings, operations on ideals, prime and maximal ideals. Ring homomorphisms, properties of ring homomorphisms. First isomorphism theorem, second isomorphism theorem, third iso-morphism theorem, Correspondence theorem, congruence on rings, one-one correspondence between the set of ideals and the set of all congruences on a Ring.

			Linear Algebra I: Vector spaces, subspaces, algebra of subspaces, quotient spaces, linear combination of vectors, linear span, linear independence, basis and dimension, dimension of subspaces. Subspaces of Rn , dimension of subspaces of Rn . Geometric significance of subspace. ● Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, change of coordinate matrix. Algebra of linear transformations. Isomorphisms. Isomorphism theorems, invertibility and isomorphisms. Eigen values, eigen vectors and characteristic equation of a matrix. Cayley-Hamilton theorem and its use in finding the inverse of a matrix.
	SEC2	Graph Theory	After the completion of these courses the students will acquire skills in thinking Mathematics in a graphical way. They can understand to relate various real life problems with the concept of graph theory.
V (Hons.)	CC11	Partial Differential Equations and Applications	On completion of this unit of the course, the student will be able to understand, derive and solve different types of partial differential equations which may arise in real life problems: ● Partial diffffferential equations of the first order, Lagrange's solution, non- linear first order partial diffffferential equations, Charpit's general method of solution, some special types of equations which can be solved easily by methods other than the general method. ● Derivation of heat equation, wave equation and Laplace equation. Classification of second order linear equations as hyperbolic, parabolic or elliptic. Reduction of second order linear equations to canonical forms. ● The Cauchy problem, Cauchy-Kowalewskaya theorem, Cauchy problem of finite and infinite string. Initial boundary value problems. Semi-infinite string with a fixed end, semi-infinite string with a free end. Equations with non-homogeneous boundary conditions. Non

			homogeneous wave equation. Method of separation of variables, solving the vibrating string problem. Solving the heat conduction problem
	CC12	Mechanics I	After completion of this course, the students will be able to learn and explain different concepts on Mechanics including Statics covered by the following units: Unit-1 ● Coplanar forces in general: Resultant force and resultant couple, Special cases, Varignon's theorem, Necessary and suffiffifficient conditions of equilibrium. Equilibrium equations of the first, second and third kind. ● An arbitrary force system in space: Moment of a force about an axis, Varignon's theorem. Resultant force and resultant couple, necessary and suffiffifficient conditions of equilibrium. Equilibrium equations, Reduction to a wrench, Poinsot's central axis, intensity and pitch of a wrench, Invariants of a system of forces. Statically determinate and indeterminate problems. ● Equilibrium in the presence of sliding Friction force: Contact force between bodies, Coulomb's laws of static Friction and dynamic friction. The angle and cone of friction, the equilibrium region. Unit-2 ● Virtual work: Workless constraints - examples, virtual displacements and virtual work. The principle of virtual work, Deductions of the necessary and suffiffifficient conditions of equilibrium of an arbitrary force system in plane and space, acting on a rigid body. ● Stability of equilibrium: Conservative force field, energy test of stability, condition of stability of a perfectly rough heavy body lying on a fixed body. Rocking stones. Unit-3 ● Kinematics of a particle: velocity, acceleration, angular velocity, linear and angular momentum. Relative velocity and acceleration. Expressions for velocity and acceleration in case of rectilinear motion and planar motion - in Cartesian and polar coordinates, tangential and

			normal components. Uniform circular motion. ● Newton laws of motion and law of gravitation: Space, time, mass, force, inertial reference frame, principle of equivalence and g. Vector equation of motion. Work, power, kinetic energy, conservative forces - potential energy. Existence of potential energy function. Energy conservation in a conservative field. Stable equilibrium and small oscillations: Approximate equation of motion for small oscillation. Impulsive forces Unit-4 ● Problems in particle dynamics: Rectilinear motion in a given force field - vertical motion under uniform gravity, inverse square field, constrained rectilinear motion, vertical motion under gravity in a resisting medium, simple harmonic motion, Damped and forced oscillations, resonance of an oscillating system, motion of elastic strings and springs. ● Planar motion of a particle: Motion of a projectile in a resisting medium under gravity, orbits in a central force field, Stability of nearly circular orbits. Motion under the attractive inverse square law, Kepler's laws of planetary motion. Slightly disturbed orbits, motion of artificial satellites. Constrained motion of a particle on smooth and rough curves. Equations of motion referred to a set of rotating axes. ● Motion of a particle in three dimensions: Motion on a smooth sphere, cone, and on any surface of revolution. Unit-5 (Many particles system) ● The linear momentum principle: Linear momentum, linear momentum principle, motion of the centre of mass, conservation of linear momentum. ● The angular momentum principle: Moment of a force about a point, about an axis. Angular momentum about a point, about an axis. Angular momentum principle about centre of mass. Conservation of angular momentum (about a point and an axis). Impulsive forces. ● The energy principle: Configurations and degrees of freedom of a multi-particle system, energy principle, energy conservation. ● Rocket motion in free space and under

			gravity, collision of elastic bodies. The two-body problem.
	DSE1	Linear Programming	After completion of this unit of the course, the students will be able to Formulate the LPP, Conceptualize the feasible region, Solve the LPP using different methods & understand the importance of LPP in daily life. In details, the student will be able to understand and visualize the • Motivation of Linear Programming problem. Statement of L.P.P. Formulation of L.P.P. Slack and Surplus variables. L.P.P. is matrix form. Convex set, Hyperplane, Extreme points, convex Polyhedron, Basic solutions and Basic Feasible Solutions (B.F.S.). Degenerate and Non degenerate B.F.S. • The set of all feasible solutions of an L.P.P. is a convex set. The objective function of an L.P.P. assumes its optimal value at an extreme print of the convex set of feasible solutions, A.B.F.S. to an L.P.P. corresponds to an extreme point of the convex set of feasible solutions. • Fundamental Theorem of L.P.P. (Statement only) Reduction of a feasible solution to a B.F.S. Standard form of an L.P.P. Solution by graphical method (for two variables), by simplex method and method of penalty. Concept of Duality. Duality Theory. The dual of the dual is the primal. Relation between the objective values of dual and the primal problems. Dual problems with at most one unrestricted variable, one constraint of equality. Transportation and Assignment problem and their optimal solutions.
	DSE2	Probability and Statistics	After completion of this course, the students will be able to understand & apply the concepts of probability & statistics covered in the following Units: Unit-1 ● Random experiment, σ-field, Sample space, probability as a set function, probability axioms, probability space. Finite sample spaces. Conditional probability, Bayes theorem, independence. Real random variables (discrete and continuous), cumulative distribution function,

			probability mass/density functions, mathematical expectation, moments, moment generating function, characteristic function. Discrete distributions: uniform, binomial, Poisson, geometric, negative binomial, Continuous distributions: uniform, normal, exponential. Unit-2 ● Joint cumulative distribution function and its properties, joint probability density functions, marginal and conditional distributions, expectation of function of two random variables, moments, covariance, correlation coefficient, independent random variables, joint moment generating function (jmgf) and calculation of covariance from jmgf, characteristic function. Conditional expectations, linear regression for two variables, regression curves. Bivariate normal distribution. Unit-3 ● Markov and Chebyshev's inequality, Convergence in Probability, statement and interpretation of weak law of large numbers and strong law of large numbers. Central limit theorem for independent and identically distributed random variables with finite variance. Unit-4 • Sampling and Sampling Distributions: Populations and Samples, Random Sample, distribution of the sample, Simple random sampling with and without replacement. Sample characteristics. Sampling Distributions: Statistic, Sample moments. Sample variance, Sampling from the normal distributions, Chi-square, t and F -distributions and some other sampling distributions Estimation of parameters: Point estimation. Interval Estimation Confidence Intervals for mean and variance of Normal Population. Mean squared error. Properties of good estimators - unbiasedness, consistency, sufficiency, Minimum-Variance Unbiased Estimator (MVUE). ● Method of Maximum likelihood: likelihood function, ML estimators for discrete and continuous models. Unit-5 ● Statistical hypothesis: Simple and composite hypotheses, null

			hypotheses, alternative hypotheses, one-sided and two-sided hypotheses. The critical region and test statistic, type I error and type II error, level of significance. Power function of a test, most powerful test. The p-value (observed level of significance), Calculating p-values. ● Simple hypothesis versus simple alternative: Neyman-Pearson lemma (Statement only). ● Bivariate frequency Distribution: Bivariate data, Scatter diagram, Correlation, Linear Regression, principle of least squares and fitting of polynomials and exponential curves.
VI (Hons.)	CC13	Metric Spaces and Complex Analysis	**Metric Spaces:** ● Continuous mappings, sequential criterion of continuity. Uniform continuity. ● Compactness, Sequential compactness, Heine-Borel theorem in R. Finite intersection property, continuous functions on compact sets. ● Concept of connected-ness and some examples of connected metric space, connected subsets of R, C. ● Contraction mappings, Banach Fixed point Theorem and its application **Complex Analysis:** After completion of this course, the students will be able to demonstrate understanding of the basic concepts and fundamental definitions underlying complex analysis. They can prove and explain concepts of series and integration of complex functions and clearly understand problem-solving using complex analysis techniques after covering the following topics: ● Stereographic projection. Regions in the complex plane. Limits, limits involving the point at infinity. Continuity of functions of complex variables. ● Derivatives, differentiation formulas, Cauchy-Riemann equations, sufficient conditions for differentiability. Analytic functions, exponential function, logarithmic function, trigonometric functions, hyperbolic functions. M¨obius transformation. ● Power series: Cauchy-Hadamard theorem

			Determination of radius of convergence. Uniform and absolute convergence of power series. Analytic functions represented by power series. Uniqueness of power series. ● Contours, complex integration along a contour and its examples, upper bounds for moduli of contour integrals. Cauchy- Goursat theorem (statement only) and its consequences, Cauchy integral formula.
	CC14	Ring Theory and Linear Algebra II	After completion of this course, the students will be able to demonstrate the mathematical maturity of understanding the advance aspects of Linear Algebra ● Inner product spaces and norms, Gram-Schmidt orthonormalization process, orthogonal complements, Bessel's inequality, the adjoint of a linear operator and its basic properties. ● Bilinear and quadratic forms, Diagonalization of symmetric matrices, Second derivative test for critical point of a function of several variables, Hessian matrix, Sylvester's law of inertia. Index, signature. ● Dual spaces, dual basis, double dual, transpose of a linear transformation and its matrix in the dual basis, annihilators. Eigenspaces of a linear operator, diagonalizability, invariant subspaces and Cayley-Hamilton theorem, the minimal polynomial for a linear operator, canonical forms (Jordan & rational).
	DSE3	Group Theory II	After completion of this course, the students will be able to demonstrate the mathematical maturity of understanding the advance aspects of Group Theory ● Automorphism, inner automorphism, automorphism groups, automorphism groups of finite and infinite cyclic groups, applications of factor groups to automorphism groups. ● External direct product and its properties, the group of units modulo n as an external direct product, internal direct product, converse of Department of Mathematics, Gokhale Memorial Girls' College, Kolkata-20

			Lagrange's theorem for finite abelian group, Cauchy's theorem for finite abelian group, Fundamental theorem of finite abelian groups.
	PW01	Bio-Mathematics	In This area is specially, they make a project work on this topic. Generally it is a research area in advanced Mathematics. They can learn the beautiful relation of Biology and Mathematics by studying dynamical systems.
I (Genl.)	GE1/CC1	Differential Calculus	On completion of this area of the course, the student will be able to develop a clear concept of the following: ● Rational numbers, Geometrical representations, Irrational number, Real number represented as point on a line — Linear Continuum. Acquaintance with basic properties of real number (No deduction or proof is included). ● Real-valued functions defined on an interval, limit of a function (Cauchy's definition). Algebra of limits. Continuity of a function at a point and in an interval. Acquaintance (on proof) with the important properties of continuous functions no closed intervals. Statement of existence of inverse function of a strictly monotone function and its continuity. ● Derivative-its geometrical and physical interpretation. Sign of derivative Monotonic increasing and decreasing functions. Relation between continuity and derivability. Differentiability - application in finding approximation. ● Successive derivative - Leibnitz's theorem and its application. ● Functions of two and three variables : their geometrical representations. Limit and Continuity (definitions only) for function of two variables. Partial derivatives. Knowledge and use of chain Rule. Exact differentiability (emphasis on solving problems only). Functions of two variables - Successive partial Derivatives : Statement of Schwarz's Theorem on Commutative property of mixed derivatives. Euler's Theorem on homogeneous function of two and three variables. ● Applications of Differentiability Calculus : Curvature of plane curves. Rectilinear Asymptots (Cartesian only). Envelope of a family of straight lines and of curves (problems only). Definitions and examples of singular points (Viz. Node. Cusp, Isolated point).

II (Genl.)	GE2/CC2	Differential Equation	problems: • Order, degree and solution of an ordinary differential equation (ODE) in presence of arbitrary constants, Formation of ODE. • First order equations : (i) Exact equations and those reducible to such equation. (ii) Euler's and Bernoulli's equations (Linear). (iii) Clairaut's Equations : General and Singular solutions. • Second order linear equations : Second order linear differential equation with constant coefficients. Euler's Homogeneous equations. • Second order differential equation : (i) Method of variation of parameters, (ii) Method of undetermined coefficients.
III (Genl.)	GE3/CC3	Real Analysis	After completion of this course, the students will be able to think about the basic proof techniques and fundamental definitions related to the real number system. They can demonstrate some of the fundamental theorems of analysis. The students will gradually develop Analysis skills in sets, sequences and infinite series of Real Numbers covered by the three respective units as follows: ● Intuitive idea of real numbers. Mathematical operations and usual order of real numbers revisited with their properties (closure, commutative, associative, identity, inverse, distributive). Idea of countable sets, un-countable sets and uncountability of R. Concept of bounded and unbounded sets in R. L.U.B. (supremum), G.L.B. (infimum) of a set and their properties. L.U.B. axiom or order completeness axiom. Archimedean property of R. Density of rational (and Irrational) numbers in R. ● Intervals. Neighbourhood of a point. Interior point. Open set. Union, intersection of open sets. Limit point and isolated point of a set. Bolzano Weirstrass theorem for sets. Existence of limit point of every uncountable set as a consequence of Bolzano-Weirstrass theorem. Derived set. Closed set. Complement of open set and closed set. Union and intersection of closed sets as a consequence. No nonempty proper subset of R is both open and closed. Dense set in R as a set having non-empty

			intersection with every open interval. ● Real sequence. Bounded sequence. Convergence and non-convergence. Examples. Boundedness of convergent sequence. Uniqueness of limit. Algebra of limits. ● Relation between the limit point of a set and the limit of a convergent sequence of distinct elements. Monotone sequences and their convergence. Sandwich rule. Nested interval theorem. Limit of some important sequences. Cauchy's first and second limit theorems.
IV (Genl.)	GE4/CC4	Algebra	On completion of this course, the student will have a clear understanding of some important concepts of Classical Algebra & Linear Algebra as follows: ● Complex Numbers : De Moivre's Theorem and its applications. Exponential, Sine, Cosine and Logarithm of a complex number. Definition of Inverse circular and Hyperbolic functions. ● Polynomials : Fundamental Theorem of Algebra (Statement only). Polynomials with real coefficients, the n-th degree polynomial equation has exactly Nature of roots of an equation (surd or complex roots occur in pairs). Statement of Descarte's rule of signs and its applications. ● Statements of : (i) If a polynomial f(x) has opposite signs for two real values and b of x, the equation f(x) = 0 has an odd number of real roots between b. If f(a) and f(b) are of the same sign, either no real root or an even number of roots lies between a and b. (ii) Rolle's Theorem and its direct applications. ● Relation between roots and coefficients, symmetric functions of roots, transformations of equations. Cardan's method of solution of a cubic equation. ● Rank of a matrix : Determination of rank either by considering minors or by sweep out process. Consistency and solution of a system of linear equations wit than 3 variables by matrix method.
V(Genl.)	DSE1	Matrices	After completion of this unit of the course, the students will be able to find ● Rank of a matrix, inverse of a matrix, characterizations of invertible matrices. ● Systems of linear equations, row reduction and echelon forms, vector equations, the matrix equation AX = B, solution sets of linear systems, applications of linear systems.
VI (Genl.)	DSE2	Linear Programming	After completion of this unit of the course, the students will be able to Formulate the LPP

			Conceptualize the feasible region, Solve the LPP using different methods & understand the importance of LPP in daily life. In details, the student will be able to understand and visualize the • Motivation of Linear Programming problem. Statement of L.P.P. Formulation of L.P.P. Slack and Surplus variables. L.P.P. is matrix form. Convex set, Hyperplane, Extreme points, convex Polyhedron, Basic solutions and Basic Feasible Solutions (B.F.S.). Degenerate and Non degenerate B.F.S. • The set of all feasible solutions of an L.P.P. is a convex set. The objective function of an L.P.P. assumes its optimal value at an extreme print of the convex set of feasible solutions, A.B.F.S. to an L.P.P. corresponds to an extreme point of the convex set of feasible solutions. • Fundamental Theorem of L.P.P. (Statement only) Reduction of a feasible solution to a B.F.S. Standard form of an L.P.P. Solution by graphical method (for two variables), by simplex method and method of penalty.

Name of the Department: **MICROBIOLOGY**

System: **CBCS**/Part

Programme Specific Outcome:

1. Students of the B.Sc. (Honours) Microbiology programme will learn to use scientific logic as they explore a wide range of contemporary subjects spanning various aspects of basic microbiology such as Bacteriology, Virology, Biochemistry, Microbial Physiology, Immunology, Cell Biology, Molecular Biology, Genetics, Recombinant DNA Technology, Microbial Biotechnology, Immunology and Molecularbiology, Plant Pathology, in addition to becoming aware of the applied aspects ofmicrobiology such as Industrial Microbiology, Food and Dairy Microbiology, Environmental Microbiology and Medical Microbiology to name just a few.

2. Students will appreciate the biological diversity of microbial forms and be able todescribe/explain the processes used by microorganisms for their replication, survival,and interaction with their environment, hosts, and host populations. They willbecome aware of the important role of microorganisms play in maintenance of aclean and healthy environment. They will learn of the role of microorganisms inplant, animal and human health and disease.

3. Students will gain knowledge of various biotechnological applications ofmicroorganisms and will learn of industrially important products produced bymicroorganisms. They will gain familiarity with the unique role of microbes in geneticmodification technologies.

4. Students will become familiar with scientific methodology, hypothesis generationand testing, design and execution of experiments. Students will develop the ability tothink critically and to read and analyze scientific literature.

5. Students will acquire and demonstrate proficiency in good laboratory practices ina microbiological laboratory and be able to explain the theoretical basis and practicalskills of the tools/technologies commonly used to study this field.6. Students will develop proficiency in the quantitative skills necessary to analyze biological problems(e.g.,arithmetic, algebra, and statistical methods as applied tobiology)

7. Students will develop strong oral and written communication skills through the effective to presentation of experimental results

as well as through seminars. 8. Graduates of the B.Sc. (Honours) Microbiology programme will be informed citizens who can understand and evaluate the impact of new research discoveries in the life sciences, and will be able to pursue a wide range of careers, including biological and medical research in higher education institutions as well as careers in public and global health, scientific writing, environmental organizations, and food, pharmaceuticals and biotechnology industries.

Course Outcome:

Semester/Part	Course Type	PaperDescription	CourseOutcome
I	**CC-1**	Introduction to Microbiology and Microbial Diversity	Students will study about history of Microbiology, algae, and fungi also known the different types of Microscope and their details functions.
	CC-2	Bacteriology	Students will gain about beneficial role of Microorganism, Also learn about growth characteristics, nutrients, staining characteristics, control of microbes as well as different bacteriological techniques involved in microbiology.
II	**CC-3**	Biochemistry	Studentswilllearnaboutthe bio-moleculesby studying their structures and types.
	CC-4	Virology	1. Students will learn to differentiate between types of viruses and their role indisease and cancer. 2. Ability to isolate and cultivate bacteriophages.

III	**CC-5**	Microbial Physiology & Metabolism	Students will study the growth and control of microbes as well as different bacteriological techniques involved in microbiology.
	CC-6	Cell Biology	1. Students will gain knowledge about the different cell organelles of microorganisms and their detailed functions. 2. Students will gain knowledge of functioning of different part of cells and understand differences between normaland diseased cells.
	CC-7	Molecular Biology	1. Students will study the detailed structure of nucleic acids. **2.** Students will earn in detail the Molecular processes such as replication, transcription and translation.
	SEC-1	Microbiological Analysis of Air and Water OR Microbial Diagnosis in Health Clinics	Students will gain knowledge about modeof action of different antibiotics, different type technique as well as ELISA, Agglutination, PCR.

IV	**CC-8**	Microbial Genetics	Students will gain knowledge of prokaryotic gene transfer mechanisms, mutations and recombination.
	CC-9	Environmental Microbiology	Students will gain knowledge and use the properties of microorganisms,

			principally bacteria, as bio-indicators of contamination and to remedy problems of contamination and other environmental impacts.
	CC-10	Food and Dairy Microbiology	1. Students will gain knowledge of significance and activities of microorganisms in food. 2. Students will also study interaction between microorganisms and factors influencing their growth and survival. 3. Students will study use of standard methods and procedure for the Microbiological analysis of milk. 4. Students will study the characteristics of food-borne microorganisms and Spoilagemicro organisms and preventive measures.
	SEC-2	Bio-fertilizers and Bio pesticides	Students will gain knowledge about biofertilizer production, role of bio-fertilizerin agriculture. Also will study role of bio-pesticides inplant diseases

V	**CC-11**	Industrial Microbiology	1. Isolation of industrially important microbial strains and fermentation media. 2.Types of fermentation processes, bio reactors and measurement of fermentation parameters 3.Down-stream processing 4.Microbial production of Industrial products (micro-organisms involved, media, fermentation conditions, downstream processing and uses)
	CC-12	Immunology	Students will gain hands on experience of haematology and immune-techniques.
	DSE-1	Microbesin Sustainable Agriculture And Development	
	DSE-2	Instrumentation and Bio techniques	1.Students willlearnaboutthe principle,working and applications of commonly used instruments in microbiology. 2. Students will also learn applications ofdifferent separation techniques such aselectrophoresis, centrifugation, chromatography,etc. Students will be able to handle, calibrate and use the instruments.

VI	**CC-13**	Medical Microbiology	Students will be able to correlate disease symptoms with causative agent, isolate and identify pathogens. They will gain knowledge of mechanism of action of antimicrobial drugs And prophylaxis.
	CC-14	Recombinant DNATechnology	Students will be able to handle microorganisms for Isolation and amplification of DNA and transform host cells.
	DSE-3	Term Paper & Its PowerPoint Presentation	Ability to apply the tools and techniques of Microbiologyin Conducting research Enhanced capacity to analyze observations and results & Prepare project report.
	DSE-4	Plant Pathology	1.The students will be able to identify the types of plant diseases affecting crops 2. They will be able to isolate PGPB and formulate bio- inoculant.

Name of the Department: Philosophy

System: CBCS/Part

Programme Specific Outcome:1: Proper understanding of any kind of situation through logical and rational thinking.

2: Proper realization of the nature of lifeand society.

3: Development of moral consciousness that enables thestudents to become complete human beings and responsible citizens.

4: Building overall awareness regarding rights and duties towards environment. The student becomes conscious of the environmental issues and tries to take initiative towards environmental protection and sustenance.

5: Encourage to engage in higher studies and research work

Course Outcome:

Semester/Part	Course Type	Paper Description	Course Outcome
I(H)	CC-1	Outlines of Indian Philosophy	Indian Philosophy consists of nine different chools of Indian thoughts, both Āstika and Nāstika systems. Among āstika schools there are Nyāya ,Vaiśeṣika , Saṁkhya , Yoga , Mimaṁsā and Vedānta. On the other hand there are Cārvāka, Jainism and Budhhism as Nāstika schools.
	CC-2	Outlines of Western Philosophy- I	Study of philosophy helps to develop an integrated and Holistic view of life and world. Proper realization of the nature of life and society.
I (G)	CC1A	Indian Philosophy	Indian Philosophy teaches true knowledge of life, describes Purushartha, that is Dharma Artha Kaam Moksha, which is the valuable thing in our life. Ancient philosophers like Jaina Samkhya Yoga teaches us how to sacrifice our life for good, and attain the goal moksha in Niskama karma.
II(H)	CC-3	Outlines of Indian Philosophy-II	Students are introduced with Pramanas with special references to Arthapatti, Anupalabdhi and Pramanyavada of Purva-mimamsadarshan.
	CC-4	Outlines of Western Philosophy- II	Study of philosophy helps to develop an integrated and Holistic view of life and world. Proper realization of the nature of life and society.
II(G)	CC1B	Western Philosophy	Study of philosophy helps to develop an integrated and holistic viewof life and world. Proper realization of the Nature of life and society.
III(H)	CC-5	Indian Ethics	The study of Ethics helps a student to gain the ability so that they can make themselves to become aproper social being. The Honours course enables the students to develop an insight into the intricacies of the subject and prepare them For more advanced courses on subject in the university of

			Calcutta as well as in the other universities both national andinternational.It also develops in them to think logically and essentially which is absolutely essential in realizing the principles and theories of Philosophy.
	CC-6	Western Ethics	Ethics teaches what is the difference between good or bad, happiness, unhappiness, valuable things in our life and nature and scope of ethics nature of morality and moral and non-moral action including motive and intention.
	CC-7	Indian Logic	Proper understanding of any kind of situation through Logical and rational thinking.
III (H/G)	SEC-1	Philosophy in practice	Students are taught with epistemic enquiry in Philosophyanddarsanaandmetaphysicalenquiryin philosophy and darsana
III(G)	CC-1C	Logic	Logical and critical attitude: Study of logic helps to think logically and critically.The student can argue and evaluate in a constructive way.
IV(H)	CC-8	Western Logic-I	Logical and critical attitude: Study of logic helps to think logically and critically.The student can argue and evaluate in a constructive way. By studying Logic, students get acquainted with the use of logical rules for identifying a valid argument. Along with these, they also learn existential import, symbolic interpretation, constructing formal proof of validity, proving invalidity, Quantification theory. Study of this paper helps them to be aware of Mill's different experimental methods, Science and Hypothesis and also different theories of probability. In NET and SLET and other competitive exams most of the questions are based on logic and reasoning, so proper understanding and knowledge of this paper helps them to perform better in these exams.
	CC-9	Psychology	Students are introduced withthe nature of psychology, research method in psychology,central nervous system and also perception attention etc.
	CC-10	Philosophy of religion	This course helps the students to understand the different religious traditions and their implications. Arguments for the existence and non-existence of God, the peculiarity of religious language are some of the topics in this paper. Basic tenets of Christianity and Islam are explained and analyzed. The course does not confine itself to discussion about ancient religious beliefs; it throws light upon the recent concepts of Universal Religion, inter- religious understanding and communications.
IV(G)	CC1D	Contemporary Indian Philosophy	Students are introduced with the philosophical opinions of Rabindranath Tagore, S Radhakrishnan and Sri Aurobindo'stheory.

IV(H/G)	SEC2	Philosophy of human rights	The study of philosophy enhances a person's problem-solving capacities. It helps us to analyze concepts, definitions, arguments, and problems. It contributes to our capacity to organize ideas and issues,to deal with questions of value, and to extract what is essential from large Quantities of information.
V (H)	CC-11	Socio-Political Philosophy	In the part of Social and Political philosophy students of philosophy learn about the nature of social and political philosophy and their relation. They also study the basic concepts of society, nature and role of family in society, different theories regarding therelation between individual and society. They also learn about secularism, nature and progress of Social changes, different theories of social changes, discussion about different political ideals.
	CC-12	Westernlogic II	Logical and critical attitude: Study of logic helps to think logically and critically.The student can argue and evaluate in a constructive way. By studying Logic, students get acquainted with the use of logical rules for identifying a valid argument. Along with these, they also learn existential import, symbolic interpretation, constructing formal proof of validity, proving invalidity, Quantification theory. Study of this paper helps themtobe aware of Mill's different experimental methods, Science and Hypothesis and also different theories of probability. In NET and SLET and other competitive exams most of the questions are based on logic and reasoning, so proper understanding and knowledge of this paper helps them to perform better in these exams.
	DSE1	Kathopanisad	The Katha Upanishad asserts that the essence of Veda is to make man liberated and free,look past what has happened and what has not happened, free from the past and the future, refocus his attention past Ignorance to Knowledge, to them eans of blissful existence beyond joy and sorrow.
	DSE2	B.Russell the problems of philosophy	Inseeking certainty, we discover vagueness and confusion in many common ideas. The search for certainty launches us into the study of philosophy. One area that seems to grant us certainty is our immediate experience. Russell describes his immediate experience as he sits in a sunny room at his desk. He focuses on the sensations he experiences of the table before him.
V (G)	DSE-1A	Philosophy of religion	This course helps the students to understand the different religious traditions and their implications. Arguments for the existence and non-existence of God, the peculiarity of religious language are some of the topics in this paper. Basic

			Tenets of Christianity and Islam are explained and analyzed. The course does not confine itself to discussion about ancient religiousbeliefs;itthrowslightupontherecent concepts of Universal Religion, inter- religious understanding and communications
	SEC-3	Philosophical Analysis	Analytic outlook: This ability develops through proper study Of analytic philosophy. It helps to form the capacity to analyze various situations in life.
VI(H)	CC-13	Philosophy in the twentieth century Indian	Students are introduced with the philosophical opinions of Rabindranath Tagore, S Radhakrishnan and Sri Aurobindo'stheory.
	CC-14	Philosophy in the twentiethcentury western	Analytic outlook: This ability develops through proper study of analytic philosophy. It helps to form the capacity to analyze various situations in life.
	DSE3	RABINDRANATH TAGORE: SADHONA	Students are introduced with thecollection of spiritual discourses given by Rabindranath Tagore.The relation of the individual to the universe, soul consciousness and realization in love.
	DSE4	HUME	Today, philosophers recognize Hume as a thorough going exponent of philosophical naturalism, as a precursor of contemporary cognitive science,and as the inspiration for several of the most significant types of ethical theory Developed in contemporary moral philosophy.
VI(G)	DSE1B	TARKASAMGRAHA (Saptapadartha)	Proper understanding of any kind of situation through logical and rational thinking.
	SEC-4	Ethics in practice	Ethics teaches what is the difference between good or bad, happiness,unhappiness,valuable things in our life and nature and scope of ethics nature of morality and moral and non-moral action including motive and intention.

Name of the Department: Physical Education

System: CBCS/Part

Programme Specific Outcome:

1) Know sports management and employ principles of strategic planning, and financial and human resource management.
2) Assess marketing needs and formulate short term and long term solutions.
3) Develop critical thinking in analysing sport management issues and in managerial planning and decision making.
4) Able to organize recreational camp and activities.
5) Explain the Anatomy, Physiology and functions of various Tissues and cell, organization of Cellular System.
6) Classify different types of Tissue and explain Anatomy and Physiology of Skeletal System and Joints.
7) Explain the Anatomy and Physiology of Cardiovascular and Respiratory System and its disorders.
8) Explain the Anatomy and Physiology of digestive, nervous system and its disorders.
9) Explain the Anatomy and Physiology of Endocrine System and sense organs and its disorders.
10) Understand Historical development of Yoga and science behind it.
11) Relate Yoga with health and wellness.
12) Demonstrate and apply variations benefit of Yoga in the physical, mental spiritual body.
13) Understand Historical development of Yoga and science behind it.
14) Relate Yoga with health and wellness. Demonstrate and apply variations benefit of Yoga in the physical, mental spiritual body

Course Outcome: Theory

Semester/Part	Course Type	Paper Description with Paper Code	Course Outcome
Sem-1	B.A (G)	Foundation and History of Physical Education (CC_1A)	1. Physical education has been shown to be an essential part of a student's education. It helps students to stay healthy, learn teamwork skills, and have fun. In addition, physical education can also help students maintain a healthy weight and reduce the risk of obesity. 2. Physical education not only helps keep the body fit, but it also allows children to have better mental health, inculcates a competitive spirit and more: we put the spotlight on reasons that make physical education so important and necessary.
Sem-2	B.A (G)	Management of Physical Education and Sports (CC_1B)	1.Sports management can be Defined as the coordination of resources, technologies, processes, personnel and situational contingencies for the efficient production and exchange of sports services." A sound programme is the key to success for an organisation. 2. Management in sport organizations provide sports development, general planning activities i

			the field of sports, organizes all relevant resources, processes and functions, exercised a policy of human resources development, organized sports and business functions, provide communication and coordination, deciding on the .
Sem -3	B.A (G)	Anatomy, Physiology and Exercise Physiology (CC_1C)	1.The knowledge of anatomy and physiology is essential to understand physical education and sports from scientific point of view. The performance of an athlete can be improved by understanding the effect of exercises on various body parts of athlete. Anatomy and Physiology are inter-related. 2. Anatomy refers to the internal and external structures of the body and their physical relationships, whereas physiology refers to the study of the functions of those structures. 3. Anatomy describes the physical structures of organisms while physiology describes mechanical and chemical processes. In other words, anatomy is akin to the blueprints for a machine and physiology is akin to a description of how the parts function.
Sem-4	B.A (G)	Health Education, Physical Fitness and Wellness (CC_1D)	1. Fitness is very important for good health. Besides feeling better mentally, exercising can help protect you from heart disease, stroke, obesity, diabetes, and high blood pressure; and it can make you look younger, increase and maintain bone density, improve the quality of your life, and may keep you from getting sick. 2. A good quality education is the foundation of health and well-being. For people to lead healthy and productive lives, they need knowledge to prevent sickness and disease. For children and adolescents to learn, they need to be well nourished and healthy. 3. Health education teaches physical, mental, emotional, and social health. It helps students to improve and preserve their health, avoid illness, and reduce risky behaviors. Health education curricula and training help students learn skills so that they can make healthier decisions in their lives.
Sem -5	B.A (G)	Test, Measurement and Evaluation in Physical Education (DSE_1)	1. To frame the objectives - Test and Measurement helps in setting the target or goal according to the need and requirement. By adopting the Test and Measurement techniques the physical education teachers gets an accurate idea about the progress made by the students. 2. Test and measurement have a very important role

			in the field of physical education. Through measurement we can explore the ability, qualification and important information of students. Physical fitness components can be measured by using specific tests. 3. Measurements provide us with accurate details. To determine weight and height, measurement is necessary. To know the time, temperature, length, area, pressure, voltage, etc. measurement becomes essential.
Sem-6	B.A (G)	Psychology in Physical Education and Sports (DSE_2)	1.Sports psychology looks at how physical activity and mental well-being intersect. Sports psychologists help athletes maintain high levels of performance by prioritizing mental fitness. They also look at sports participation in relation to skills like teamwork and emotional regulation. 2. Psychology helps to improve the performance and personality of players by scientifically modifying his behavior. Proper motivation and feedback enhances the performance of the player.

Course Outcome: Practical

Semester/Part	Course Type	Paper Description with Paper Code	Course Outcome
Sem -3	B.A (G)	Track and Field (SEC_1)	• Physical activity enhances an individual's ability to think, concentrate, & focus. ... • Physical activity is important for healthy growth & development. ... • Physical activity prevents sleep deprivation. ... • Physical activity helps relieve stress and anxiety.
Sem-4	B.A (G)	Gymnastics and Yoga (SEC_2)	1.The ability of the gymnast to focus and to not get distracted by their senses, will help improve their performance. Yoga practice, designed to balance body and mind, will help to create balance and mental focus. 2. Gymnastics training emphasises body weight strength to improve core strength, reflexes, whole body muscle extension and flexion, and balance

			Gymnasts are some of the strongest athletes in the world and gymnastics strength training can help tone all muscles and assist in decreasing chronic muscle soreness and pain. 3. Yoga has the potential to help gymnasts with injury prevention, body posture and awareness, stress relief and better focus. It also increases athletes' strength and flexibility. Every day there are many different exercises such as heavy jumps, landings and conditioning that pound on the joints and muscles.
Sem -5	B.A (G)	Indian Games and Racket Games (SEC_3)	1. Games in India are played not just to fulfill the social need but also to teach important values like planning, strategizing, leadership, teamwork, perseverance, tolerance etc. Indian games have evolved significantly over thousands of years. 2. Playing traditional games, such as board or outdoor games help children to think for themselves, learn cooperation and teamwork skills, work on strategies and tactics, and learn how to hold a conversation with adults. Games are a fun way of getting your child to learn – without them even realising it! 3. Playing indigenous games not only improves physical development and brain stimulation. They get to experience and let their imagination wonder. Children also learn social skills because most of these games are played in a group. They also learn and understand rules.
Sem-6	B.A (G)	Ball Games (SEC_4)	• 1.They improve coordination and timing. • 2.They help your children to keep to a healthy weight and a good level of fitness and are great for making muscles and bones stronger.

Name of the Department: Physics

System: CBCS

Programme: B.Sc. Physics (Hons) Programme

Specific Outcome:

- Understand the natural laws which are governing our physical world.
- Learn different numerical analysis software which will be beneficial for data analysis required during carrying out any scientific research.
- Understand the concepts and significance of the various physical phenomena.
- Carry out experiments to understand the laws and concepts of Physics.
- Apply the theories learnt and the skills acquired to solve real time problems.
- Acquire a wide range of problem solving skills, both analytical and technical and to apply them.
- To motivate the students to pursue PG courses in reputed institutions.

Course Outcome:

Semester	Course Type	Paper Description	Course Outcome
1	CC - 1	Mathematical Physics-I	● Learn to solve First Order and Second Order Differential equations ● Learn about Vector Calculus ● Learn about Orthogonal Curvilinear Coordinates ● Learn about Introduction to probability ● Learn about Dirac Delta function and its properties
	CC - 2	Mechanics	● Applications of Newton's law and Laws of conservation of energy. ● How rotational dynamics is different from translational dynamics? ● Concept of Elasticity and fluid motion. ● Motion of a particle under a central force field. ● Explain time dilation in the light of Special Theory of Relativity.
2	CC - 3	Electricity & Magnetism	● Concept about the fundamental interactions of electricity and magnetism as separate phenomena ● Understand electricity and magnetism as a singular electromagnetic force. ● Concept about electrostatics, magnetism, electromagnetic induction and Maxwell's equations. ● Application in almost every branch of science and engineering. ● Gain practical knowledge about electricity and magnetism and measurements such as: Resistance, Voltage, current etc.
	CC - 4	Waves and Optics	● Will there be any difference if harmonic oscillators are superposed in a collinear fashion and perpendicular fashion? ● Define Longitudinal and Transverse Waves. ● Define Temporal and Spatial Coherence. ● Explain the phenomena behind Newton's Rings formation. ● What is the Principle of Holography?
3	CC - 5	Mathematical Physics–II	● Identify the periodic nature of a function and the advantages of Fourier expansion of periodic functions. ● Identify singular points of 2nd order differential equations ● State the significance of Frobenius method for solving 2nd order differential equations. ● Solve Integrals in terms of Beta and Gamma functions. ● Explain the separation of variables technique for solving partial differential equations.

	CC - 6	Thermal Physics	● Understand the basic physics of heat and temperature and their relation with energy, work, radiation and matter. ● Learn how laws of thermodynamics are used in a heat engine to transform heat into work. ● Study of laws of thermodynamics, thermodynamic description of systems, thermodynamic potentials, ● Understand kinetic theory of gases. ● Gain practical knowledge about heat and radiation, thermodynamics, thermo emf , RTD etc. and perform various experiments.
	CC - 7	Digital Systems and Applications	● Learn about CRO and IC ● Learn about different logic gates ● Learn about Boolean algebra and its applications ● Learn about Arithmetic Circuits and Sequential Circuits ● Learn about Computer Organization and Intel 8085 Microprocessor Architecture
	SEC – 1	Renewable Energy and Energy harvesting	● Learn about Fossil fuels and Alternate Sources of energy ● Learn about Solar energy, Ocean Energy, Geothermal Energy ● Learn about Wind Energy harvesting ● Learn about Electromagnetic Energy Harvesting ● Learn about Piezoelectric Energy harvesting
4	CC - 8	Mathematical Physics–III	● Define "Residue" of a function of complex variables and state "Residue Theorem". ● State Cauchy's Integral formula and mention some of its advantages. ● State the advantages of "Fourier Integral Theorem" and give some examples of "Fourier Transform". ● Representation of Dirac delta function as a Fourier Integral ● Explain the Laplace transforms of derivatives and integrals of function with some examples.

	CC - 9	Elements of Modern Physics	● How Photo-electric effect is related to Quantum theory of light? ● What do you understand by Heisenberg uncertainty principle? ● Comment on Wave-particle duality. ● What is the Law of radioactive decay? ● Can you differentiate between fission and fusion reaction?
	CC - 10	Analog Systems & Applications	● Learn about Semiconductor Diodes ● Learn about Two-terminal Devices and their Applications ● Learn about Bipolar Junction transistors ● Learn about Amplifiers, Coupled Amplifier, Feedback in Amplifiers ● Learn about Operational Amplifiers and their applications
	SEC – 2	Electrical circuits and Network Skills	● Learn about Basic Electricity Principles, ● Understand Electrical Circuits ● Learn about Electrical Drawing and Symbols ● Learn about Generators and Transformers ● Learn about Electrical wiring
5	CC - 11	Quantum Mechanics and Applications	● What are the properties of wave function? ● Interpret wave function probability and probability current density. ● What is zero point energy? ● What will be your approach to solve the Schrodinger equations for hydrogen-like atoms? ● Differentiate between normal and anomalous Zeeman effect.

	CC - 12	Solid State Physics	• Identify different crystal structures and their reciprocal lattices. • Why X-rays are used for identification of crystal structures? • What are the fundamental differences between Einstein's and Debye's theories of specific heat of solids? • Mention some similarities and differences between the dielectric and magnetic properties of matter. • How does the Kronig Penny model help to understand the concept of band gap?
	DSE - 1	Advanced Mathematical Physics	• Learn about Linear Vector Spaces • Learn about Matrices, • Learn about Eigen-values and Eigenvectors • Learn about Cartesian Tensors • Learn about General Tensors
	DSE - 2	Classical Dynamics	• Learn about Classical Mechanics of Point Particles • Ability solve relevant numerical problems • Learn about Small Amplitude Oscillations • Learn about Special Theory of Relativity • Learn about Fluid Dynamics
6	CC - 13	Electro-magnetic Theory	• Lean about Maxwell Equations • Learn about Electromagnetic wave propagation in bounded and unbounded media • Learn about Polarization of Electromagnetic Waves • Learn about Rotatory Polarization • Learn about Wave Guides and Optical Fibres

	CC - 14	Statistical Mechanics	● What do you understand by microstate, macrostate and phase space? ● How would you resolve the Gibbs paradox? ● Mention the difference between classical and quantum theories of radiation. ● What is Ultraviolet Catastrophe? ● Discuss the difference between Bose-Einstein and Fermi-Dirac statistics.
	DSE - 3	Nuclear and Particle Physics	● Learn about General Properties of Nuclei and Nuclear Models ● Learn about Radioactive decay and Nuclear Reactions ● Learn about Interaction of Nuclear Radiation with matter ● Learn about Detector for Nuclear Radiations ● Learn about Particle Accelerators and Particle Physics
	DSE - 4	Astronomy and Astrophysics	● Learn about Astronomical Scales ● Learn about Astronomical techniques ● Learn about The Sun ● Learn about The milky way and Galaxies ● Learn about Large scale structure & expanding universe

Programme outcomes

Subject–Political Science Honours

(1) Political Science as a social science has the immense potential tochange the worldina new direction. Students who have completed their BA honours programme in Political Science are dimensioned with this power of potentiality and rationally justify the new goals with which social developments have occurred.

(2) As most of the queries discussed within the realm of Political Science start with **why**, and **how** questions, it develops analytical power in the mind of students and helps them to capitulate the power of knowledge in a rational way.

(3) Most of the subject matter of Political Science has a practical dimension. Therefore it helps students to develop practical knowledge and understand its applicability in their lives.

(4) It helps students to become sociable, sensitive, and responsible citizens.

(5) It makes students more focused on their career by opening up the new scope of jobs, details ofwhich are given below

Civil Services (Indian Administrative Services, Indian Foreign Services)	Bank Manager/Clerk
Journalist	Political Scientist
Secretary to various government departments and agencies	Election and Campaign Manager
Political content developer	Teacher
NGO	Policy Analyst
Legislative Assistant	Public Relations Specialist
Social Media Manager	Marketing Research Analyst
Political Consultant	Attorney
Intelligence Analyst	Public Opinion Analyst
Communications Director	Corporate Manager
Survey Analyst	Foreign Service Officer
Human Rights Activists	Legal Adviser to Political Parties

Course outcomes

Political Science Honours		
Course code	Course Title	Course outcome
Sem-1 CC-1	Western Political Thought	• CO-1 Ideas of key thinkers in the Western political thought helps identify the foundations of the conceptual framework of some major theories in political science. • CO-2 It focuses on key themes (such as justice, the nature of state, sovereignty, general will, etc.) presented by the renowned thinkers and their works to postulate further studies in this field. • CO-3 Western political thought is the reflection of how best to adjust in our collective life. • CO-4 During this course students can develop a critical perspective through which they can evaluate the strengths and weaknesses of various philosophical approaches.
Sem-1 CC-2	Political Theory	• CO-1 It helps students to understand what role does political theory play in solving various problems of society and in what ways it either legitimizes a political system or declines it in a given society. • CO-2 With this course students can learn about the different perspectives of political science which interprets society in different ways. • CO-3 It makes students enable to know about the core concept of sovereignty and its various theoretical dimensions along with its changing perspectives. • CO-4 It facilitates students' knowledge about the conceptualization of universal ideas like liberty and equality; it helps them to find out their inter-relation as well as contradiction in a given situation. Present dimensions of these concepts also help students to perceive its utility in the modern value system. • CO-5 Role of justice in modern states with special reference to John Rawls helps students to understand the moral values in the political world. • CO-6 It makes students familiar about the roles and goals of different ideological forms of our society. Besides this, it helps students to understand what sort of appeals are generated by these ideologies and how much influence they have on the life of common people. • CO-7 Theoretical frameworks of understanding various forms of states and its activities also make students more focused about their subject.

Sem-2 CC-3	Indian Political Thought	• CO-1 This course is attributed with some important questions, i.e., what is Indian Political Thought, in what sense it is different from that of its Western counterparts, what makes it evolve in Indian context, what determines its nature and scope, who have contributed in its development, and so on. • CO-2 Along with the answer to these questions, students who have completed this course can largely understand about the indigenous methods applied for the cultivation of knowledge on the conceptual level of Indian politics and society. • CO-3 It makes students informed about the norms on the basis of which state-society interface took place. • CO-4 It helps students to capitulate the knowledge about nation, nationality, and nationalism in Indian context by dimensing their quest for knowledge towards the thinking of national thinkers attributed with Indian nationalism. • CO-5 It not only helps students to perceive the core concepts of Ahimsa, Satya, and Swaraj but also helps them to materialize these concepts in their daily life. • CO-6 It makes students understand about the concept of social justice and its rationality in Indian society.
Sem-2 CC-4	Indian Government and Politics	• CO-1 It helps students to assume the idea about the structural and functional setup of Indian Government and presume the political backdrop on the basis of which it emerged. • CO-2 It focuses on the process of making Constitution in connection with which roles and goals of Constituent Assembly becomes important to realize. • CO-3 It connects students with the soul of the Constitution (The Preamble) and helps them to accept its significance in their own life. • CO-4 It helps to make students more conscious about their Constitutional rights and Duties. In addition to this, Directive Principles of State Policy also helps students to understand about the policies on the basis of which Indian states regulate. • CO-4 It helps students to reveal the true nature of Indian federalism. • CO-5 It makes students understand about the various wings of Government (legislative, executive, judicial) and their roles and relation to get a clearer vision about governance. • CO-6 Party system enhances the knowledge about various political parties, their role in the formation of government, and the process through which it links up common people with rulers. It also narrates the backdrop within which coalition politics forms. • CO-7 It expresses the significance of electoral system; focuses on the role and responsibility of Election Commission in conducting elections democratically and reveals the necessity of electoral reform in the present Indian context.

Sem-3 CC-5	Comparative Government and Politics	• In the existing course structure of Burdwan University, it is offered in Semester-3 for Political Science Honours students. • CO-1 It focuses on the comparative analysis between various states. Six states namely UK, USA, France, China, Mexico, and Nigeria of different structural outfits are selected for this purpose. To extract knowledge about the functional structures of different states, their activities, capacity to regulate state mechanisms, relationship between different state structures, means of state-society interaction, a comparative analysis has been taken into consideration. • CO-2 It helps to differentiate between Comparative Government and Politics and focuses on their level of activities in different fields of work. • CO-3 Comparing between the core principles of Constitution and constitutionality is another important thrust area of this discipline. • CO-4 Mode of comparison between different states, their structures, activities, procedures to deliver goods and services, their interaction with their society and people as well as others also fall into the ambit of this discipline. • CO-5 To generate knowledge about the interaction between different structural outcomes within a single state, it becomes helpful and effective. • CO-6 Along with formal actors, a large number of informal actors also come into the domain of Comparative Politics which can help students to develop a more concrete view about the role and goal of politics both in national and international levels.
Sem-3	Public Administration	• Students learn from this course about the – (1) Theoretical foundation of Public Administration; (2) Roles and goals of public (formally constituted government) as the key makers of administration;
CC-6		• CO-3 Dimensions of various administrative principles and its implications. • CO-4 Theoretical explanation of the relationship between men and state in terms of management theory. • CO-5 Modern theories of administration and its implicational values in the life of human. • CO-6 Approaches to study modern administrative behaviour, rules, and regulations. • CO-7 Informal attributes of formal administration.

Sem-3 CC-7	Local Government in India	• This paper is offered for Semester-3 Honours students under the curriculum of Burdwan University. • CO-1 It helps students to understand how does power devolve in local level within the federal structure of Indian democracy. • CO-2 It generates knowledge about the infrastructural developments through which power devolves in local level. • CO-3 Constitutional status of local self-government institutions and subsequent amendments (73^{rd} and 74^{th}) are also within its ambit. • CO-4 It focuses on the role and responsibility of local self-government institutions (both rural and urban) to promote and protect the rights of local people with special emphasis on West Bengal. • CO-5 Role of bureaucrats (DM, SDO, BDO, SP) in different levels of administration and their connections with the local self-government institutions also helps students to evaluate the fact that how much such institutions are free from bureaucratic interference and to what extent it will depend upon bureaucrats to fulfill its needs. • CO-6 It helps students to cater knowledge about the state administration of West Bengal with special reference to the role of chief secretary, Divisional Commissioner so that continuity of administrative process will be maintained in present discourse. • CO-7 Administrative reforms in India with special reference to Lokpal, Lokayukta, and RTI help students to understand about the measures taken for checking corruption in administrative domain.
Sem-3 SEC-1	Legislative Support	CO-1 It helps students to understand the roles and responsibilities of Parliament in Indian context. • CO-2 It focuses on the roles of people's representatives and helps students to understand how much they are effective in protecting and promoting the interest of people to prove themselves more responsible to their electorate. • CO-3 It develops practical knowledge in the minds of students by making them familiar with the legislative process. • CO-4 It helps students to decide the parameters on the basis of which they can assess the role of different parliamentary committees in the law-making procedure. • CO-5 Procedures of budget making and the role of parliament in reviewing it is another thrust area of this paper that helps students to understand the connection between economics and politics in the public sphere. • CO-6 It makes students understand about the various Grants allotted by the Ministers and its utility in public life.
Sem-4 CC-8	International Relations	CO-1 It helps students to understand about the basic concepts of International Relations and its implications in real life. CO-2 It has an interdisciplinary dimension that develops a special skill among learners to connect political activities with the other disciplines of Social Science. CO-3 It makes students enable to spread their analytical notion about the connections between political activities, performed in different levels of political sphere. CO-4 It helps students to increase their knowledge about the various dimensions of inter-state relations and make them understand about its effect on the state's national life as well as in international sphere. CO-5 It facilitates knowledge about the leading issues of International politics, i.e., Globalization, Human Rights, Terrorism, and helps students to connect with these issues and measure their role in International Politics.

Sem-4 CC-9	Sociologyand Politics	CO-1 This course helps to identify some social determinants of politics in a systematic method. It directly influences the activities of learners. CO-2 Study of political sociology enables students to analyze a deep layer of political life. They gain capacities of explanation of dynamics of social and political processes.
Sem-4 CC- 10	International organizations	It is offered for Political Science Honours students as a core course. It is within the curriculum of 3rd Semester Honours and mainly focused on influential International Organizations to measure their roles in International as well as in regional politics. CO-1 It helps to understand about the evolution process of International organizations. CO-2 Enriches students about the emergence of UNO and its different functional organizations to assess their role in International politics. CO-3 Mapping out the role of UNO as it takes in peacekeeping and peacebuilding methods throughout the world. CO-4 It helps students to assess the role of various regional organizations (economic, security, and others), i.e., APEC, OPEC, NATO, ARC, SAARC, ASEAN, BRICS, which play a connecting role between International and regional politics and manage to cater with the needs of International Politics at the regional level.
Sem-4 SEC- 2	PublicOpinion in Survey Research	CO-1 It helps students to inculcate knowledge about what public opinion is and what its significance in Public life. CO-2 It makes students understand about the methods used for surveying public opinion. CO-3 It reveals the importance of the interview method as an effective tool of mapping public opinion, hence informs students about its different usages in research activities. Framing questionnaires is also a part of it. CO-4 It enhances students' knowledge about the polling prediction, its possibilities and pitfalls.
Sem-5 CC- 11	Social movementsin India	It makes students understand about the causes and consequences of the Social movement in India. CO-2 It makes students familiar with the different forms of social movement and enhances their knowledge about different perspectives through which it can be summarized. CO-3 It enriches their vision with the interdisciplinary dimensions of thought emanating from the inter-relationship between various factors actively participating in Social movements. CO-4 It helps students to assess the true nature of India's social fabric and their role to protect this fabric from any interference coming from outside. CO-5 It develops their analytical power to connect themselves with different perspectives on which a number of Social movements took place.
Sem-5 CC- 12	Elementary research methodsin Political Science	CO-1 It provides the lens through which research in social science is conducted effectively. It also focuses on what research means and the objectives to which it directs. CO-2 It makes students aware of the methodology of both Qualitative and Quantitative research. CO-3 It familiarizes students with the vocabulary of research and helps them to conceptualize these terms in a practical way. CO-4 It makes students enable to identify the components of research design and provides them necessary direction to form a research design with those components. CO-5 It helps students to acquire practical knowledge about the use of major research methods and techniques of data collection, survey research, case study, and in this sense, broadens their knowledge about empirical research.

Sem-5 DSE- 1	Select Comparative Political Theories	CO-1 Students can learn from this course about the comparative narratives framed for understanding the various dimensions of comparison between Indian and Western political thought. CO-2 It develops practical knowledge among students to make them realize about the common parallelism of different political phenomena and the contrast between them. CO-3 It expands the outlook of students by making them familiar with the core values of political thought of both Indian and Western political thinkers. CO-4 It helps students to develop skills for interdisciplinary analysis.
Sem-5 DSE- 2	Understanding Good Governance	This course belongs to the Core course and it is offered to the Political Science Honours students in their 5th semester. This course is basically attributed with the study of governance and its implications in different fields of life. From this course, students gain knowledge about the: • (1) Capacity of government and assess its effectiveness in fulfilling the demands that arise both at the National level as well as at the State level; • (2) Various forms of governance which most often play a key role in their daily life. For example, if they don't know about the role of E-governance, they will definitely miss the utility of its role. Since birth registration to death certificate, form fill-up for BU exam to scholarship, everything is under the purview of E-governance, therefore it is important to know its utility. • (3) How does democratic government operate, its capacity to meet the demand of the people residing within its premises, its role to accommodate different people within its ambit also help people to assess their role and responsibility in a democratic polity. • (4) This course not only limits its subject matter within the boundary of a state but expands its scope to the international sphere and makes people aware about Global Governance and helps them to assess its role in their life. • (5) With the increasing influence of MNCs and other transnational organizations in state's national affairs, Corporate Governance and related issues also come within its purview. It enables people to measure the state's power which is essential to protect their interests from the interference of foreign multimillionaires. • (6) It reveals the utility of Environmental Governance and directs the way to achieve it.
Sem-6 CC- 13	Indian Foreign Policy	After completing this course: Students can understand why foreign policy is much more important for a country like India and what are the determinant factors to decide how to deal with other states. • CO-2 It helps students to understand the pros and cons of India's relationship with its neighboring states, i.e., Pakistan, Bangladesh, Nepal, Bhutan and assess how much powerful it is in regulating such relations by its own conditions. • CO-3 India's relationship with the major world powers like USA, China, and Russia is also falls into the domain of this paper. • CO-4 Students who show their interest in examining the latest trends of Indian foreign policy can also satisfy their scholarly intention in this field.

Sem-6 CC- 14	Contemporary issues in India	This course helps students in understanding the various social attributes like Caste, class, gender, etc., and its changing dimensions in present time. • (1) It makes them informed about the sources of social discrimination and violence that justify the submissive position of women and other backward people in society. • (2) It makes students more focused on their learning about the root causes of communalism and helps them to think about the way through which it can be eradicated from society effectively. • (3) It encourages students to reveal the true nature of secularism in present India and make them enable to presume the differences between real and ideal nature of secularism. • (4) It makes students more familiar with those impediments rooted in the social structure (like property, discrimination on the basis of caste) and helps them to understand its pitfalls on their social life as well as on Indian democracy. • (5) Students can learn from it the constitutional status and safeguards enshrined in the Indian constitution for SC, ST, OBC for establishing a more vibrant democracy. • (6) With this course, students can learn about the initiatives taken by the Indian government to effectively manage adverse natural calamities and others.
Sem-6 DSE-3	Local Government in West Bengal	CO-1 It examines the model of local government adopted by the West Bengal government since independence. CO-2 It makes students understand about the evolution process of both rural and urban local government in West Bengal. CO-3 With this course, students learn about democratic values by acknowledging the spirit of institutionalizing democratic will at the local level. For example, by understanding the utility of structural changes as happened in Panchayati Raj institutions, after the passing of Panchayati Act in 1973, students identify what sort of changes are required to make existing Panchayati Raj institutions more vibrant in the sense of popular democracy. CO-4 It enables students to judge the practical values of local self-government institutions by comprehending their rhythmic expansion in the life of common people. CO-5 It helps students to examine how urban local self-government institutions work, how much it is democratic in its essence, what its objectives are, to what extent it is representative in nature, and does it keep parity with the constitutional arrangements taken for this purpose?
Sem-6 DSE- 4	Political Economy in International Relations	Political Economy of International Relations is offered as a core paper for the Honours students of Political Science studies in Semester-6. CO-1 It helps students to understand how does economic phenomenon become a core analytical factor in studying International Politics. CO-2 It makes students understand about different approaches through which such interaction between politics and economics can be explained. CO-3 Focus of this paper is attributed to the examination of various modes and applicability of different financial rules in international sphere and its influences upon political actors, especially on the political relationship between different states and their interaction that shaped and sized the outcomes of International Politics. CO-4 Evolution of trade regime a long with different infrastructural development (WTO, IMF, World Bank) is also within it's ambit. CO-5 Recent trends in both International trade and finance also help students to study vividly the current development of this subject.

Name of the Department: Sanskrit

System: CBCS/Part

Programme Specific Outcome:

Programme Specific Outcome: Students will be able to compare the modern literature with the ancient literature. Lengthening knowledge about the different philosophies, Ramayana, Mahabharata, well aware of current politics, society and economic condition.

Course Outcome:

Semester/Part	Course Type	Paper Description	Course Outcome
I	CC-1	**Classical Literature (Poetry)**	• To make the knowledge of depth to difference in between Ancient Literature and Modern Literature. • This course aims to get students acquainted with classical Sanskrit poetry. • This course provides the students the information of History of Sanskrit Literature especially the development of Sanskrit Literature. • The course also seeks to help students to negotiate texts independently.
I	CC-2	**Critical Survey of Sanskrit Literature**	• This course aims to get acquaint the students with the journey of Sanskrit Literature from Vedic literature to Purana. • It also intends to give an outline of different sastrie traditions, through which the students will be able to know the different genres of Sanskrit Literature and Sastras.

Name of the Department:Sanskrit

System: CBCS/Part

Programme Specific Outcome:

- Students will come to know the mistakes in youthful days and how to make life fruitful from Sukanasopadesa.
- Moral education from fables, meditation, diet control from the Gita.

Course Outcome:

Semester/Part	Course Type	Paper Description	Course Outcome
II	CC-3	**Classical Sanskrit Literature (Prose)**	• This course aims to acquaint students with comprehensive information of classical Sanskrit prose literature, origin and development of prose, important prose romances and fables in Sanskrit, etc. have also been included here to acquaint the students with the history of Sanskrit Prose Literature. • Besides, the information of history, this course also seeks to help students to select the Sanskrit texts for independent literary study.
II	CC-4	**Self-Managementin the Gita**	• Through the study of the Gita the students have to know Spiritual power, the power of knowledge, the study of work culture etc. • The objective of this course is to study the philosophy of self-management in the Srimadbhagavadgita. This course helps the students for creative writing and analytical study. • It helps the students to understand the broader perspective of life. • It helps the students to know various ways of maintaining balance between thought and action.

Name of the Department:Sanskrit

System: CBCS/Part

Programme Specific Outcome:

- Students will learn how to administer and rule the country. • Learning about prosody and rhetoric, different scripts.

Course Outcome:

Semester /Part	Course Type	Paper Description	Course Outcome
III	CC-5	**Classical Sanskrit Literature (Drāmā)**	• Life values and personality development. • Study on a poet's Poetic approach of Sanskrit drama "Abhijananashakuntalam". • Study on ancient Story and brief history. • The way of Sanskrit theatre has grown and development and their contribution. • Analytical study On Dushant and Sahkuntala and their characters.
III	CC-6	**Poetics and Literary Criticism**	• The study of Sāhityadarpana (Sanskrit Poetics) embraces all poetic arts and includes concepts like alaṁkāra, rasa, rīti, vakrokti, dhvani, aucitya etc. The entire domain of Sanskrit poetic has flourished with the topics such as definition of poetry and divisions, functions of word and meaning, theory of rasa and alaṁkāra (figures of speech) and chandas (metre), etc.All these familiarize the students with the fundamental technical structures of Sanskrit literature. • This develops capacity for creative writing and literary appreciation. • Students can gain knowledge about the basic concept of kavya's and their parts.
III	CC-7	**Indian Social Institution and Polity**	• Social institutions and Indian Polity have been highlighted in Dharma-śāstra literature. • The aim of this course is to make the students acquainted with various aspects of social institutions and Indian polity as propounded in the ancient Sanskrit texts such as Saṁhitās, Mahābhārata, Purāṇa, Kauṭilya'sArthaśāstra and other works known as Nītiśāstra.

III	SEC-1	**Basic Sanskrit**	• Students can learn the script like bramhi ,pali , prakrit and also Devnagari. • Students can learn the moral value of human life from fable Brahmadatta-karkaṭa-kathā- (Aparīkṣitakāraka)

Name of the Department: Sanskrit

System: CBCS/Part

Programme Specific Outcome:

- Students will learn about epigraphy, the modern literature and world literature.
- Spoken Sanskrit, development of reading and writing skills.

Course Outcome:

Semester/Part	Course Type	Paper Description	Course Outcome
IV	CC-8	**Indian Epigraphy and Chronology**	• This course aims to acquaint the students with the epigraphical journey in Sanskrit, the only source which directly reflects the society, politics, geography and economy of the time. • The course also seeks to help students to know the different styles of Sanskrit writing.
IV	CC-9	**Modern Sanskrit Literature**	• The purpose of this course is to expose students to the rich & profound tradition of modern creative writing in Sanskrit, enriched by new genres of writing. • Students will be able to know not only ancient literature and their classification but also modern Sanskrit literature
IV	CC-10	**Sanskrit and World Literature**	• This course is aimed to provide information to students about the spread & influence of Sanskrit • Study on a poet and poetry and existence of Sanskrit literature. • Study on ancient Story and brief history. • The way of Sanskrit theatre has grown and development and their contribution.
IV	SEC-2	**Spoken Sanskrit**	• Letter writing in Sanskrit, evaluation of Bengali scripts.

Name of the Department: Sanskrit

System: CBCS/Part

Programme Specific Outcome:

Students will learn Linguistics, Grammar, Sentence structure, developtheir knowledge about details of drama, Vedic Devatas.

Course Outcome:

Semester /Part	Course Type	Paper Description	Course Outcome
V	CC-11	**Vedic Literature**	This course on Vedic literature aims to introduce various types of Vedic texts. Students will also be able to read one Upaniṣad namely Isopanisad, where primary Vedānta-view is propounded. • mastery over some of the exemplary portions of the Vedic literature. • A thorough acquaintance of the methodology employed by Sayanacharya in interpreting the Vedas. • the comprehension of the selected portions of Yaska'sNirukta. • the understanding of the basics of Vedic etymology
V	CC-12	**Sanskrit Grammar**	• To acquaint the students with general Sanskrit Grammar • Acquaintanceship with the basic structure of Sanskrit Compounds. • training in the theories of Compound formation • the ability to understand the syntax and semantics of Sanskrit compounds. • the ability to apply grammatical rules in examples.
V	DSE-1	**Dramaturgy--Sāhityadarpaṇa**	• The theories of Sanskrit Aesthetics and Literary Criticism as embodied in the selected portions of Sahityadarp ana. • The basic doctrines of different schools of aesthetics and literary criticism in Sanskrit.
V	DSE-2	**Elements of Linguistics–**	• The basics of Linguistics. • The possibilities of extending and applying the Sanskrit grammatical rules to other arenas. • How to utilize online resources to develop knowledge in a field of one's own choice.

			The basics of Linguistics. • The possibilities of extending and applying the Sanskrit grammatical rules to other arenas. • How to utilize online resources to develop knowledge in a field of one's own choice.

Name of the Department:Sanskrit

System: CBCS/Part

Programme Specific Outcome:

- Students will learn healthy and natural living in life,
- Development of communication skills.

Course Outcome:

Semester /Part	Course Type	Paper Description	Course Outcome
VI	CC-13	**Indian Ontology and Epistemology**	• This course aims to get the students acquainted with the cardinal principles of the Nyāya Vaiśeṣika philosophy through the Tarkasaṁgraha and to enable students to handle philosophical texts in Sanskrit. • It also intends to give them an understanding of essential aspects of Indian Philosophy. • The basics of Advaita Vedanta. • A popular form of Vedantic methodology which in turn will enable the learner to have further pursuits into the higher realms of Indian Philosophy.
VI	CC-14	**Sanskrit Composition and Communication**	Acquaintanceship with the basic structure of Sanskrit Sentences. • Training in the theories of karaka • The ability to understand the syntax and semantics of Sanskrit. The ability to apply grammatical rules in examples. • This paper aims at teaching composition and other related information based on Laghusiddhāntakau mudīVibhaktyartha Prakarana.
VI	DSE-3	**Environment Awareness in Sanskrit**	Awareness regarding health, environment, life education, Four Ashramas in Manusamhita.

VI	DSE-4	**Art of Balanced Living**	• Comprehension of the selected portion of Yoga Sutras of Patanjali. • Understanding of the interrelation existing between the Sankhya and Yoga systems of philosophy. • An acumen to discern the theme and the import of the often confusing terminology of Bhagavad Gita. • Mastery over the opening chapters of the most popular scripture of the Vedantins.

Name of the Department: Sanskrit

System: CBCS/Part

Programme Specific Outcome:

- Students will learn the philosophies of Sanskrit poets, their thoughts and holistic ideas.

Course Outcome:

Semester /Part	Course Type	Paper Description	Course Outcome
I	CC-1	**Sanskrit Poetry**	● To make the knowledge of depth to difference in between ancient literature and modern Literature. ● This course aims to get students acquainted with Classical Sanskrit Poetry. ● This course provides the students the information of History of Sanskrit literature, especially the development of Sanskrit literature. ● The course also seeks to help students to negotiate texts independently.

Name of the Department:Sanskrit

System: CBCS/Part

Programme Specific Outcome:

- Students will learn the philosophies of the prose writers, moral lesson from the different fables.

Course Outcome:

Semester /Part	Course Type	Paper Description	Course Outcome
II	CC-2	**Sanskrit Prose**	● This course aims to acquaint students with comprehensive information of Classical Sanskrit Prose literature. Origin and development of prose, Important prose romances and fables Sanskrit, etc., have also been included here to acquaint the students with the history of Sanskrit Prose literature. ● Besides the information of history this course also seeks to help students to select the Sanskrit Texts for independent literary study.

Name of the Department: Sanskrit

System: CBCS/Part

Programme Specific Outcome:

- Students will learn the philosophies of the playwrights, their thoughts, and dramaturgy.
- They will also learn Astangik Yoga.

Course Outcome:

Semester/Part	Course Type	Paper Description	CourseOutcome
III	CC-3	**Sanskrit Drama**	● Life values and personality development. ● Study on a poet's Poetic approach of Sanskrit drama "Abhijananashakuntalam". ● Study on ancient Story and brief history. ● The way of Sanskrit theatre has grown and development and their contribution. ● Analytical study On Dushant and Sahkuntala and their characters.
III	SEC-1	**Skill Based Papers 1**	● comprehension of the selected portion of Yoga Sutras of Patanjali. ● Understanding of the interrelation existing between the Sankhya andYoga systems of philosophy.

Name of the Department: Sanskrit

System: CBCS/Part

Programme Specific Outcome:

- Students will learn the rules of grammar, translation, declensions, and conjugations and so on.

Course Outcome:

Semester /Part	Course Type	Paper Description	Course Outcome
IV	CC-4	**Sanskrit Grammar**	• To acquaint the students with general Sanskrit Grammar • Acquaintanceship with the basic structure of Sanskrit Compounds • Training in the theories of Compound formation. • The ability to understand the syntax and semantics of Sanskrit compounds. • The ability to apply grammatical rules in examples
IV	SEC-2	**BasicSanskrit–Part-I**	• Grammar is very important part of this language for the making word, sentence, to know appropriate meaning of text, oral communication and perfection. • Students can learn the moral value of human life from fable Brahmadatta-karkaṭa-kathā-(Aparīkṣitakāraka)

Name of the Department: Sanskrit

System: CBCS/Part

Programme Specific Outcome:

- Students will learn the Vedic Literature, impact of Puranas.

Course Outcome:

Semester /Part	Course Type	Paper Description	Course Outcome
V	DSE- 1A	**Philosophy, Religion and Culture in Sanskrit Tradition**	● This course aims to get acquaint the students with the journey of Sanskrit literature fromVedic literature to Purāṇa. ● It also intends to give an outline of different Śāstric traditions, through which the students will be able to know the different genres of Sanskrit Literature and Śāstras

Name of the Department: Sanskrit

System: CBCS/Part

Programme Specific Outcome:

- Students will learn metrics, Alangkara.

Course Outcome:

Semester /Part	Course Type	Paper Description	Course Outcome
VI	DSE- 1B	Literary Criticism	• Easy memorization, • Embellishment • Dress of thoughts

Name of the Department: Statistics System: CBCS

Programme Specific Outcome:

Statistics as a subject is an important branch of knowledge and is devoted to various techniques of collection, presentation, analysis and interpretation of data. It is a science of data. This programme will provide tools for making decisions when the condition of uncertainty prevails. Students will be able to use statistical tools and techniques in almost all fields. Knowledge of different aspects of Statistics has become crucial in the present scenario. Students will be able to apply statistical techniques for pursuing higher studies and simultaneously can apply statistical tools judiciously to a variety of data sets to arrive at some valid conclusions.

Course Outcome:

Semester/Part	Course Type	Paper Description	Course Outcomes
SemI	CBCS	Statistical Methods (Theory) & Statistical Methods (Practical)	i) Students learnt about graphical Representation of data. ii) They learnt about the measure ofcentral tendency. iii) They learnt about the Measure of dispersion. iv) They got idea about Moments, Skewness and Kurtosis. v) They learnt about how to analyze bivariate data. vi) They also learnt about the theory of attribute.
SemII	CBCS	Introductory Probability(Th) & Introductory Probability(Practical)	i) Students learnt about the different types of definition of probability and they also learnt independent events, total probability theory and Bayes theorem. ii) They also learnt about random variables and their types. iii) They also learnt about convergence in probability. iv) They also learnt about standard probability distribution.

NB: Subject Statistics is provided to the students of limitedscience streams. So, they read statistics only Sem I and Sem II.

Therefore, other semesters are not applicable for Statistics Dept.

Name of the Department: ZOOLOGY System: CBCS

Programme Specific Outcome:

- Apply zoological knowledge in much more broader areas of life.
- Identify and analyze problems by applying the principles of natural science.
- Provide a comprehensive understanding of various animals fromtheir primitive forms to theirhighly evolved forms.
- Inculcate knowledge and prepare for a successful career in the field of zoology.
- Aims to emphasize the need for biodiversity conservation.

Course Outcome:

Semester	Course Type	Paper Description	Course Outcome
I	CC-1	Non Chordates I	• To understand the basics of animal kingdom. • To understand and recognize the life functions of Cnidaria. • To understand the characteristics, position in animal kingdom. • To gain knowledge about the morphological, physiological and evolutionary aspects of Non-chordates. • To understand the life functions of phylum Ctenophora, Platyhelminthes, and Nematoda.
	CC-2	Ecology	• Study of organisms in relation to environment. • To understand the living and non-living component of the environment. • To understand the interaction between living and non-living parts of the environment. • To understand the aquatic ecosystem components and the aspects of conservation of animals. • To acquire training for PowerPoint presentation of relevant work.
	GE-1	Animal Diversity	• To understand the existing diversity of the animal kingdom. • To be able to distinguish different species on the basis of their characteristic features. • To be able to understand the complexity of life forms easily. • To build a clear concept about chordates and non-chordates. • To gain knowledge about the morphological, physiological and evolutionary aspects of different subphyla. • Structural and anatomical peculiarities among different orders of vertebrates.
II	CC-3	Non Chordates II	• To build a clear concept about metamerism, the structure of coelom. • To be able to identify arthropods and gain knowledge about their diversity. • To understand the social behavior of termites and how they function in a colony. • To be familiar with mollusc diversity.

			• To be familiar with marine invertebrates and their life functions.
	CC-4	Cell Biology	• To understand the molecular mechanism of mitosis and meiosis. • To build concepts about the signaling events that control various life forms. • To understand the basic structure of the cell. • To understand the cytoskeleton of the cell. • To understand the nuclear structure and function of the cell. • To understand the basic principles of inheritance at the molecular, cellular, and organism levels.
	GE-2	Comparative Anatomy and Development Biology of Vertebrates	• To gain knowledge about the basic principles and process of early and late development processes of animals. • To understand the working of the urogenital system. • To understand the importance of the integumentary system with reference to bodily functions. • To be able to provide a comparative account of the brain and its functions. • To build a concept about the various events involved in embryonic development.
III	CC-5	Chordates	• To gain knowledge about classification of various chordates and their characteristics. • To identify various chordates through specimen study. • To build a clear concept about the origin of chordates. • To understand the aerodynamics of flight in birds. • To gain knowledge about the structural differences and life functions in terrestrial and aquatic mammals. • To gain knowledge about the zoogeographical realms, plate tectonics, and continental drift.
	CC-6	Animal Physiology	• To gain knowledge about the various metabolic and physiological mechanisms of the whole human body. • To gain fundamental knowledge about Animal Physiology. • To build clear ideas and concepts about the mechanisms that work to keep the human body alive and functioning. • To understand the important functions of tissues in maintaining overall body health. • To gain knowledge about the different signal transduction pathways of steroidal and non-steroidal hormones.
	CC-7	Fundamentals of Biochemistry	• To understand glucose metabolism in the human body. • To understand the structural and biological importance of carbohydrates. • To understand the physiological importance of essential and non-essential amino acids. • To build basic concepts about nucleotide metabolism. • To understand the mechanism of enzyme action.

			• To understand the basic structure, function, and importance, and metabolic pathways of Lipid and Protein.
	SEC-1	Sericulture	• To understand the history, types, races, and present status of sericulture. • To understand the prospect and employment potential of sericulture. • To gain knowledge about the detailed steps of mulberry cultivation, i.e., Moriculture, which is an integral part of Sericulture. • To gain knowledge about the various sericulture centers in India. • To have a basic concept about the various techniques involved in the rearing of silkworm.
	GE-3	Physiology and Biochemistry	• To gain knowledge about the various metabolic and physiological mechanisms of whole human body. • To gain fundamental knowledge about Animal Physiology. • To build clear ideas and concepts about the mechanisms that work to keep the human body alive and functioning. • To understand the mechanism of enzyme action. • To understand the biochemical activity of medicine.
	CC-8	Comparative Anatomy of Vertebrates	• To understand the anatomical peculiarities of different organs in vertebrates. • To understand functional activity of different organs. • To compare the structural and physiological differences between different vertebrates. • To build basic concepts about the importance of sense organs and the various receptors associated with it. • To gain knowledge about the different organ functions in reptiles, amphibians, mammals, and birds.
	CC-9	Animal Physiology	• To understand the structure and physiology of heart. • To understand the structure and function of kidney. • To build a concept about the various physiological processes that are important for normal body functioning. • To gain knowledge about the functioning of heart and apply this knowledge to prevent heart diseases. • To understand the components of blood and how haemoglobin level impacts our overall health.

IV	CC-10	Immunology	• To gain knowledge about the migration of immune cells through the body and the anatomy of lymphoid organs. • To gain knowledge about the therapeutic strategies to treat immunological diseases. • To be able to give an account on causes and consequences of deregulated immune response. • To build a basic concept about MHC molecules and its function.
	SEC-2	Aquarium Fish Keeping	• To gain knowledge about the morphology, behaviour, and importance of different ornamental fishes. • To identify and characterize the fishes important in aquarium fish keeping industry. • To gain knowledge about how fish keeping can be used to earn livelihood and open more employment opportunities. • To learn about the endemic and exotic fish species. • To gain knowledge about the maintenance of aquarium.
	GE-4	Genetics and Evolutionary Biology	• To understand the process of evolution. • To understand the formation of new species. • To gain knowledge about the genetic overview of evolution. • To understand the world at different age levels. • To build concept about the diversification of different species.
V	CC-11	Molecular Biology	• To build a clear concept about the genetic material DNA and RNA. • To understand the mechanism of DNA replication. • To gain knowledge about the mechanism of transcription in prokaryotes and eukaryotes. • To understand the process of DNA repair mechanism. • To know the different molecular techniques and its applications.
	CC-12	Genetics	• To build a clear concept about the principles of Mendelian genetics. • To understand the process of linkage, crossing over. • To understand chromosome mapping, recombination frequency, interference, coincidence andtobe able tosolve problem sumsrelatedto it. • To underst and how genetic concepts affect health and disease. • To understand the role of genetic mechanisms in evolution.
	DSE-1	Animal Biotechnology	• To understand the principle and procedure of various modern molecular techniques that are used to analyze cell functioning. • To build concept and idea about genome and its regulation. • To know how cloned and trans genic animal are produced. • To gain knowledge about DNA sequencing, PCR, DNA fingerprinting etc. • To learn about the molecular diagnosis of genetic diseases.

	DSE-2	Parasitology	• To gain knowledge about the morphology, life history, pathogenicity, and control measures of different protozoan and platyhelminthes parasites. • To identify and characterize different parasitic arthropods. • To understand host-parasite relationship. • To be able to know about the prophylaxis and treatment of platyhelminth parasitic infection. • To gain knowledge about different mechanical and biological vectors.
	DSE-1 (Gen)	Applied Zoology	• To gain basic knowledge about poultry farming. • To gain basic knowledge about animal husbandry. • To gain knowledge about the economically important and medically important insect pests with their prime role. • To be able to understand the epidemiology of diseases like tuberculosis and typhoid. • To be able to learn how poultry farming and fish technology can be used to earn a livelihood.
	SEC-3	Sericulture	• To understand the history, types, races, and present status of sericulture. • To understand the prospect and employment potential of sericulture. • To gain knowledge about the detailed steps of mulberry cultivation, i.e., Moriculture, which is an integral part of Sericulture. • To gain knowledge about the various sericulture centers in India. • To have a basic concept about the various techniques involved in the rearing of silkworm.
VI	CC-13	Developmental Biology	• To gain knowledge about the late developmental processes of animals. • To gain knowledge about the implementation of human embryo in the uterus.
			• To understand the basic concept about phases in development. • To understand gastrulation in chick and frog. • To know about teratogenesis and its effect on embryonic development. • To gain knowledge about in vitro fertilization, stem cell, and amniocentesis.
	CC-14	Evolutionary Biology	• To understand the chemical basis of evolution. • To get a historical review of evolutionary concepts like Lamarckism, Darwinism, and Neo-Darwinism. • To know about the various events in Geological Time Scale. • To build clear concepts about the origin and evolution of Man. • To be able to construct phylogenetic trees and interpret them.

	DSE-3	Animal Behaviour	• To get an historical overview on the origin and study of Ethology. • To be aware of the contributions made by Nikotinbergen, Karl von Frisch, Konrad Lorenz. • To know about the different forms of learning. • To gain knowledge about the various behavioral displays among different animal species. • To learn about data collection methods and experimental designs.
	DSE-4	Endocrinology	• To understand the structure and function of the Endocrine system. • To be able to classify and characterize different hormones. • To know about the structure of the pineal gland, hypothalamus, and pituitary gland. • To understand the mechanism of regulation of hormone action. • To build basic concepts about estrous cycle and menstrual cycle.
	DSE-2 (Gen)	Immunology	• To gain knowledge about the migration of immune cells through the body and the anatomy of lymphoid organs. • To gain knowledge about the migration of immune cells through the body and the anatomy of lymphoid organs. • To gain knowledge about the therapeutic strategies to treat immunological diseases. • To be able to give an account on causes and consequences of deregulated immune response. • To build a basic concept about MHC molecules and their function.
	SEC-4	Community nutrition and health statistics	• To build concepts about community and factors affecting the health of the community. • To get a basic idea about nutritional assessment of humans, nutritional anthropometry. • To build basic concepts about statistics and calculation of mean, median, mode from statistical data. • To know about analysis of variance and its application. • To understand the principles of epidemiology.