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Ref. No..... Date .....

Programme Outcomes, Programme Specific Outcomes And Course Outcomes

Programme Outcomes

- Bachelor of Arts
- Bachelor of Science
- Bachelor of Commerce

Programme Specific Outcomes And Course Outcomes

- Department of Bengali
- Department of Education
- Department of English
- Department of History
- Department of Philosophy
- Department of Political Science
- Department of Sanskrit
- Department of Film Studies
- Department of Commerce
- Department of Chemistry
- Department of Computer Science
- Department of Geography
- Department of Mathematics
- Department of Microbiology
- Department of Physics
- Department of Zoology
- Department of Botany

Programme Outcomes, Programme Specific Outcomes & Course Outcomes

A program outcome is the summation of the knowledge, skills, abilities and attitudes of the students at the end of a degree program. The general aspects of the program are covered and describe the depth of knowledge and skills a student would acquire at the end of the program.

Program Specific Outcomes specifically aim at a particular degree program in terms of Humanities, Science, Commerce etc. that a student takes up for acquiring knowledge and skills. This not only gives a specific direction to the career of the particular individual but also makes him a contributor to the development of society.

Course Outcomes are the resultant knowledge skills that the students acquire at the end of the course. It defines the cognitive processes and is precise and quantifiable information that a student will acquire by the end of a course.

The institution outlines POs and PSOs for all programmes and COs for each course following the prescribed syllabus in different subjects of the affiliating University. The teachers design the lesson plan accordingly to incorporate the teaching, learning and assessment strategies in such a way as to give enough weightage to each of the specified learning activities and attainment of outcomes.

Programme Outcomes
Bachelor of Arts

The humanities or Arts stream is well-diversified and multi-disciplinary. As a student of humanities, one can pursue higher study or research work in various fields of interest. So, humanities students have bright future as far as their career is concerned. A student of Bachelor of Arts can also crack competitive examinations of UPSC, state PSC, SSC Combined Graduate Level, IBPS, RRC etc. for various state/central Govt. jobs and also can join the private sector.

Humanities or Arts students have the following common career opportunities:

- Teaching
- Research Work
- Banking sector
- Human Resource management

- Law
- Editing and Content writing
- Travel and Tourism
- Political Advisor or Security Advisor

- **PO1.** Understanding of ethical and human values, culture and sense of social service
- **PO2.** Skill of effective communication and language
- **PO3.** Independent learning of appropriate methodologies
- **PO4.** Develop critical and analytical thinking to assess issues
- **PO5.** Expertise in respective fields, work with self-esteem, self-reliance, self-reflection and creativity to face adversities in the work and personal life.

Bachelor of Science

Science graduates (Honours or General) can end up in teaching, research, higher education in advanced engineering and technological field, laboratory work, chemical industry or might join non specialized fields like banking sector, defence services, state/central government administrative jobs, etc.

- **PO1**. Explanation of basic scientific principles, procedures and methods.
- **PO2.** Inculcate the process of scientific thinking and awareness among the student.
- **PO3.** Ability to communicate the thoughts and outcomes of a scientific innovation or experiment.
- **PO4.** Ability to handle any unprecedented situation by critical analysis of the scenario and finding out a feasible solution.
- **PO5**. Understanding the issues related to nature and environmental contexts and sustainable development.

Bachelor of Commerce

B.Com. is an undergraduate programme which deals with the study of accounting and finance, economics, business policy, business administration and taxation etc. Hence students pursuing B. Com. have a golden chance to have jobs in a wide variety of business and industry.

- **PO1.** Students of this course acquire the fundamental knowledge on an array of subjects like accounting, finance, auditing, taxation, economics, management, business communication, business laws, entrepreneurship, economics, business ethics, applications of mathematics and

statistics in business and commerce, marketing, 8 human resource, e-commerce, basics of information technology, etc.

- **PO2.** With this background, a student can pursue higher study (post-graduation and research) to become an academician or become a business entrepreneur. B.Com. graduates can also pursue globally recognized and reputed overseas professional courses like CMA from the UK, ACCA and CA from the UK, and CPA and CFA from the USA.
- **PO3.** Many Commerce students take up professional courses like chartered accountancy (CA), company secretaryship (CS), or cost and management accountancy (CMA). There is a high demand for such professionals in the country both in the corporate as well as non-corporate sector. Moreover, acquiring these qualifications opens up the prospect for independent practice.
- **PO4.** A large number of Commerce graduates also opt for Management or Business Administration courses to acquire necessary knowledge and skill for entering managerial jobs with good pay in the corporate sector. A career in Law in general and Company Law in particular, is also quite a promising option before Commerce graduates.
- **PO5.** After completing B. Com., one can also apply for competitive examinations for various government jobs including the Central and State Accounts or Audit Services.
- **PO6.** Conceptual understanding of the underpinnings of financial and cost accounts, financial management, direct and indirect tax system, company law provisions, auditing procedure, statistical applications, and marketing concepts help to acquire the practical skills to work as tax consultant, auditor, management consultant, financial expert, stock market analyst and similar other support services.

DEPARTMENT OF BENGALI

BENGALI HONOURS AND GENERAL UNDER CBCS

BENGALI GENERAL (B.A.) BNGA

Programme Specific Outcomes

1. Students will be Graduates with Bengali Honours degree after completing Bengali Honors course of 6 semesters in three years.
2. Students will grasp the literary essence of Bengali Classics and Texts to boost further studies.
3. They can pursue higher studies in Bengali literature, Comparative literature, Linguistics, art and culture etc, after completing the course.
4. Students can get a good foothold in Bengali grammar with a penchant towards creative-writing.
5. Students can recognize and appreciate the cultural, social, and historical contexts in which Bengali literature has evolved and how it reflects the broader cultural heritage.
6. They can acquire research aptitude through various seminars, extempore, debates and projects during the entire course and go for Research programmes.
7. Through "Skill Enhancement Course", students learn Computer basics through MS Word, Excel, CorelDRAW, InDesign, PageMaker etc which can help them to develop skill on design, publication and production.
8. Students can pursue B.Ed. and after clearing TET, UPSC examinations, NET/SET etc. they can avail School/College teacher ship or Government jobs.
9. After completion of this course, students can join the course of Art and Culture, Journalism, Fine Arts Mass Communication, Acting and Performing Arts etc. to acquire further knowledge and can get into various professions involving these fields.
10. Apart from above fields, through completion of Bengali Advance/General course, students can always choose professions like Translators, Interpreters, Proof-readers, Proof-Readers, Editing & Content-writing, Travel & Tourism etc.

11. Other fields where students can involve themselves for future careers include Advertising & Marketing, Event Management, Human Resource, Retail etc.

Course Outcomes

I	***CC - 1 = Bengali Literature in the Ancient-Medieval Ages***	☞ Students understand the primary/basic concept on the origin of Bengali Literature & Language They get acquainted with the trends of Bengali literary practices prevalent in the Ancient-Medieval Period. ☞ They form concepts on the nature of Bengalis' literary practices before it started in Bengal
	CC - 2 = Bengali Linguistics	☞ Students get an idea on the current form of Bengali language, it's different elements and how it is constructed. ☞ They get a thorough understanding of the internal structure of the Bengali language.
II	***CC - 3 = Modern Literature Part 1***	☞ Students get an understanding about the dynamic nature of the first phase of modern Bengali literature. ☞ They become aware of how renaissance took place centring around literature. ☞ They acquire knowledge on the development of Bengali prose, drama and periodicals.
	CC - 4 = Poetry, Literary Fiction, Drama, Prose, Essay	☞ Students understand the trend of evolution of Bengali poetry from ancient times to modern times. ☞ They learn to read texts related to literary fictions, essays and dramas in an analytical way.

III	***CC - 5 = Modern and Postmodern History of Bengali Literature***	☞ Students get an accurate understanding of the dynamic nature of modern Bengali literature. ☞ They learn about the direction of modern Bengali language practice. ☞ They understand the speciality of all authors in Bengali Literature.
	CC - 6 = History of Linguistics	☞ Students learn about the concepts of the origin of Bengali language as well as other languages from all over India. ☞ They form a concept on the connection of Bengali language with other languages in India. ☞ They get an understanding of the different levels of Indian Aryan language as well as that of the Bengali language.
	CC - 7 = Bengali Literature	☞ Students develop an analytical viewpoint to the novels written by Rabindranath Tagore, Sarat Chandra Chattopadhyay, Manik Bandopadhyay and Mahashweta Devi. ☞ They learn to critically evaluate the texts. ☞ They get concepts about the dynamic nature of Bengali short stories along with their text assessment.
	SEC - A-3-1 = Printing and Publishing	☞ Students get acquainted to the practical basics of book printing and publishing. ☞ They learn about how books are written, printed, bound and published.

IV	***CC - 8 = Prehistoric Literature***	☞ Students develop knowledge about the theories and application of Vaishnava Literature along with the nature of various prevalent rituals. ☞ They also develop knowledge about the theories and application of "Shakto-Pada" Literature along with the nature of various prevalent rituals. ☞ They develop an analytical perspective towards "Chandi Mangal".
	CC - 9 = Rhythm, Ornamentation and Theory of Poetry	☞ Students grow a comprehensive understanding of the Bengali rhythms. ☞ They also develop a comprehensive understanding of the Bengali ornamentation. ☞ They develop an awareness of the various ancient Indian literary analytical methods through lessons containing theories of poetry.
	CC - 10 = Essays in Bengali Literature	☞ Students develop concepts on the unique nature of various modern Bengali essays. ☞ They form an analytical approach to certain texts of essays.
	SEC - B-4-2 = Practicality of Bengali Language- 2	☞ Students learn to improve their writing proficiency through writing stories, essays and various letters. ☞ They tend to develop concepts regarding Roman and IPA. ☞ They learn about the proper rules of Bengali spelling.
V V	***CC - 11 = Bengali Literary Style***	☞ Students get acquainted to the basic and primary concepts of different forms of Bengali literature. ☞ They form a fundamental idea of what Bengali stories, essays, novels and dramas are.

	CC - 12 = Drama and Theatre	☞ Students develop an overall understanding of the history of Bengali Theater. ☞ They gain knowledge about the Drama Regulation Bill and the dynamic nature of Bengali drama. ☞ They learn about the origins of various theaters and their activities.
	DSE A-5-1 = Social and Cultural History of Bengal	☞ Students get an idea of the origin and development of Bengal community from ancient to modern times. ☞ They learn about "Chaitanya Renaissance". ☞ They also learn about the political, religious and cultural history of Bengal.
	DSE B-5-1 = Bengali Literature on Children and Adolescents	☞ Students learn about various Bengali literature texts on children and adolescents along with the respective authors. ☞ They get familiar with different forms of Bengali literature on children and adolescents.
VIVI	***CC - 13 = Modern Bengali Poetry***	☞ Students get acquainted to different styles of modern Bengali poetry. ☞ They learn to analyze modern Bengali poetry accurately.
	CC - 14 = History of Sanskrit, English and Hindi Literature	☞ Students form a primary concept on the evolution of English literature. ☞ They form a primary understanding on the evolution of Sanskrit Literature. ☞ They develop a basic understanding on the evolution of Hindi literature.

	DSE A-6-3 = Literatures on Detective, Science Fiction and Supernatural genres	☞ Students learn about the various genres of Bengali detective literature; get acquainted to Satyajit Ray. ☞ They learn about the genres of Bengali science fiction literature. ☞ They learn about the genres of Bengali supernatural literature.
	DSE B-6-3 = "Charitsahitya" and Travel Literature	☞ Students form a thorough concept on "Atmacharit" and "Charitsahitya". ☞ They get acquainted to various Bengali travel literatures and "ramyarachana". ☞ They learn about the unique writing pattern of Syed Mujtaba Ali.

BENGALI GENERAL (B.A.) BNGG

Programme Specific Outcomes

❖ Students will grasp the literary essence of Bengali Classics and Texts to boost further studies.

❖ Students can get a good foothold in Bengali grammar with a penchant towards creative writing.

❖ Students can exhibit a comprehensive understanding of Bengali literature, including its historical development, major literary figures, and literary genres.

❖ After completion of this course, students can join the course of Art and Culture, Journalism, Fine Arts Mass Communication, Acting and Performing Arts etc. to acquire further knowledge and can get into various professions involving these fields.

❖ Students can analyze and interpret various literary texts critically, demonstrating the ability to engage with complex themes and ideas within Bengali literature.

Semester	Course Title	Course Outcome
I	***CC-1 = History of Modern Bengali Literature***	☞ Students get an understanding about the dynamic nature of the first phase of modern Bengali literature. ☞ They become aware of how renaissance took place centering around literature. ☞ They understand the specialty of all authors in Bengali Literature.
II	***CC-2 = Bengali Linguistics, Rhythm and Ornamentation***	☞ Students learn about the concepts of the origin of bengali language as well as other languages from all over India. ☞ They form a concept on the connection of bengali language with other languages in India. ☞ They get an understanding of the different levels of Indian Aryan language as well as that of the bengali language. ☞ Students develop knowledge about the theories and application of Vaishnava Literature along with the nature of various prevalent rituals. ☞ They also develop knowledge about the theories and application of "Shakto-Pada" Literature along with the nature of various prevalent rituals.
III	***CC-3 = "Vaishnava Padabali" & Modern Bengali Poem and Drama***	☞ Students learn about the theories and applications of Vaishnava Literature. ☞ They learn to analyze modern Bengali poetries. ☞ They form concepts related to "Rabindra Natok".
	SEC-A-3/5-1 = Printing and Publishing	☞ Students get acquainted to the practical basics of book printing and publishing. ☞ They learn about how books are written, printed, bound and published.

IV	***CC-4 = Bengali Novels, Short Stories and Essays***	☞ Students learn to read Sarat Chandra Chattopadhay's "Pallisamaj" in an analytical way. ☞ They get acquainted to the dynamic nature of Bengali short stories. ☞ They learn about the varieties of genre in Rabindranath Tagore's 'prabandha' (essays).
	LCC-(2)-4-1 = Linguistics, Different Forms of Bengali Literature & "Kabya"	☞ Students form accurate concepts related to Bengali grammar; especially of words and their various changes ☞ They form ideas related to the different forms of Bengali literature ☞ They get a thorough reading of the finest epic poem "Meghnad Badh Kabya"
	SEC-B-4/6-2 = Practicality of Bengali Language - 2	☞ Students learn to improve their writing proficiency through writing stories, essays and various letters ☞ They tend to develop concepts regarding Roman and IPA ☞ They learn about the proper rules of bengali spelling
V	***DSE-A-5-2 = Literatures on Detective, Science Fiction and Supernatural genres***	☞ Students learn about the various genres of Bengali detective literature; get acquainted to Satyajit Ray ☞ They learn about the genres of Bengali science fiction literature ☞ They learn about the genres of Bengali supernatural literature
	SEC-A-3/5-1 = Printing & Publishing	☞ Students get acquainted to the practical basics of book printing and publishing ☞ They learn about how books are written, printed, bound and published

VI	***DSE-B-6-2 = Folk Culture & Folk Literature***	☞ Students learn about the theoretical nature of folk culture ☞ They get familiar with the diverse folk culture of Bengal, for example - “broto”, “parbon” ☞ They get acquainted with the diverse nature of folk Bengali literature, for example - bengali rhymes, puzzles, songs, dances and proverbs
	SEC-B-4/6-2 = Practicality of Bengali Language - 2	☞ Students learn to improve their writing proficiency through writing stories, essays and various letters ☞ They tend to develop concepts regarding Roman and IPA ☞ They learn about the proper rules of bengali spelling
	LCC-(2)-6-2 = Periodicals and Bengali Literary Fictions = Periodicals and Bengali Literary Fictions	☞ Students get acquainted with the developmental trends of Bengali periodicals and with their various activities ☞ They learn to read Bankim Chandra Chattopadhyay’s famous novel “Rajani” from an analytical viewpoint ☞ They get familiar with the variations of Bengali and Hindi short stories, learn about how time gets reflected in Bengali stories

DEPARTMENT OF EDUCATION

EDUCATION HONOURS AND GENERAL UNDER CBCS

DEPARTMENT OF EDUCATION (EDCA)

Programme Specific Outcomes

1. Students after completion of Education Honours course of 6 semesters in three years will be Graduates having Education Honours degree.
2. They will develop advanced critical thinking skills along with teaching aptitude.
3. They will develop abilities for further studies i.e. they can pursue higher education after completing the course.
4. Students will be able to use and analyze their newly acquired knowledge in various fields of social science as Education is a multi-disciplinary subject.
5. They will have research aptitude which will help them to participate in any research related activities.
6. They will be well aware of Information and Communication technology and hence will acquire ICT skills.
7. Students will develop knowledge about statistics and will be able to analyze data statistically.
8. Knowledge of Educational psychology along with the knowledge of Psychology of adjustment and Guidance and Counselling will prepare them to deal with behaviour of human being and enable them to pursue their career as therapist, school guidance officer, counsellor.
9. Students can pursue B.Ed. and go for teaching at Secondary School level.
10. Some of the job positions related to this include educational administrator, Primary and upper Primary school teachers, research fellows, data analyst, tutor, career guide and the like.

Course Outcomes

Semester	Course Title	Course Outcome
I	***CC – 1 = Introduction to Education***	☞ Students understand the meaning, nature, scope and aims of education. ☞ They can explain the factors of education and their interrelationship. ☞ They become aware of different agencies of education that influence education. ☞ They are acquainted with the concept of child-centricism and play-way in education.
	CC– 2 = History of Indian Education	☞ Students get acquainted with the salient features of education in India during ancient and medieval times. ☞ They get acquainted with the development of education in British India. ☞ They become aware of the significant points of selected education commissions & national policy of education in independent India.
II	***CC – 3 = Psychological Foundation of Education***	☞ Students acquire knowledge about the meaning of Psychology its different aspects. ☞ They know the patterns of different aspects of human development and relate this knowledge with education. ☞ To develop knowledge of cognitive approach of development and thus understand the process and factors of cognition. ☞ They get acquainted with concepts and theories of learning, memorization and intelligence.

	CC – 4 = Philosophical Foundation of Education	☞ They get knowledge of the meaning, relation and importance of philosophy and education. ☞ They get acquainted with both the Indian and the Western schools of philosophy along their impact on education. ☞ Students have an understanding of philosophy for development of humanity.
III	***CC – 5 = Sociological Foundation of Education Management and Planning***	☞ Students understand the relation between Sociology and Education. Nature, and scope of Sociology of education. ☞ They can explain the concept of Social Groups and Socialization process. ☞ They are able to understand the concept of social change and social interaction in education. ☞ They become aware of social Communication in Education
	CC – 6 = Educational Organization	☞ The concept organization, management, school organization and educational management is developed in the students. ☞ They know the essential functions of educational management. ☞ They understand the concept and different aspects of Educational Planning.
	CC – 7 = Guidance and Counselling	☞ They become aware of the concept of Guidance and Counseling. ☞ They know various types of Guidance and Counselling. ☞ They get acquainted with the basic data necessary for Guidance.

	SEC – A = Communication Skills	☞ They understand the basic elements of Communication. ☞ They acquire the knowledge of Listening Skills. ☞ They acquire the knowledge of Speaking Skills. ☞ They acquire the knowledge of Reading and Writing Skills.
IVIV	***CC – 8 = Technology in Education***	☞ Students develop an understanding of educational technology. ☞ They get acquainted with the concept and components of system approach. ☞ Students develop an understanding of the use of computer in education and communication. ☞ They get acquainted with the instructional techniques and different models of teaching. ☞ They develop an understanding of ICT & e-learning.
	CC – 9 = Curriculum Studies	☞ Students develop an understanding about concept, nature, types and major approaches of curriculum ☞ They develop an understanding about curriculum development and national curriculum frame work, 2005. ☞ They develop an understanding of evaluation & reform of curriculum

	CC – 10 = Inclusive Education	☞ Students understand the meaning of Inclusion and exclusion. ☞ They know the types of exclusion and their causes. ☞ They know about differently abled people and different types of disabilities. ☞ They get aware about how to bring about inclusion in different spheres.
	SEC – B = Teaching Skill	☞ They know the basic concept of Teaching. ☞ They know the different types of Teaching. ☞ They understand the Skills of Teaching. ☞ They learn the Concept of Learning Design (LD)
V	***CC – 11 = Measurement and Evaluation in Education***	☞ Student develop an understanding of the concepts of measurement and evaluation in education. ☞ They get acquainted with different types of measuring instruments and their uses. ☞ They develop an understanding of the concepts of validity and reliability and their importance in educational measurement. ☞ They get acquainted with the principles of test construction.

	CC – 12 = Statistics in Education	☞ The concept of statistics and skill in analyzing descriptive measures is developed in the students. ☞ They get acquainted with the concept of Normal Probability Curve and its uses in education. ☞ They develop the concept of measures of relationship. ☞ They develop the ability to organize relevant educational data and are able to represent them through graphs. ☞ They develop skill in analyzing and displaying data. ☞ They get practical knowledge of tabulating score and analyzing them statistically.
	DSE A2- Educational Thought of Great Educators	☞ Students develop an understanding of educational ideas of Indian and Western Educators. ☞ They understand pedagogical concepts given by Indian and Western educational thinkers.
	DSE B1- Teacher Education	☞ They understand the basic concept of teacher education. ☞ They can explain the historical perspective and development of teacher education in India. ☞ They understand the Role of the different agencies in teacher education. ☞ To make an idea about some Courses for preparation of teacher.

VI	***CC – 13 = Psychology of Adjustment***	☞ They understand the concept of adjustment, maladjustment and some commonly found problem behavior. ☞ They know the multi-axial classification of mental disorders. ☞ They become aware about different coping strategies for stressful situation. ☞ They develop the knowledge of the administration, scoring and interpretation of the psychological tests.
	CC – 14 = Basic Concept of Educational Research	☞ They develop a concept of educational research. ☞ They learn about the various steps to be followed for conducting research. ☞ They learn how to write a research proposal and review research papers.
	DSE A3= Gender and Society	☞ They understand the basic terms, concepts used in gender studies. ☞ They understand the gender discrimination in construction and dissemination of knowledge. ☞ They develop an awareness and sensitivity.
	DSE B4= Women Education	☞ They know the historical perspectives of Women Education. ☞ They know the Policy Perspectives and Committees and Commissions on Women Education. ☞ They understand the role of Indian thinkers towards Women Education. ☞ They identify major constraints of Women Education and Women Empowerment.

EDUCATION GENERAL (B.A.) EDCG

Programme Outcomes

1. The UG Education General attempts to lay down the important foundation of Education as discipline which enables students to have clear understanding about the field of Education.
2. It allows the students to gain foundation in teaching and the theories of learning.
3. Knowledge of Educational Psychology enables them to understand human behaviour and child psychology in depth.
4. They develop communication skill and teaching skill which will enable them to pursue teaching career.
5. Their knowledge of Educational Sociology and Inclusive Education will enable them to work with various NGOs who are working with disadvantaged children of the society.

Course Outcomes

Semester	Course Title	Course Outcome
I	***CC – 1/GE1 = Introduction to Education***	☞ Students understand the meaning, nature, scope and aims of education. ☞ They can explain the factors of education and their interrelationship. ☞ They become aware of different agencies of education that influence education. ☞ They are acquainted with the concept of child-centricism and play-way in education.
II	***CC2/GE2 = Psychological Foundation of Education***	☞ Students acquire knowledge about the meaning of Psychology its different aspects. ☞ They know the patterns of different aspects of human development and relate this knowledge with education. ☞ To develop knowledge of cognitive approach of development and thus understand the process and factors of cognition.

		☞ They get acquainted with concepts and theories of learning, memorization and intelligence.
III	***CC3/GE3 = Sociological Foundation of Education***	☞ Students understand the relation between Sociology and Education. Nature, and scope of Sociology of education. ☞ They can explain the concept of Social Groups and Socialization process. ☞ They are able to understand the concept of social change and social interaction in education. ☞ They become aware of social Communication in Education.
IV	***CC4/GE4 = Inclusive Education***	☞ Students understand the meaning of Inclusion and exclusion. ☞ They know the types of exclusion and their causes. ☞ They know about differently abled people and different types of disabilities. ☞ They get aware about how to bring about inclusion in different spheres.
V	***Educational Thought of Great Educators***	☞ Students develop an understanding of educational ideas of Indian and Western Educators. ☞ They understand pedagogical concepts given by Indian and Western educational thinkers.
VI	***Women Education***	☞ They know the historical perspectives of Women Education. ☞ They know the Policy Perspectives and Committees and Commissions on Women Education. ☞ They understand the role of Indian thinkers towards Women Education.

		☞ They identify major constraints of Women Education and Women Empowerment.
III/V	***SEC A: Communication Skills***	☞ They understand the basic elements of Communication. ☞ They acquire the knowledge of Listening Skills. ☞ They acquire the knowledge of Speaking Skills. ☞ They acquire the knowledge of Reading and Writing Skills.
IV/VI	***SEC B: Teaching Skill***	☞ They know the basic concept of Teaching. ☞ They know the different types of Teaching. ☞ They understand the Skills of Teaching. ☞ They learn the Concept of Learning Design (LD).

DEPARTMENT OF ENGLISH

ENGLISH HONOURS AND GENERAL UNDER CBCS

Course Outcome/Programme Outcome

Course Name	Course Outcome
CC1 (History Of English Literature And philology)	1.a. The CC1 module consists of two groups- the first one (Group A) deals with the History of English Literature, while the second one (Group B) focuses on Philology. b. The completion of the course is supposed to benefit the students in the following ways: 2. The course offers extensive insight into the history of English literature, while laying special emphasis on various literary movements, genres and writers that are held to be the representatives of their times. 3. It helps the students to evaluate the way socio-cultural and historical phenomena influence the literary production of a particular period. 4. By familiarizing students with the socio-cultural ambience and the discursive frameworks of various ages, the course helps the students to develop a nuanced appreciation of the literary stalwarts of those times. 5. The students are also offered an in-depth understanding on the growth of the English language under the influence of various other languages including Latin and French, besides being mentored in the structural nitty-gritties of the language.
CC2 (European Classical Literature)	1. Introducing students to the seminal practitioners of English Literature and laying the foundation for contextualising specific texts against definite historical backdrops.

	2. Analysing the art of story-telling and the various structural elements of a short story with special reference to James Joyce's Araby, Conrad's Lagoon. 3. Understanding the Romantic Movement and its implications in the works of second generation Romantic poets-Keats and Shelley while thoroughly examining university prescribed texts like Ode To Autumn, To a Skylark. 4. Investigating the efficacy of specific literary terms like caesura, blank verse to understand the significance of metrical patterns and the art of versification.
AECC1 - Communicative English	1. This course aims at addressing the importance of communication skills through an interactive mode of teaching-learning process and by focusing on various dimensions of communication skills. 2. It'll also help the students to learn the language of communication, such as personal communication, social interactions and communication in professional situations such as interviews, group discussions and office environments, important reading skills as well as writing skills such as report writing, note-making etc. 3. It'll also enable the students to commit fewer errors while organizing, structuring and writing sentences as the course focusses on improving the grammatical skills of the students.
CC3 (Indian Writing In English)	After the completion of this course, the participants would gain insight into 'Indianness' through representative works. Students will be able to- 1. appreciate the historical trajectory of various genres of Indian Writing in English from colonial times to till the present 2. analyze Indian literary texts written in English in terms of colonialism, post- colonialism, regionalism, and nationalism 3. Understand the role of English as a medium for political awakening and the use of English in India for creative writing 4. analyze how the sociological, historical, cultural and political context impacted the texts selected for study 5. analyse the strength and constraints of Indian English as a literary medium

	6. evaluate critically the contributions of major Indian English poets and dramatists 7. develop a literary sensibility and display an emotional response to the literary texts and cultivate a sense of appreciation for them 8. apply the ideas encapsulated in Indian Aesthetics to literary texts
CC4 (British Poetry And Drama (14th – 17th Century)	After the completion of this course, students will be able to- 1. comprehend the significance of Elizabethan literature and the writers belonged and its impact on literary works produced world over. 2. evaluate the significance of the socio-political and historical events which shaped the perspective of the Elizabethan Age 3. explain how socio-historical factors have influenced individual texts and how individual texts are representative of their age 4. identify and explain the formal and literary features of each genre and text, and how they contribute to the complexity of values and emotions represented in the texts 5. develop a clear understanding of Renaissance Humanism that provides the basis for the texts suggested 6. Analyze the various elements of poetry, such as diction, tone, form, genre, imagery, figures of speech, symbolism, theme, etc. 7. To know several Shakespearean sonnets, understand the sonnet form, analyze particular Shakespearean sonnets, and appreciate Shakespeare's contribution to the form. 8. gain insight into the age of Shakespeare and the uniqueness of Shakespearean creative output with regard to both his sonnets and plays 9. to have a nuanced understanding of the dramatic literature of the Elizabethan period, with regard to the classical and romantic strains embedded in the plays 10. To apply a knowledge of the social, political, and intellectual context of Elizabethan England to an understanding of Shakespeare's and Marlowe's works

	11. To understand the great ideas conveyed in Shakespeare's dramas and appreciate the rhetorical and poetic art through which those ideas are conveyed.
CC2/GE2 (Essay, Drama and Novel)	1. Understand the genre of essays in Romantic period and how Charles lamb has cultivated this genre in Romantic period and the philosophy of that era through a detailed study of Dream Children: A Reverie. 2. Dissecting the genre of essay and that changes in a symbolic covertly political postcolonial context in George Orwell's 'Shooting an Elephant'. 3. Discussing how the symbolic act of 'shooting the elephant' reflects on the 'the real nature of imperialism the real motives for which despotic governments act', how the essay broadens the focus to tyranny in general and not just imperialism. A cross-referential study of Orwell's Animal Farm and 1984 for a better understanding of the prescribed text. 4. Analysing the significance of fate, destiny and coincidence in Thomas Hardy's craft of storytelling. 5. Examining the larger framework and socio-political scenario of Victorian England in The Mayor of Casterbridge and Thomas Hardy's portrayal of the main protagonist and his treatment of women in the novel.
CC5 (American Literature)	1. After successful completion of this course in semester III, students will be able to- 2. understand the depth and diversity of American literature, keeping in mind the history and culture of the United States of America from the colonial period to the present. 3.understand the social-cultural-ecological-political, historical, religious and philosophical contexts of the American spirit in literature including the idea of democracy, Millennial Narratives, the Myth of Success, the American Adam, the Myth of the Old South, the Wild West, Melting pot, Multiculturalism, etc.

	4. evaluate the thoughts, beliefs, customs, struggles, and visions of African American writers 5. Understand the American style of writing and ideologies like Transcendentalism, corruption, pride, power and obsession along with spiritualism and Christian values. 6. Critically analyze American literary texts in the light of several movements in literature and understand the changing faces of texts with developments in culture. Students can compare/contrast literary works through an analysis of genre, theme, character, and other literary devices 7. understand the changing notions of class, gender, ethnicity in a postcolonial, diasporic and neocolonial world order.
CC6 (Popular Literature)	The completion of the course is supposed to benefit the students in the following ways: 1. It will encourage students to analyse the complexities of popular culture and its social and cultural function. 2. It will enable students to perceive how gender, sexuality, race, ethnicity, class and other socially codified markers of identity are represented in popular culture. 3. It will also help the students to explore the many competing theories, methods, concepts and frameworks that surround, explain and situate popular culture, examine popular culture examples and discuss critical issues such as ethics, politics and histories.
• ***CC7 (British Poetry an Drama, 17th-18th CENTURY)***	The completion of the course would enable the students to: 1. Develop a thorough understanding of the various eras in the history of English literature including the Renaissance, Restoration and Neoclassical periods through the perusal of representative works of the time. 2. Investigate the way the volatile socio-political scenario influenced the literary production of the era. 3. Gain insights into the genre of Comedy of Manners through an appreciation of Aphra Behn, the one of the most prolific female figures of Restoration theatre.

	4. Decode the stylistic aspects of epic poetry and mock-heroic poetry which is quintessential for comprehending the works of Milton and Pope included in the module.
CC3/GE3 (Women's Writing And Women's Empowerment)	1. Learn how and on what grounds women's writing can be considered as a separate genre. They can examine and appreciate the role played by socio- cultural-economic contexts in defining women. It will enlighten them about the issues and concerns of the women writers of the developed and developing countries. They can understand and appreciate the representation of female experience in literature. 2. Analyze the Literary texts through the perspective of gender to achieve particular literary, rhetorical and aesthetic effects. The students will have an awareness of class, race and gender as social constructs and how they influence women's lives. They will be equipped with analytical, critical and creative skills to interrogate the biases in the construction of gender and patriarchal norms. 3. To explore the writing style of women, the students come to know some of the developments, themes, and narrative strategies of women's writing. Students can analyse literary texts through the perspectives of gender, knowing the central points of a selection of feminist theory, and can use it as a context for reading literary texts. 4. Understand various perspectives in Women's Writing which represents women's voices and histories, breaking the silence of patriarchal oppression and the students will come to know how these significant Others of the human population and their writings contributed to our understanding of womanhood and authorship.
LCC (L1)	The completion of the course is supposed to benefit the students in the following ways: 1. It aims to help the students attain communicative competence so that they can use language accurately and appropriately 2. It'll help them to understand the basic features of communication and aim at improving language skills.

	3. This course will also allow the students to gain useful letter/report writing tools, tips and techniques to effectively apply the skills to their everyday workplace correspondence. 4. It will also demonstrate the particulars of writing effective emails, whilst improving punctuation and grammar. Also making sure that the style, content and message is concise, correct and appropriate.
SEC-A2 (Business Communication)	After completion of this course in semester three, students would be able to- 1. Understand the significance of business communication in any organized job sector or even how to write any formal letter to bank, post office or editor of a newspaper for our daily existence. 2. Comprehend how business communication is only relevant for a working professional but for anyone interacting with any governmental services necessary for our quotidian lives. 3. Write their curriculum vitae for applying to any jobs or even the letters of acceptance or rejection afterwards. 4. Navigate through e-correspondence. In today's time and age, it is absolutely mandatory to know how one should write any emails and the professional etiquettes of writing one.
CC8 (18th Century British Literature)	1. This course will enable the students to identify and describe distinct literary characteristics of the 18th century British literature driven by reason, intellect, correctness and satirical spirit. 2. It will help them to develop an understanding of 18th-century British literature within its cultural and historical context. 3. It will also allow the students to evaluate how novel as a genre blossomed in England in the first half of the 18th century to analyze the various social and economic causes of the novel's popularity and thus its influence in the depiction of individual character, society, culture, and politics. 4. It will also provide a deeper insight into the sophistication of theatrical thinking during this period, with complex subplots and characters intended as ironic parodies of common stereotypes.

CC9 (British Romantic Literature)	The completion of the course in semester four would enable the students to: 1. Gain insights into the unique traits of the literary movement of "Romanticism" through the representative works of eminent writers like William Wordsworth, John Keats, Charles Lamb and Mary Shelley. 2. Examine the way literary devices like symbolism, allegory and metaphor were employed by contemporary writers in order to articulate their artistic vision. 3. Understand the way concepts like idealism, individualism and pantheism percolated into the literary output of the Romantic era. 4. Investigate the efficacy of important Romantic concepts like "imagination" and "fancy" through the perusal of iconic texts like Samuel Taylor Coleridge's Biographia Literaria, which features among the list of recommended readings for the course. 5. Appreciate the genre of essay as it was cultivated in the Romantic period by eminent essayists like Charles Lamb, who incorporated within it the intricacies of dream-narrative and autobiographical elements.
CC10 (19TH Century British Literature)	1. Identify and analyze the socio-economic-political contexts that influence the literature of the period. Students will be acquainted with the historical and political awareness of literary texts as reflected in the transition from nature to culture across various genres. 2. Appreciate female voices of the Victorian period and understand the female writer's role / position in society, the tension between the private domestic sentiments and the larger public concerns, the contemporary responses and modern critical re-assessments. 3. Familiar with the pattern of development and change in the themes and literary techniques used by the Victorian novelists and poets. Students will be acquainted with various prose and poetic styles. 4. To understand the existing conflict between faith and doubt in Victorian society.

	5. Have an analytical knowledge of some of the key aspects of Victorian literature and culture. They will come to know how to use primary and secondary sources to explore relevant historical and cultural contexts, and how to use those contexts for their readings of literary texts. 6. Analyze, discuss and write critically about the use of supernatural and gothic tropes and their significance in a range of Victorian texts. Students will be enlightened with a range of Victorian literature in relation to a range of contexts including Victorian anxieties about modernity, madness, sexual transgression and disease.
SEC-B2 (Academic Writing and Composition)	After the completion of this course, students will be able to- 1. Understand what entails in an academic piece of writing and how it is different from any other formal or creative piece of writing. 2. Comprehend how to conduct an ethical research work, put citation, references and prepare bibliography at the end of an academic paper. 3. Besides teaching academic writing, this course also teaches students to summarize or paraphrase academic works which is essential for preparing notes and answers. 4. Write critical appreciation of already existing research works and to conduct literature review.
CC4/GE4 (Academic Writing)	The completion of the course would help the students to: 1. Engage in critical thinking within a structured framework. 2. Acquire the skills of academic writing which would equip the students to tackle with ease the term papers and dissertations during the course of their academic career. 3. Develop a thorough understanding about the ethics of conducting academic research. 4. Maintain the etiquettes of academic writing by providing proper citations and refraining from unethical academic practices like plagiarism.

LCC2- 1 (Alternative English, Language, Society and Personality)	After the completion of this course students will be able to- 1. Comprehend how different personalities such as Gandhi, Tagore and Ishwar Chandra Vidyasagar have helped to shape a modern and secular India. 2. Study literary works of different authors who are not necessarily fiction writers, but rather social reformers and historians. It would solidify their understanding of English non-fiction pieces and the current conflicted socio- political scenario of modern India on which these pieces are based on. 3. Understand how literature is not just imaginary stories but rather a reflection of the realism of human existence which is also primarily shaped by the political and historical backdrop of any nation.

DEPARTMENT OF HISTORY

HISTORY HONOURS UNDER CBCS

CC 1: History of India from the earliest times to 300 B.C

This course intends to provide an extensive and deeper understanding of early Indian history. They will gain knowledge about the sources of early Indian history and historiography. Students will be acquainted with the tools required for history, diversity in history, regional variations in Indian subcontinent, various facets of ancient India i. e social, cultural, political and environmental aspect. Students will be able to trace the elements of continuity and changes in the history and will be able to understand how our present knowledge and perceptions have played a role in interpreting the past.

CC 2: Social formations and cultural patterns of the ancient world other than India

Students become acquainted with the significant developments in world history which have formed the complexities of human existence. This course makes a survey of human evolution, transition from hunting-gathering subsistence pattern to more advanced adaptations to a sedentary farming economy. This course explores the golden treasure of our ancient civilizations of Rome, Greece, Egypt.

CC 3: History of India C300 BCE to C 750 CE

Students acquire knowledge about polity, society, economy, protestant religions of the ancient India tracing the growth of empires from the Mauryas, Kushanas, Satavahanas upto the Guptas and also the post-Gupta polities such as the Pallavas, Chalukyas and Vardhanas. They can get clear view about the growth of monarchical, republican and other forms of government in ancient India.

CC 4: Social Formation and Cultural Patterns of the Medieval World Other than India

This course emphasises on the transition of ancient Europe to the Medieval world, the crisis caused by the decline of Roman Empire, the rise of religious organizations such as the Church

and Monasteries, the Carolingian and 12th century Renaissance, the rise of Universities and Towns, the rise of Feudalism and its breakdown, Crisis of Judaism and Christianity, Witchcraft, Advent of Islam, Crusades.

CC 5: History of India CE 750-1206

The objective to learn this course is to get an idea of early Medieval India-its polity, economy, society, religion and culture, the debates on Indian –Feudalism, Rise of Rajputs and the nature of the state; Evolution of political structure: Rashtrakutas, Palas, Protiharas, Cholas. Arab conquest of Sindh, Turkish Invasion; Agrarian structure and social change, Proliferation of castes, status of untouchables, Tribes as peasants, their place in the Varna order, Trade and process of urbanization, Religious and cultural developments.

CC 6: Rise of Modern west-1

This course explains the transition of Europe from Feudalism to Capitalism, geographical discoveries, Renaissance, Reformation, Shift of Economic balance from the Mediterranean to the Atlantic, Commercial Revolution, Price Revolution, Agricultural Revolution, Enclosure Movement, Development of National Monarchy, Emergence of European state system.

CC 7: History of India, C1206 -1526

This course throws light on the polity, society, economy, culture and religion of the Delhi Sultanate. Students acquire knowledge about foundation, expansion and consolidation of the Sultanate, history of Khaljis, Tughluqs, Mongal invasion, Syed and Lodis, Battle of Panipath, Theories of Kingship, Ruling elites, Sufis, Ulama, Imperial monuments and coinage, Emergence of provincial dynasties like Bahamanis, Vijoynagar, Gujrat, Malwa Jaunpur, Bengal. Regional art, architecture, literature are included in their syllabus. Students get to know about Iqta, agricultural production, technology, changes in rural society, revenue systems, Monetization, market regulations,growth of urban centres, trade and commerce, Indian Ocean trade, Sufi silsilas, Bhakti movements ,Sufi literature, Architecture of the Delhi Sultanate etc.

CC 8: Rise of the Modern West II

This course puts emphasis on some of the major path breaking changes which took place around the mid-17th and late 18 th century Europe like Print Revolution, Revolution in war techniques, Scientific Revolution, the growth of Mercantilism and its impact on the European economics, leading to a prelude to the Industrial revolution, the growth of Parliamentary monarchy with patterns of absolutism that ushered in dramatic changes in the history of Europe.

CC 9: History of India 1526-1605

Students will get an idea on the historiography of the Mughal age, an idea of the political history of the Mughal period. Ideas of the socio-economic aspects of the Mughal period, concepts of jabti, mansab, jagir, madad-i-mass, suhl-i-kul will be clear to them. Creation of the Mughal nobility and growth of a dynastic ideology, role of the Ulemas, Revolts and resistance in this age, Zamindar and peasants, rural tensions, condition of agriculture, development of trade and commerce, trade routes, overseas trade, Bhakti and Sufi movement all these are discussed in this course.

CC 10: History of India 1605-1750

This course will enable the students to identify the major political, social and economic developments in the History of India during the period between the 17th and mid-18th century. They will get an idea about Mughal art and architecture, various patterns of regional politics, 18th century crisis and its related historiography.

CC 11: History of Modern Europe (1780-1939)

This period of European history may be called a revolutionary period. The history of French Revolution, Napoleonic era and European repercussion to it, the revolutionary and radical movements of 1830,1848; Capitalist industrialization of late 18th century, various forces of Nationalism and the reorganization of the states in the 19th and 20th century Europe; Colonialism, Emperialism and World Wars-----all these phenomena add a kind of dynamism to European history which is really inspire students for research/ higher studies.

CC 12: History of India (1750-1857)

This course enlightens us with the process of transformation of India during 18th century into a colonial power. It highlights British imperialist expansion in India,together with the setting up of an apparatus of governance of the British Raj and its impact on the indigenous society and culture. The changes in the rural economy and society are emphasized in this course together with trade and industry. The reactios and revolts against the colonial impositions are also highlighted.

CC 13: History of India (1857-1964)

This course introduces India's freedom struggle to our students. The main area of focus are: cultural, social, religious reform movements; role of political associations ,Moderate and Extremist politics, Gandhian movements specially Rowlatt Satyagraha, Jalianwalabagh incident, Non-cooperation movement, Civil Disobedience movement, Quit India movement, INA Revolt; the ideologies and practices of RSS, Hindu Mahasabha, Muslim League; negotiations for Independence and partition, other popular movements of that time which were against British Raj ,Partition riots ,the emergence of a New Independent State, making of the Constitution, integration of the Princely states, Land reforms of new India, planning and Nehru Era.

CC 14: History of world politics (1945-94)

This course highlights the impact of a shift from Eurocentric politics to ideologically polarized Super power-centric politics, Concept of Cold War and it's manifestation; Truman Doctrine, Marshall plan, NATO and role of USA IN World politics; Molotov Plan, COMECON, Berlin Blockade, Warsaw Pact, Sovietaization of Eastern Europe and USSR in the World politics, Korean crisis, Vietnam war, Cuban Missile crisis, NAM and the emergence of the Third World, De-stalinisation, emergence of China in World politics,Sino-Soviet and Sino-USA relation, emergence of Independent nations in Afro-Asian countries, Birth of Israel, Arab-Israel conflict; Glasnost, Perestroika and Disintegration, decline of Soviet Union; End of Cold War and the rise of a Unipolar World system, Globalisation since 1990s.

☞ ***For DSE, our choices are DSE A1 & A3, DSE B 1 & B3:***

DSE A 1 Course is the History of Bengal (1757-1905)

This course is about the rise of British power in Bengal from the battle of Plassey to Buxar, Diwani, the administrative history from 1765 to 1833; colonial economy: agriculture, trade, industry; cultural changes, social and Religious reform movements, Christian Missionaries, the advent of printing and it's implications, education; Hindu and Muslim religious revivalist movements, Social reforms and the women's question; Protest movements and insurgencies against the Raj, Fakir and Sanyasi revolt, Pabna Peasant Uprisings, Partition of Bengal 1905.

DSE A 3 Course is the History of Bengal (1905-1947)

This course deals with the Partition of Bengal and Swadeshi Movement, Political ideology and organizations, Extremist Movement in Bengal, Revolutionary terrorism, Communal politics, Birth of Muslim League, Gandhian nationalism after 1919,Non-Cooperation movement, Khilafat Movement, Swarajya Party, Civil Disobedience movement; beginning of Left politics in the 1920s,Rise of Krishak Proja Party; Govt. Of India Act,1935, Peasant movement, Labour movement, Caste movement, Women's movement in Bengal. Students get introduced with the role of Subhash Chandra Bose in the Freedom movement, Quit India Movement leads to Independence and Partition, Communal Riots ,Birth of West Bengal and East Pakistan.

DSE B 1 & 3 is History of Modern East Asia (China & Japan)

Students get knowledge about Imperialism and China during the 19th & early 20th century which includes Chinese feudalism, the transformation of china into a informal colony, Opium Wars, Unequal Treaties, Open Door policy, Agrarian and Popular Movements, Self – strengthening reforms, Emergence of Nationalism in China, The Revolution of 1911: Sun-Yat-Sen; The formation of Republic; May Fourth Movement of 1919.In the second part ,students have to study Nationalism and Communism in China, Formation of CCP, Communist Movement, Mao Tse Tung.

The syllabus of the history of Japan deals with the Transition from feudalism to Capitalism, Meiji Restoration & reforms, Japanese Imperialism, Democracy & Militarism/ Fascism, Second World War, American occupation of Japan.

☞ ***For SEC we have selected SEC A (1) & B (2)***

SEC A (1) is Archives & Museums which introduces students to the institutions that house and maintain documentary, visual and material remains of the past, explains the significance of Museums and Archives and how they work. Students become encouraged to undertake collection, documentation and exhibition of such materials in their localities and colleges. Visit to National Archives and National Museum are an integral part of this course.

SEC B (2) is the course on Art Appreciation: An Introduction to Indian Art. The purpose of this course is to introduce students to Indian art, from ancient to contemporary times, to understand and appreciate its diversity and its aesthetic richness. The course will equip students with the abilities to understand art as a medium of cultural expression. It will give students direct exposure to Indian art through visuals and visits to sites and museums. A concept of Indian Art and Architecture from Pre-historic time to the colonial period can be developed from this course.

HISTORY GENERAL UNDER CBCS

CC/GE 1 History of India from Earliest times up to 300 CE

This course describes a broad survey of Paleolithic, Mesolithik and Neolithik cultures; Harappan Civilization, Vedic age, Rise of Magadha, Jainism & Buddhism, Mauryan Empire, Sangam age, Satavahana phase, Age of Indo-Greeks, shakas, Kushanas.

CC/GE 2 is History of India from C.300 to 1206

This course is to know in details the Age of Guptas, Harsha; History of South India: Pallava, Chalukya, Rashtrakuta; Palas, Pratiharas; Rajputs, Arabs, Establishment of Sultanate.

CC/GE 3 is the History of India from 1206 to 1707

Which deals with the foundation, consolidation of the Delhi Sultanate; Iqta & Nobility, reforms under Khiljis, Tughlaqs; Bhakti & Sufi movement; Provincial Kingdom like Vijayanagar and Bahamani kingdom, Bengal. This course also describes the Emergence and consolidation of Mughal state: Akbar to Aurangjeb- Mansab, jagirs, state & religion, socio-religious movements, Emergence of Maratha power.

CC/GE 4 is the History of India: 1707-1950

Interprets the 18th century, emergence of independent states & establishment of colonial power up to 1857; Uprising of 1857; colonial economy, socio-religious movement, emergence & growth of Nationalism with focus on Gandhian nationalism, Communalism, Partition of India, Establishment of Republic.

DSE A 2: Some aspects of European History (1780-1945)

Students are to study The French Revolution, Napoleon, Revolutions of 1830,1848; Unification of Italy, Germany; World War I; Rise of Nazism, Fascism; World War II.

DSE B 2: Some aspects of Society & Economy of Modern Europe (15th to18th century)

This course help students to understand The Historiographical Trends, Feudal crisis, Renaissance, Reformation, beginning of the era of Colonization, Shift of economic balance from the Mediterranean to the Atlantic, Transition from Feudalism to Capitalism: Industrial Revolution in England.

SEC A 1 is the course on Historical Tourism: Theory and Practice

It defines Heritage, Art and Architecture in various forms. For Field Work students must visit historical sites museums

SEC B 1 is the course on Museum and Archives in India

Students gain knowledge of setting up of Museums and Archives along with Field Work, studying of structures and Functions, Training & Employment.

Programme outcome of B.A with History General

B.A degree is awarded for an undergraduate programme in the liberal arts.

B.A degree generally equips a student with certain skills like critical thinking, research and writing effectively. This degree opens up a lot of prospects in terms of job, one can pursue for higher education. A graduate with history as a general subject can opt for a good career like teaching, banking, management, police service, journalism, travel & tourism, law, content

writer etc. Actually, Arts is a diverse and a beautiful stream. Career option for Arts can very well be paying as well as satisfying in terms of work and balance in life and history as a subject play a major role in this. History is the study of change over time and it covers all aspects of human society. Political, social, economic, scientific, technological, medical, cultural, intellectual, religious, military developments all are part of history. History plays a vital role in the making of a nation.

Programme outcome of B.A with History Honours

The three-year undergraduate programme of History honours makes a student aware of international situation, sensitizes them to the existence and desirability of multiple perspective through which knowledge about past is constructed, encourages them to think critically, make them able to analyze different perspectives, to articulate their own views regarding various themes in history, to develop a sense of active citizenship, to inculcate a humanitarian spirit within them. The expected outcome of this programme is to provide students with a knowledge of interconnectivity of our past with the present. All these establishes a platform over which a student can pursue higher studies in History. Besides the skills specific to the discipline, the wider life skills of argumentation and communication, attitudes and temperaments, general values inherent in a discipline that studies human beings in their social context with all its complexities, ultimately enable one to live a rich, productive and meaningful live. Their possible career may be Administrative Assignments, Foreign service, Journalism and Media, Policy making and Governance, Public life and People's Representation, Social work, Archives, Museum and Archaeological research, Teaching and Research.

DEPARTMENT OF PHILOSOPHY

Program Specific Outcome

The graduate degree holder in philosophy Honours and general course have following avenues:

1. Logical reasoning being an essential part of philosophy discipline, students can join legal profession and excel.
2. Government Services
3. Career in Media
4. Career in the field of Medical Ethics
5. Academic Consultant

Course Outcome

We follow the prescribed syllabus of University of Calcutta. Our department offers both advanced and generic Courses in under graduate level. Below is the detail picture of course name and outcome.

Course Name	Course Outcome
(PHIA) CC-1: Outlines of Indian Philosophy-1	Students have a complete and comprehensive knowledge about Carvaka, Jainism, Buddhism, Nyaya and Vaisesika Philosophy.
CC-2: History of western Philosophy-1	Students are to acquire knowledge about ancient and medieval Philosophy of western era.
CC-3: Outlines of Indian Philosophy-2	Indian epistemology and metaphysics are to be taught in this segment to make students comprehensive knowledge about the reality of the World.
CC-4: Outlines of Western Philosophy-2	Students taught to learn about the modern western philosophy.
CC-5: Philosophy of Mind	Students acquire knowledge about human psychology with special reference to other homoserines groups.

CC-6: Social and Political Philosophy	This section deals with the prevalent social issues, political ideologies which are most effective for students to understand the difference between ought and is.
CC-7: Philosophy of Religion	Students understand the different religious views and outlooks. It also equipped them with the inter- religious understanding which is of very much implications in today's scenario.
CC-8: Western Logic-i	Logic is one of the finest reasoning that helps student to aquire the power of mathematical understanding. Nevertheless, it also helps them to inculcate rationality to its extent.
CC-9: Western Logic-ii	It builds the capacity to understand truth functional systems, quantification theory and other symbolic logic related topics.
CC-10: Epistemology and Metaphysics (Western)	This part of analytic philosophy enables students with hard core philosophical problems and solutions.
CC-11: Nyaya logic and Epistemology -i	This section enables students to think and practice logically and critically.
CC-12: Ethics-(Indian)	Ethics is an integral part of the syllabus that helps to build morality and values of life.
CC-13: Nyaya logic and Epistemology -ii	Study of logic and epistemology makes students to grasp the techniques of valid arguments and reality of outer World.
CC-14: Ethics (Western)	Study of western ethics enables student to know the age old ideas of West
DSE- A and DSE-B	These are special papers which students have to take within their syllabus. These courses are meant for extensive study about hard core philosophical books and isms and also contemporary philosophical ideologies.
SEC-A and SEC-B	Under this heading, students are expected to equipped themselves with philosophical skills like understanding of man and nature relationships, feminism, logical applications, human rights, recent trends in ethics, peace studies etc.

NB: the syllabus of PHIG (Philosophy General) to some extent is similar with the syllabus of PHIA.

DEPARTMENT OF POLITICAL SCIENCE

Course Outcome

The affiliating University ensures that new areas are incorporated within the imparted courses and the ongoing CBCS course has Skill Enhancement Course (SEC) related to Legal Literacy, Research Methodology etc as well as Discipline Specific Elective Course (DSE) associated with Gender Studies, Global Politics, Human Rights etc. It has opened up novel avenues for employment in the field of law and also encourages students to explore research areas through getting enrolled and pursuing higher education further.

List of Advance Core Course (CC) with its Outcome

Semester I ***(Core Course)***	**Course Outcome**
CC1 - Understanding Political Theory: Concepts	☞ Enrich the students with theoretical knowledge about concepts, theories of J. Rawls and David Held. ☞ Enhance the basic conceptual knowledge about the discipline.
CC2 - Understanding Political Theory: Approaches and Debates	☞ Provide knowledge about various approaches in political science, theories, scientific socialism of Karl Marx, Lenin-Rosa debate, Hegemony and Civil Society of Gramsci
Semester II ***(Core Course)***	**Course Outcome**
CC3- Constitutional Government in India	☞ Impart knowledge about Indian Constitution, its evolution, salient features, amendment procedure and functioning of three organs of government.

CC4 - Politics in India: Structures and Processes	☞ Generate awareness among students and keep them informed about Indian Party System and various movements related to environment, human rights, women and impact of caste, religion and language on Indian Politics.
Semester III ***(Core Course)***	**Course Outcome**
CC5- Indian Political Thought-I	☞ Provide knowledge on contribution made by various Indian Political Thinkers from Kautilya to Gandhi.
CC6- Comparative Government and Politics	☞ Provide knowledge on salient features about constitutions of various nations like UK, USA, PRC, Russia, France, Bangladesh and gain basic understanding about comparative politics and government.
CC7- Perspectives on International Relations	☞ Provide conceptual knowledge about International Relation, theories, Indian Foreign Policy, contemporary issues like Indo-Us and Indo-Sino bilateral relations.
Semester IV ***(Core Course)***	**Course Outcome**
CC8- Indian Political Thought-II	☞ Provides knowledge on thinkers from M.N. Roy to Pandita Ramabai
CC9- Global Politics since 1945	☞ It deals with Cold War and Post Cold War Phase Politics, information about various regional organizations, UNO and bilateral relations with neighboring countries.
CC10- Western Political Thought and Theory-I	☞ It deals with the indelible contribution of western political thinkers from Greek till social contractual list like Hobbes, Locke and Rousseau.
Semester V	**Course Outcome**

(Core Course)	
CC11- Western Political Thought and Theory-II	☞ It deals with indelible contribution of western political thinkers from Bentham till Frankfurt School and Post Marxism contentions.
CC12- Political Sociology	☞ It basically deals with various concepts of social structure and impact of religion, gender on Indian politics and Electoral politics.
Semester VI ***(Core Course)***	**Course Outcome**
CC13- Public Administration— Concepts and Perspectives	☞ It deals with basic understanding about public administration, public policy and its major concepts
CC14- Administrative and Public Policy in India	☞ It focuses mainly on civil service, Panchayati Raj, social welfare policies like MGNREGA, NHM, SSA, 73rd and 74th Amendment Act.

Apart from the above CC in Advance Course there are CC paper for General/Pass students as well as DSE and SEC papers too for specialisation.

List of General Core Course (CC)/Generic Elective (GE) with its Outcome

Semester I ***(CC/GE)***	**Course Outcome**
CC/GE 1- Introduction to Political Theory	❖ Basically, provides conceptual knowledge about the subject, denotation of terms like Democracy, Nationalism, Internationalism, Law, Liberty, Equality, Justice, Rights, Political parties, Interest Group and theories on origin of state.
Semester II ***(CC/GE)***	**Course Outcome**

CC/GE 2- Comparative Government and Politics	☞ Comparative study about salient features of the Constitution of UK, USA, PRC, Bangladesh, France and Switzerland.
Semester III ***(CC/GE)***	**Course Outcome**
CC/GE 3- Government and Politics in India	☞ Basically, emphasizes on constitutional structure with salient features of India.
Semester III ***(CC/GE)***	**Course Outcome**
CC/GE 4- International Relations	☞ Basically, deals with current affairs and Foreign Relations with Neighboring Countries and Developed Nations

DEPARTMENT OF SANSKRIT

SANSKRIT HONOURS AND GENERAL UNDER CBCS

SANSKRIT HONOURS (B.A.) SANA

Programme Specific Outcomes

1. After completing of Sanskrit Honours of 6 semesters in three years students will be graduates having Sanskrit Honours degree.

2. Students will be able to use and analyze their newly acquired knowledge in the field of higher studies in multi-disciplinary subjects.

3. Studying Sanskrit will help them how to pronounce a word properly; simultaneously it will increase their stock of vocabularies which will be benefited in communication skill.

4. Several multi-disciplinary research works especially in the field of **Indology** have been done in every year around the glove, so students of Sanskrit have lot of opportunities to get research work in there.

5. After completing

6. graduation, they will work in different fields related to translation. There are vast unpublished Manuscripts in the field of Sanskrit world; not to publish due to inadequate of Sanskrit translators. Every year Google also take translators from English to Sanskrit for Digitalization. So, students of Sanskrit have huge opportunities to get chance in these before said fields.

7. If possible after completing graduation they will also pursue B. ED degree and go for teaching at secondary or higher secondary Schools. Not only this, they will also pursue M. Phil or P. HD degree for higher studies.

8. Several universities around the world in the field of Indological studies has provided well amount of fellowship for comparative studies. So, students can easily apply for that to get higher benefits.

9. Knowledge and language always interrelated with each other. A huge amount of ancient Indigenous texts was written in Sanskrit language. Naturally studying Sanskrit will open up various dimensions of Indian knowledge system so that students can easily relate ancient

educational system with modern one. It will also help them to understand the socio-cultural diversities in India.

10. Modern IT or Information Technology has shown a huge interest in Sanskrit especially in the field of programming language of computer Science. So, studying Sanskrit will open up a bright future for them.

Semester	Course Title	Course Outcome
I	***CC1=Raghuvaṃsam, Kumārasambhavam,Kīrātārjunīyam, Nītiśatakam, Origin and development of Mahākāvya and Gītikāvya***	☞ Students can understand the inner perspective and the purpose of writing of these literature ☞ They knew the structure of the sentences and its implementation in different fields ☞ They have learned grammatical analysis, translation, explanation, and poet's commentary on the society ☞ They get knowledge about the origin and development of Indian traditional heritage of literature.
	CC-2=Saṃhitās (Rik, Yajus, Saman, Atharva), Vedic Literature, Rāmāyanam, Mahābhāratam, Purāṇas,General Introduction to Vyakaraṇas, Darśanas, Sāhitya-śāstras	
II	***CC-3=śukanasopadeśa, Rājavāhanacaritam, Origin and development of prose, Romances and fables***	☞ They have acquired social and political thoughts depicted in these texts. ☞ They get knowledge about how to control our mind through learning the text, *Gita.* ☞ They also aware about the clarity of *buddhi,* controlling over senses, resolution of conflict over mind when it comes. How to controls EGO etc. ☞ They also learn communicative English as AECC.
	CC-4=Gītā: Cognition and emotive apparatus, Gita: Controlling the mind confusing and conflict,Gita: Self-management through devotion, AECC-2. GE 2	

III	***CC-5=Svapnavāsavadattam, Abhijñānaśakuntalam, Critical survey of Sanskrit Dramma***	☞ They get acquainted with the personification of nature and its modern implementation ☞ they have known about the purpose and design of the Kalidasa's Magnum opus Sakuntalam. ☞ They also get aware about the system of ancient marriage policy, their social background, Tax and Social system as well. ☞ Students also knew about the origin and development of Sanskrit Drama and its modern relevance
	CC-6=Introduction to Sanskrit poetics, Sabda-sakti and Rasa-sutra, Figures of speech and meter	☞ they have aware of the power of word and its meaning and also their internal relationship with figure and speech. ☞ they knew different type of speeches ☞ they have get knowledge about the position of women in our ancient society ☞ social values of life according to our Indian Ethical system they have learned ☞ They also knew about the caste system and socio-cultural diversities of ancient Indian background. ☞ They have developed their writing skill which has reflected in writing skill as well
	CC-7=Indian Social Institutions: Nature and concepts, Structure of Society and values of life, Position of Women in the society, social values of life, Important Thinkers on Indian Polity, Sanskrit Writing Skill (SEC-A-1), GE-3	

IV	***CC8= Epigraphy, Paleography, Study of selected Inscriptions, Chronology***	☞ Students have learned importance of Indian Inscriptions in the reconstruction of Ancient Indian History and Culture. ☞ History and development of Indian scripts and its modern implementation. ☞ Students knew about the antiquity of the art of writing. ☞ Students have known the development of the history of modern Sanskrit literature in Bengal and across the Bengal. ☞ They have acquired CC-9=Mahākāvya and Caritakavya, Gadya Padya, Rupaka CC-10=Sanskrit studies in West, Sanskrit fables in world literature, Kālidāsa in the West, Sanskrit studies across the world, GE 4 (other than Sanskrit) knowledge about Sanskrit studies across the world and its modern relevance. ☞ They have understood impact of Indian Epics in South-East Asia and its modern implementation. ☞ Students have gained knowledge about different Sanskrit study centers in Asia and Europe and scope of learning Sanskrit across the world.
	CC-9=Mahākāvya and Caritakavya, Gadya Padya, Rupaka	
	CC-10=Sanskrit studies in West, Sanskrit fables in world literature, Kālidāsa in the West, Sanskrit studies across the world, GE 4 (other than Sanskrit)	
V	***CC-11=Vedic Literature, Vedic Grammar,***	

V	***DSE-I= Darsana, Tarkabhāṣā, Saptapadārthī, Vivekacuḍāmaṇi***	☞ Students have acquired knowledge about the Vedic period, its knowledge system, meter, vast domain of literature ☞ Students knew about the very popular philosophical texts like Vivekacuḍāmaṇi, Tarkabhāṣā etc and its modern implementation in psychological world ☞ Students have known about the fundamental structure of Sanskrit grammar that is Kāraka, Samāsa ☞ They have made sentences fluently because of adequate knowledge of grammar that they have also learned ☞ They have known about the classification of language, phonetic laws, phonetic tendinitis
	CC-12=Sanskrit Grammmar, General Introduction to Philology, Kāraka, Samāsa,	
	DSE-2= Kavya, Sāhitya-darpaṇa (ch I, II, III)	
VI	***CC-13=Essentials of Indian philosophy, Ontology (Based on Tarkasaṃgrahaḥ), Epistemology (Based on Tarkasamgrahah),***	☞ They have known about the meaning and purpose of darsana and its general classification i.e. āstika and nāstika and their impact on other philosophical branches. ☞ They have acquired knowledge about several philosophical offshoots likes Realism, Dualism, Monism, Pluralism, Idealism etc.
	DSE-3=Vyakaraṇa (Strī, Tiṅanta, Ajanta)	

	CC-14=Vibhaktyartha, Voice and Kṛt, Translation and communication, Spoken Sanskrit,	☞ They knew about the concepts of padārtha, definition of their different types of presentations. ☞ They have learned social and cultural aspects of Indian learning method through Upanisadic views. ☞ They have acquired knowledge about how to communicate in Sanskrit language through Spoken Sanskrit Classes which enrich their communication skill also.
	DSE-4=Veda (Eastern and Western Interpretation of the Veda), śunaḥkṣepokhyana, Taittiriyopaniṣadśikṣāvallī, Muṇḍakopaniṣad,	

SANSKRIT GENERAL (B.A.) SANG

Programme Specific Outcomes

1. The structure of the UG Sanskrit General syllabus has a broader perspective which grew an interesting way to study Sanskrit among the students.

2. It enriches students to collect knowledge about our culture heritage, vast domain of ancient literature as well as system of different philosophical outlooks.

3. Students will develop their skill of communication through spoken Sanskrit and not only that, it will also helpful for them to enlarge their skill of confidence.

4. Knowledge of different language also helpful for them to inter-relate with other languages which will be beneficial for further higher studies especially comparative or inter relative studies.

5. It will also open up so many paths in future as result students will go in different academic or non-academic fields in future.

6. After completing Graduation, they will pursue B. ED or Master degree according to their interest which will be helpful for getting jobs in different fields.

Course Outcomes

Semester	Course Title	Course Outcomes
I	***CC-A1=Raghuvaṃśaṃ (canto –I, verse 1-25), śiśupālavadham (canto-I, verse 1-30), Nītiśatakam (verse 1-20), History of Sanskrit poetry,***	☞ Students have learned about origin and development of different types of Mahākāvyas, Poetries and about poets ☞ They have understood about the background of different types of Indian literature and its evolution ☞ They have learned about meaning, explanation, of the text and also purpose of the authors written behind the texts ☞ They become aware about environmental studies and its impact in our day-to-day life
	CC-B-1 (other than Sanskrit), ENG,	
	AECC-ENVS	
II	***CC-A-2=śukanāsopadeśa, śivarājavijayam (Nivāsa-I), survey of Sanskrit literature, CC-B-2=other than Sanskrit, AECC (2)***	☞ Students have learned about the political and social thoughts depicted in these texts ☞ They have understood about the social and moral values about life ☞ They understand about the origin and development of prose and romance literature of Sanskrit ☞ They also learned another language other than Sanskrit especially English that will be helpful in their future in comparative exams

III	***CC-A-3=Abhijñānaśakuntalam (canto 1 to 7), Technical terms from Sanskrit Dramaturgy, History of Sanskrit Drama and an Introduction to principle of Sanskrit Drama***	☞ Students have learned about the *Magnum Opus* of Kālidāsa and its modern relevance in our literature ☞ They also learned about some technical terms of Sanskrit Dramma that will also helpful to relate with modern drama ☞ They have tried to speak and write in Sanskrit through Basic Sanskrit course as referred by UG syllabus
	CC-B-3=other than Sanskrit	
	LCC-1=declensions, conjugations, grammatical rules	
	SEC-A-1=Basic Sanskrit	
IV	***CC-4=Laghusiddhāntakaumudī: Sandhiprakaraṇa, Vibhaktyartha-prakaraṇa,***	☞ They have learned fundamental grammatical elements through Spoken language courses that will also help them for preservation and digitalization of Sanskrit texts in future. ☞ Basic computer awareness Programme also introduced to them through this course to make this subject more interesting.
	CC-B-4=other than Sanskrit	
	LCC (2) =	
	SEC-B-1=Spoken Sanskrit	
V	***DSE-1=Dharma, Saṃskāra and puruṣārtha, Svadharma***	☞ They have learned historical perspective of Indian religious system, its

	DSE-2=Historical perspective Rgveda, 1.164.37, Chāndogyopaniṣad, VI.2.3, Bṛhadāraṇyakopaniṣad, II.5.18-19 Concept of a person, Personality types, Measures for behavioral improvement	classification, utilization and also several modern interpretations ☞ They knew how to control emotions, how to improve behavioral measures through leaning *Gītā* ☞ They have learned how to imply the innermost message of the *Gītā* in their practical life ☞ They have acquired knowledge about some basic elements of ancient healing system i.e. *Ayurveda* and its modern implementation to cure diseases.
	SEC-A-2=Basic elements of Ayurveda (Carakasaṃhitā, Taittirīyopaniṣad)	
VI	***DSE-3=Kāvyaprakāśa: kāvyaśiṣtya and kāvyaprayojana, kāvyakāraṇa, kāvyasvarūpa and kāvyabheda***	☞ they knew about our core concept of Nationalism and the rise of nationalist movement and their sacrifices ☞ they develop their knowledge about National integration, religious tolerance, national pride and freedom of speech ☞ they knew about the philosophical view of Gandhian movement and his innermost realization about India ☞ they have acquired knowledge about nationalistic trends in modern Sanskrit literature before Independence and also after Independence ☞ they knew about social, political and religious background of Gandhian thought with special reference to Satyāgraha

	DSE-4=Concepts and basic features of Indian Nationalism (meaning, definition and elements of Indian Nation Rāṣṭra), Nationality, Name of country, National symbol and rise of Nationalism (Bhāratavarṣa) Rise of Indian nationalism and freedom struggle movement Nationalistic thoughts and modern Sanskrit literature Modern Nationalistic thoughts and Gandhian Sanskrit literature.	☞ they have understood how Gandhi was very often influenced by Upanisadic view and the essence of Indian philosophy .e. *ahiṃsā hi paramo dharmo*.
	SEC-B-2=Yogasūtra of Patañjali (Samādhipāda, Sādhanapāda and Vibhūtipāda)	

DEPARTMENT OF FILM STUDIES

FILM STUDIES GENERAL UNDER CBCS

Programme Specific Outcome:

1. Analyse and interpret various film genres, styles, and techniques, including their historical and cultural contexts.
2. Evaluate the artistic and technical elements of film production, including cinematography, editing, sound, and visual effects.
3. Demonstrate critical thinking and effective communication skills through the analysis and interpretation of film texts, both orally and in writing.
4. Understand the impact of film on society and its role in shaping cultural norms, values.
5. Apply theoretical frameworks, such as feminist and postcolonial theory, to the analysis of film texts and their broader social and political contexts.
6. Collaborate effectively with others in film production projects, demonstrating leadership and teamwork skills.
7. Create original film projects that demonstrate a high level of technical and creative proficiency.
8. Develop a strong foundation in film history, theory, and criticism, preparing them for further study in graduate programs or careers in the film industry or related fields.

Course Outcome of Film Studies (General) Under CBCS

Course Code	Course Name	Course Outcome
CC I/GE I (Semester I) Total Marks: 100 [Theory (Th) 50 + Practical (Pr) 30 + Internal Assessment 10+Attendance: 10] Total Credits: [4(Th)+2(Pr)]=6	***Film Language & Cinema's Journey from Primitive to Narrative***	Knowledge about how films are made and introduction to film technology. Idea on the development of cinematic language. Inception of cinema. Practical knowledge about technicalities of filmmaking.

CC II/GE II (Semester II) Total Marks: 100 [Theory (Th) 50 + Practical (Pr) 30 + Internal Assessment 10+Attendance: 10] Total Credits: [4(Th)+2(Pr)]=6	***History: World Cinema***	Idea about Avant Garde Cinema of the world in the post WW 1 & 2. Idea about how film contents and forms are influenced by socioeconomic and geo-political changes. Introduction to practical film making.
CC III/GE III (Semester III) Total Marks: 100 [Theory (Th) 50 + Practical (Pr) 30 + Internal Assessment 10+Attendance: 10] Total Credits: [4(Th)+2(Pr)]=6	***Indian Cinema***	Brief history of Indian cinema from the formative period to the present days. Idea about Indian Auteurs and art house cinema. Developing the skills of photography.
CC IV/GE IV (Semester IV) Total Marks: 100 [Theory (Th) 50 + Practical (Pr) 30 + Internal Assessment 10+Attendance: 10] Total Credits: [4(Th)+2(Pr)]=6	***Documentary***	Introduction to the ethics and aesthetics of Documentary Overview of Documentaries of Different countries with special reference to Indian Documentary. Knowledge of Documentary film making.
DSE A1 (Semester V) Total Marks: 100 [Theory (Th) 65 + Tutorial (Tu) 15 + Internal Assessment 10 +	***Film Theories & Study of Post –Neorealist Italian Cinema***	Introduction to several film theories Knowledge about Post –Neorealist Italian Cinema. Practical application of film theories.

Attendance: 10] Total Credits: [5(Th)+1(Tu)]=6		
DSE A2 (Semester V) Total Marks: 100 [Theory (Th) 65 + Tutorial (Tu) 15 + Internal Assessment 10 + Attendance: 10] Total Credits: [5(Th)+1(Tu)]=6	***Film Theories & Study of Bengali Cinema***	□ Introduction to several film theories □ Knowledge about Bengali Cinema □ Practical application of film theories.
DSE B1 (Semester VI) Total Marks: 100 [Theory (Th)	***Globalisation & Bollywood, Study of Iranian Cinema***	□ Knowledge about the economic and aesthetic effect of Globalisation on the largest film industry of the country.
50 + Practical (Pr) 30 + Internal Assessment 10 + Attendance: 10] Total Credits: [4(Th)+2(Pr)]=6		□ Introduction to the uniqueness of Iranian cinema. □ Knowledge about Practical film making.
DSE B2 (Semester VI) Total Marks: 100 [Theory (Th) 50 + Practical (Pr) 30 + Internal Assessment 10 + Attendance: 10] Total Credits: [4(Th)+2(Pr)]=6	***Censorship & Study of Latin American Cinema***	□ Understanding the relevance of Censorship and its complexity. □ Introduction to the uniqueness of Latin American cinema. □ Knowledge about Practical film making.

SEC A1 (Semester III/V) Total Marks: 100 [Theory (Th) 80 + Internal Assessment 10+Attendance: 10] Total Credits: 2	***Script Writing & Film Analysis***	Knowledge about Writing Scripts of Feature and Documentary films. Understanding the process of film analysis. Knowhow of writing film review.
SEC A2 (Semester III/V) Total Marks: 100 [Theory (Th) 80 + Internal Assessment 10+Attendance: 10] Total Credits: 2	***Film Marketing and Distribution***	Understanding the Film Business in real term. Knowledge on film marketing and distribution of film.
SEC B1 (Semester IV/VI) Total Marks: 100 [Theory (Th) 80 + Internal Assessment 10+Attendance: 10] Total Credits: 2	***Videography & Editing***	Understanding Videography & its basic concept. Understanding Film Editing & its basic concept.
SEC B2 (Semester IV/VI) Total Marks: 100 [Theory (Th) 80 + Internal Assessment 10+Attendance: 10] Total Credits: 2	***Cinema, Other Media & Animation***	Understanding the inter-relationship between Film, TV and Web World. Knowledge about Animation film making.

DEPARTMENT OF COMMERCE

Programme specific outcomes:

We know that B. Com. is an undergraduate Programme offering Four Year Honours with Research/without Research and Three-Year Multidisciplinary options under the Credit and Curriculum Framework (CCF) of the New Education Policy (NEP). The Four-Year Honours with Research/without Research option is meant for advanced level students who aim either for higher studies/professional studies or for research in commerce or allied fields. The three-Year Multidisciplinary option is suitable for those students who are academically not that advanced as well as for those who prefer to get jobs rather than going for higher studies.

The B. Com. Programme of the University of Calcutta deals with the study of accounting and finance, economics, business policy and ethics, corporate management and governance, business laws, taxation, etc. Hence students pursuing B. Com. have a golden chance to get jobs in a wide variety of business and industry, and to become entrepreneurs as well.

They have, in particular, the following opportunities:

- Students of this course acquire the fundamental knowledge on an array of subjects like accounting, finance, auditing, taxation, economics, management, business communication, business laws, entrepreneurship, economics, business ethics, applications of mathematics and statistics in business and commerce, marketing, human resource, e-commerce, basics of information technology, etc.

With this background, a student can either pursue higher studies (post-graduation and research) to become an academician, or can opt for statutory professions like chartered accountancy or company secretaryship, or even become a business entrepreneur.

- Many Commerce students take up professional courses like chartered accountancy (CA), company secretaryship (CS), or cost and management accountancy (CMA). There is a high demand for such professionals in the country both in the corporate as well as non-corporate sector. Moreover, acquiring these qualifications, opens up the prospect for independent practice.

- Commerce graduates can also pursue globally recognized and reputed overseas professional courses like CMA from the UK, ACCA and CA from the UK, and CPA and CFA from the USA.

- A large number of Commerce graduates opt for Business Management or Business Administration (MBA) courses to acquire coveted knowledge and skill for entering managerial jobs with good pay in the corporate sector.

- A career in Law in general and Company Law in particular, is also quite a promising option for Commerce graduates.

- Only commerce graduates can apply for entering specialized government jobs as gazette officers in central or state Audit and Accounts Services.

- Conceptual understanding of the underpinnings of financial and cost accounts, financial management, direct and indirect tax system, company law provisions, auditing procedure, statistical applications, and marketing concepts help to acquire the practical skills to work as tax consultant, auditor, management consultant, financial expert, stock market analyst and similar other support services.

COURSE SPECIFIC OUTCOMES (CSO) OF B. COM. HONOURS

SEMESTER I:

GE 1.1 Chg Module I

Microeconomics

CO1_Students will understand various concepts related to the law of demand and supply and measurement of elasticity. Also they will learn how a consumer will allocate his income among goods and services to maximize utility

CO2_They will be familiarized with the concepts and theory of production and cost along with profit maximization objective on the part of producer

CO3_Students will be able to analyse the perfectly competitive market structure and equilibrium output determination under short run as well as long run equilibrium conditions

GE 1.1 Chg Module II

Statistics

CO1_To gain in depth knowledge and understanding of the concept and scope of statistics

CO2_To understand and apply the measures of Central Tendency like Arithmetic Mean, Geometric Mean and Harmonic Mean

CO3_To understand the concept of measures of dispersion, including absolute version and relative version

CO4_To gain a thorough knowledge about Moments, Skewness and Kurtosis

CO5_To know how to apply statistical methods in other relevant areas

CC 1.1 Chg

Business Laws

CO1_To gain understanding of the various legal and regulatory rules covered in the course and the respective rights and obligations created under these

CO2_To apply basic legal knowledge to business transactions

CO3_To gain a clear understanding of the legal environment of business

CO4_To communicate effectively using standard business and legal terminology

CC 1.2 Chg

Principles of Management

CO1_Students will have an overall idea about various concepts of management and the historical development of different schools of management

CO2_Students will have a detailed idea on the concepts of planning, organizing, directing and staffing

CO3_Students will be able to conceptualize the concepts of motivation, control and coordination

CC 1.1 Ch

Financial Accounting I

CO1_Students will have an overall impression about Accounting

CO2_Students will be able to learn about the preparation of Balance Sheet

CO3_Students will be able to understand accounting concepts and conventions

SEMESTER II:

GE 2.1 Chg Module I

e-Commerce

CO1_Students will gather knowledge about the emergence of digital economy and its governing characteristics

CO2_Students will understand the ways in which e-commerce is conducted in virtual space

CO3_Students will become proficient in conducting and facilitating economic transactions in the digital space

CO4_Students will understand the features of websites and the tools used to build an e-commerce website

GE 2.1 Chg Module II

Business Communication

CO1_Students will understand the concepts, elements and barriers to communication

CO2_Students will learn the types and tools of communication

CO3_Students will master the skills of drafting letters, notices, agenda, minutes etc.

CC 2.1 Chg

Company Law

CO1_Students will acquire functional knowledge about the laws governing the world of trade, industry and Commerce

CO2_Students will understand the legal framework within which commercial activities must be restricted, the protection such laws provide and the penalties that have to be borne in case of their breach

CO3_Students will understand the legal principles and the fountainheads from which the specific commercial laws have evolved and become well-versed about their general applicability

CC 2.2 Chg Module I

Marketing Management

CO1_Students will learn the basic concepts and the principles governing the art and science of marketing management

CO2_Students will develop the skill sets required for converting and actualizing a sale
CO3_Acquire practical knowledge about marketing and getting a domain view of the process

CC 2.2 Chg Module II

Human Resource Management

CO1_Students will understand the dynamics of human relations, especially in workplace
CO2_Students will acquire adequate knowledge about the legal and procedural inputs required to manage humans as valuable resource in the business entity.
CO3_Students will be equipped with practical knowledge to maintain good interpersonal relationships to channelize all energies towards fulfilment of common goals

CC 2.1 Ch

Cost and Management Accounting I

CO1_Students will gather knowledge on the importance and efficacies of costing as a prime mover in the world of trade, commerce and industry
CO2_Students will understand how various cost inputs are factored in, calculated and realised in the production process, down to the final pricing
CO3_Students will acquire workable knowledge about the calculation of costs and thereby maximize the stated outcomes for which the particular enterprise is run

SEMESTER III:

SEC 3.1 Chg Module I

Information Technology & Its Application in Business (Theory)

CO1_Students will develop an overall impression regarding various concepts related to Information Technology, their implementation and usage.
CO2_Students will gain extensive knowledge about networking, threats, e-security and relatedlegal regulations applicable.

SEC 3.1 Chg Module II

Information Technology & Its Application in Business (Practical)

CO1_Students will get working knowledge on Information Technology – the different facets of IT that are ushering in a tectonic shift in the world and the ways they are impacting

businesses.

CO2_Students will be well versed with the different technological advancements that are now finding place in the commercial environment and will acquire the ability to use them for enhancing the overall effectiveness of the enterprise.

GE 3.3 Chg Module I

Business Mathematics

CO1_Students will be able to state possible number of arrangements and selection of things under different conditions

CO2_Students will be able to solve numerical problem related to set theory using Venn Diagram.

CO3_Students will be able to generalize the binomial theorem for any integral power in the expansion.

CO4_Students will be able to convert exponent to logarithm and vice versa.

CO5_Students will be able to calculate amount, interest and time period related problem on annuities and compound interest.

GE 3.3 Chg Module II

Statistics

CO1_Students will be able to find correlation between two variables.

CO2_Students will be able to solve different problem related to regression.

CO3_Students will be able to evaluate cost of living index.

CO4_Students will be able to plan an investigation and display time series distribution.

CO5_Students will be able to apply key concept of probability and conditional probability.

CC 3.1 Ch

Financial Accounting II

CO1_Students will be well versed with the different laws governing partnerships in relation to their accounting needs

CO2_Students will be able to prepare branch accounts and to understand the expansion led to the concept of development of branch

CO3_Students will be conversant with both hire purchase and instalment payment systems.

CO4_Students will be able to understand the departmental Trading Profit & Loss Account and Balance Sheet in present competitive business environment.

CO5_Students will be able to understand the accounting for investments, governed by theprovisions set out in AS-13 “Accounting for Investments” issued by ICAI.

CO6_Students will gather knowledge about how partnership can be converted into limited company and pre and post effect of profit.

CC 3.2 Ch

Indian Financial System

CO1_Students will gather knowledge on financial system and financial markets in India.

CO2_Knowledge on commercial bank and other financial institutions in India

CO3_Idea about fundamentals of financial services and players in financial sectors of SEBI

SEMESTER IV:

GE 4.1 Chg Module I

Microeconomics - II

CO1_Students will be able to understand and analyse the monopoly market structure along with the derivation of market equilibrium

CO2_In this unit students will be able to understand the features of two more market structures viz. monopolistic competition and oligopoly which are imperfect in nature. Here students will also analyse the oligopoly market with the help of Sweezy’s Kinky Demand Curve Model

CO3_Students will be able to analyse how factors are determined using various theories related to rent, wage, interest and profit.

GE 4.1 Chg Module II

Indian Economy

CO1_Students will be able to understand various concepts and measures related to development and underdevelopment. They will also learn about various aspects of National Income.

CO2_Here students will be able to analyse the sectoral distribution of National Income and Occupational Structure along with its change during post-reform period and issues related to service-led growth.

CO3_Students will be able to analyse sector-wise trend, problems and reforms related to major sectors agriculture, industry, service and external sectors.

CO4_Students will be able to understand problem of poverty and the measures related to alleviation of poverty. They will also learn about the problems of unemployment and remedial measures.

CC 4.1 Chg Module I

Entrepreneurship Development

CO1_Students will learn about the role of different financial institutions in the economy.

CO2_Students will be able to comprehend the role of family business in India.

CO3_Students will be able to write business proposals/plans.

CO4_Students will be able to identify resources for start-ups.

CO5_Students will be able to understand different financial aspects in the current scenario.

CO6_Students will be able to comprehend and appreciate the spirit of entrepreneurship

CC 4.1 Chg Module II

Business Ethics

CO1_Students will understand the importance of ethical conduct in business

CO2_Students will acquire skills which will help them to recognize and resolve ethical issues in business

CO3_The ethical dimension of decision making will reflect on them in workplace.

CO4_Students will be able to identify key organizational tools, policies, systems, and laws that apply to managing ethical conduct specifically in the business environment.

CO5_Students will be able to prioritize personal and organizational values to make ethical decisions.

CC 4.1 Ch

Taxation I

CO1_Students will be imparted with basic knowledge about relevant taxation terminologies

CO2_Students will master application of analytical skills in computation of various heads ofincome and ascertainment of taxable income r e g a r d i n g pertinent taxation provisions.

CO3_Students will be imparted practical knowledge related to application of various aspects of direct taxation.

CC 4.2 Ch

Cost and Management Accounting II

CO1_Conversant with the joint production process, the allocation of joint product costs according to the benefits-received approaches and the relevant market value approaches, themethods of accounting for by-products and the ascertainment of cost after separation.

CO2_The students will be able to distinguish between traditional overhead rates and activity-based overhead rates and also, they will be able to recognize the suitable allocation treatment.

CO3_Evaluation of adverse and favourable variations

CO4_Managerial decision making like preparation of different types of budget, application limiting factor, make or buy through marginal costing technique.

SEMESTER V:

CC 5.1 Ch

Auditing and Assurance

CO1_Students will come to know why an independent examination of books of financial accounts is essential.

CO2_Students will come to know about the various procedures and techniques that are to befollowed to conduct an audit

CO3_Students will understand about the risks which may still remain even after detailed checking and how to consider the same while auditing.

CO4_Students will come to know how the findings have to be reported in the form of Audit Report and how to provide Audit Certificates.

CO5_Students will know about the different kinds of Audit that can be done and its importance

CC 5.2 Ch

Taxation II

CO1_Students will master application of analytical skills in ascertainment of taxable income and computation of tax liability.

CO2_Students will be imparted with basic and practical knowledge about the provisions for filing and assessment of return. Basic knowledge about total tax, interest and fee payable under IT Act would also be imparted.

CO3_Students will be imparted with basic knowledge about relevant terminologies under current indirect tax regime.

CO4_Students will be imparted with basic knowledge and application of relevant terminologies under GST law.

CO5_Students will master application of analytical skills in computation of Input and Output Tax and application of Input tax credit mechanism. The basic knowledge about Composition Scheme would also be imparted.

CO6_Students will be imparted basic and practical knowledge about the pertinent taxation provisions with regards to Customs.

DSE 5.1A1

Macroeconomics

CO1_Students will understand the basic concepts of macroeconomics with particular emphasis on the various concepts of national income accounting along with their measurement method.

CO2_Students will learn to determine the equilibrium output and income by using the concepts of consumption, investment and saving and analyse the same in money market and commodity market under monetary as well as fiscal policies.

CO3_Students will study the various functions of money along with various theories associated with demand for money and supply of money and concepts and impact of inflation on the economy and unemployment.

DSE 5.1A2

Advanced Business Mathematics

CO1_Students will be able to understand about the domain and Range. They will be able to understand the dependence of one quantity over the other, that is, the relationship between 'x' and f(x). They will learn to analyse graphs. For understanding Calculus, the students need to understand this topic. Students will learn to find the limits and continuity of various functions like exponential, logarithmic, sine, cosine, etc.

CO2_The students will learn about differentiating by the first principle and by the formulas. They will learn why and where differentiation is used in real life. Integration helps the students to find out the area under a curve volume. Students will learn to integrate the different functions with the help of the formulae. They can understand that integration is the

inverse of differentiation.

CO3_Students will be able to apply the practical application of Derivatives. They understand the concept of maxima and minima. They can find out the profit and loss in business.

CO4_Students learn about the various properties of Determinants. They understand the method of finding out the Determinant with expanding and without expanding too.

CO5_Students learn about the types of matrices, arithmetic operations like addition, subtraction, multiplication, scalar multiplication.

DSE 5.2A

Corporate Accounting

CO1_Students will be well-versed with issue and forfeiture of shares and debentures as well as provisions of buy back and redemption of shares.

CO2_Students will be well-versed with preparation of company final accounts, statement of profit and loss and balance sheet.

CO3_Students will be well-versed with provisions of redemption of debentures.

CO4_Students will be well-versed with different methods of valuation of shares and goodwill.

CO5_Students will be well-versed with provisions of amalgamation in the nature of merger and purchase and learn about internal reconstruction.

SEMESTER – VI

SEC 6.1 Chg

Computerized Accounting System and e-filing of Tax Returns

CO1_Students will gain in depth knowledge of the accounting software applications, word processing, and spreadsheet.

CO2_Students will be able to establish company records, maintain daily transactions using the general ledger, accounts payable, accounts receivable, inventory, account reconciliation and payroll and create financial statements.

CO3_Students will be equipped with knowledge about the Indian Taxation System and enhance their skills in the field of Taxation and online filing of tax returns.

CC 6.1 Ch

Project Work

CO1_To instill among the students the basic knowledge and spirit of entrepreneurship.

CO2_Students will be encouraged to undertake independent research projects which can add value to society

CO3_To give a thorough understanding of different financial aspects in the current scenario

CO4_To develop oral communication skills of the students.

CO5_To encourage students to understand the practical aspects of trade industry and commerce.

DSE 6.1A

Financial Reporting and Financial Statement Analysis

CO1_The students will be able to identify and understand different tools like Ratio analysis, comparative and common size income statement and balance sheet and cash flow statement

CO2_The students will understand the accounting concepts and conventions.

CO3_The students will be able to know about the issues of ethics sustaining true financial reporting of company assets, liabilities and profits.

DSE 6.2A

Financial Management

CO1_Developing basic knowledge of the students about the elementary concepts of finance, role and techniques of financial management with an insight into various decisions of the management.

CO2_Understanding the role and responsibilities of the financial manager and corporate financial activities

CO3_Developing concepts relating to management of finance, processing of financial information for the management decision-making in key areas like working capital management, capital budgeting decisions, dividend policy, etc.

COURSE SPECIFIC OUTCOMES (CO) OF B. COM. GENERAL

SEMESTER I:

GE 1.1 Chg Module I

Microeconomics

CO1_Students will understand various concepts related to the law of demand and supply and measurement of elasticity. Also, they will learn how a consumer will allocate his income among goods and services to maximize utility

CO2_They will be familiarized with the concepts and theory of production and cost along with profit maximization objective on the part of producer

CO3_Students will be able to analyse the perfectly competitive market structure and equilibrium output determination under short run as well as long run equilibrium condition

GE 1.1 Chg Module II

Statistics

CO1_To gain in depth knowledge and understanding of the concept and scope of statistics

CO2_To understand and apply the measures of Central Tendency like Arithmetic Mean, Geometric Mean and Harmonic Mean

CO3_To understand the concept of measures of dispersion, including absolute version and relative version

CO4_To gain a thorough knowledge about Moments, Skewness and Kurtosis

CO5_To know how to apply statistical methods in other relevant areas

CC 1.1 Chg

Business Laws

CO1_To gain understanding of the various legal and regulatory rules covered in the course and the respective rights and obligations created under these

CO2_To apply basic legal knowledge to business transactions

CO3_To gain a clear understanding of the legal environment of business

CO4_To communicate effectively using standard business and legal terminology

CC 1.2 Chg

Principles of Management

CO1_Students will have an overall idea about various concepts of management and the historical development of different schools of management

CO2_Students will have a detailed idea of the concepts of planning, organizing, directing and staffing

CO3_Students will be able to conceptualize the concepts of motivation, control and coordination

CC 1.1 Cg

Financial Accounting I

CO1_Students will have an overall impression about Accounting

CO2_Students will be able to learn about the preparation of Balance Sheet

CO3_Students will be able to understand accounting concepts and conventions

SEMESTER II:

GE 2.1 Chg Module I

e-Commerce

CO1_Students will gather knowledge about the emergence of digital economy and its governing characteristics

CO2_Students will understand the ways in which e-commerce is conducted in virtual space

CO3_Students will become proficient in conducting and facilitating economic transactions in the digital space

CO4_Students will understand the features of websites and the tools used to build an e-commerce website

GE 2.1 Chg Module II

Business Communication

CO1_Students will understand the concepts, elements and barriers to communication

CO2_Students will learn the types and tools of communication

CO3_Students will master the skills of drafting letters, notices, agenda, minutes etc.

CC 2.1 Chg

Company Law

CO1_Students will acquire functional knowledge about the laws governing the world of trade, industry and Commerce

CO2_Students will understand the legal framework within which commercial activities must be restricted, the protection such laws provide and the penalties that have to be borne in case of their breach

CO3_Students will understand the legal principles and the fountainheads from which the specific commercial laws have evolved and become well versed about their general applicability

CC 2.2 Chg Module I

Marketing Management

CO1_Students will learn the basic concepts and the principles governing the art and science of marketing management

CO2_Students will develop the skill sets required for converting and actualizing a sale

CO3_Acquire practical knowledge about marketing and getting a domain view of the process

CC 2.2 Chg Module II

Human Resource Management

CO1_Students will understand the dynamics of human relations, especially in the work place

CO2_Students will acquire adequate knowledge about the legal and procedural inputs required to manage humans as valuable resource in the business entity.

CO3_Students will be equipped with practical knowledge to maintain good interpersonal relationships so as to channelise all energies towards fulfilment of common goals

CC 2.1 Cg

Cost and Management Accounting I

CO1_Students will gather knowledge on the importance and efficacies of costing as a prime mover in the world of trade, commerce and industry

CO2_Students will understand how various cost inputs are factored in, calculated and realised in the production process, down to the final pricing

CO3_Students will acquire workable knowledge about the calculation of costs and thereby

maximize the stated outcomes for which the particular enterprise is run

SEMESTER III:

SEC 3.1 Chg Module I

Information Technology & Its Application in Business (Theory)

CO1_Students will develop an overall impression regarding various concepts related to Information Technology, their implementation and usage.

CO2_Students will gain extensive knowledge about networking, threats, e-security and related legal regulations applicable.

SEC 3.1 Chg Module II

Information Technology & Its Application in Business (Practical)

CO1_Students will get working knowledge on Information Technology – the different facets of IT that are ushering in a tectonic shift in the world and the ways they are impacting businesses.

CO2_Students will be well versed with the different technological advancements that are now finding place in the commercial environment and will acquire the ability to use them for enhancing the overall effectiveness of the enterprise.

GE 3.3 Chg Module I

Business Mathematics

CO1_Students will be able to state possible number of arrangements and selection of things under different conditions

CO2_Students will be able to solve numerical problem related to set theory using Venn Diagram.

CO3_Students will be able to generalize the binomial theorem for any integral power in the expansion.

CO4_Students will be able to convert exponent to logarithm and vice versa.

CO5_Students will be able to calculate amount, interest and time period related problem on annuities and compound interest.

GE 3.3 Chg Module II

Statistics

CO1_Students will be able to find correlation between two variables.

CO2_Students will be able to solve different problem related to regression.

CO3_Students will be able to evaluate cost of living index.

CO4_Students will be able to plan an investigation and display time series distribution.

CO5_Students will be able to apply key concept of probability and conditional probability.

CO4_Students will be able to understand the departmental Trading Profit & Loss Account and Balance

CC 3.1 Cg

Financial Accounting II

CO1_Students will be well versed with the different laws governing partnerships in relation to their accounting needs

CO2_Students will be able to prepare branch accounts and to understand the expansion lead to the concept of development of branch

CO3_Students will be conversant with both hire purchase and instalment payment systems.

CO4_Students will be able to understand the departmental Trading Profit & Loss Account and Balance Sheet in present competitive business environment.

CO5_Students will be able to understand the accounting for investments, governed by the provisions set out in AS-13 "Accounting for Investments" issued by ICAI.

CO6_Students will gather knowledge about how partnership can be converted into limited company and pre and post effect of profit.

SEMESTER IV:

GE 4.1 Chg Module I

Microeconomics - II

CO1_Students will be able to understand and analyse the monopoly market structure along with the derivation of market equilibrium

CO2_In this unit students will be able to understand the features of two more market structures viz. monopolistic competition and oligopoly which are imperfect in nature. Here students will also analyse the oligopoly market with the help of Sweezy's Kinky Demand Curve Model

CO3_Students will be able to analyse how factors are determined using various theories related

to rent, wage, interest and profit

GE 4.1 Chg Module II

Indian Economy

CO1_Students will be able to understand various concepts and measures related to development and underdevelopment. They will also learn about various aspects of National Income.

CO2_Here students will be able to analyse the sectoral distribution of National Income and Occupational Structure along with its change during post-reform period and issues related to service-led growth.

CO3_Students will be able to analyse sector-wise trend, problems and reforms related tomajor sectors agriculture, industry, service and external sectors.

CO4_Students will be able to understand problem of poverty and the measures related to alleviation of poverty. They will also learn about the problems of unemployment and remedial measures

will master application of analytical skills in computation of various heads ofincome & ascertainment of taxable income with reference to pertinent taxation provisions.

CC 4.1 Chg Module I

Entrepreneurship Development

CO1_Students will learn about the role of different financial institutions in the economy.

CO2_Students will be able to comprehend the role of family business in India.

CO3_Students will be able to write business proposals/ plans.

CO4_Students will be able to identify resources for start-ups.

CO5_Students will be able to understand different financial aspects in the current scenario.

CO6_Students will be able to comprehend and appreciate the spirit of entrepreneurship

CC 4.1 Chg Module II

Business Ethics

CO1_Students will understand the importance of ethical conduct in business

CO2_Students will acquire skills which will help them to recognize and resolve ethical issues in business

CO3_The ethical dimension of decision making will reflect on them in workplace.

CO4_Students will be able to identify key organizational tools, policies, systems, and laws that apply to managing ethical conduct specifically in the business environment.
CO5_Students will be able to prioritize personal and organizational values to make ethical decisions.

CC 4.1 Cg

Taxation I

CO1_Students will be imparted with basic knowledge about relevant taxation terminology
CO2_Students will master application of analytical skills in computation of various heads of income and ascertainment of taxable income with reference to pertinent taxation provisions.
CO3_Students will be imparted practical knowledge related to application of various aspects of direct taxation.

CC 4.2 Cg

Cost and Management Accounting II

CO1_Conversant with the joint production process, the allocation of joint product costs according to the benefits-received approaches and the relevant market value approaches, the methods of accounting for by-products and the ascertainment of cost after separation.
CO2_The students will be able to distinguish between traditional overhead rates and activity-based overhead rates and also, they will be able to recognize the suitable allocation treatment.
CO3_Evaluation of adverse and favourable variations
CO4_Managerial decision making like preparation of different types of budget, application limiting factor, make or buy through marginal costing technique.

SEMESTER V:

CC 5.1 Cg

Auditing and Assurance

CO1_Students will come to know why an independent examination of books of financial accounts is essential.
CO2_Students will come to know about the various procedures & techniques that are to be followed to conduct an audit
CO3_Students will understand about the risks which may still remain even after detailed checking and how to consider the same while auditing.

CO4_Students will come to know how the findings have to be reported in the form of Audit Report and how to provide Audit Certificates.

CO5_Students will know about the different kinds of Audit that can be done and its importance

CC 5.1A

Taxation II

CO1_Students will master application of analytical skills in ascertainment of taxable income and computation of tax liability.

CO2_Students will be imparted with basic and practical knowledge about the provisions for filing and assessment of return. Basic knowledge about total tax, interest and fee payable under IT Act would also be imparted.

CO3_Students will be imparted with basic knowledge about relevant terminologies undercurrent indirect tax regime.

CO4_Students will be imparted with basic knowledge and application of relevant terminologies under GST law.

CO5_Students will master application of analytical skills in computation of Input and Output Tax and application of Input tax credit mechanism. The basic knowledge about Composition Scheme would also be imparted.

CO6_Students will be imparted basic and practical knowledge about the pertinent taxation provisions with regards to Customs.

DSE 5.2A

Corporate Accounting

CO1_Students will be well-versed with issue and forfeiture of shares and debentures as well as provisions of buy back and redemption of shares.

CO2_Students will be well-versed with preparation of company final accounts, statement of profit and loss and balance sheet.

CO3_Students will be well-versed with provisions of redemption of debentures.

CO4_Students will be well-versed with different methods of valuation of shares and goodwill.

CO5_Students will be well-versed with provisions of amalgamation like merger and purchase and learn about internal reconstruction.

SEMESTER – VI

SEC 6.1 Chg

Computerized Accounting System and e-filing of Tax Returns

CO1_Students will gain in depth knowledge of the accounting software applications, word processing, and spreadsheet.

CO2_Students will be able to establish company records, maintain daily transactions using the general ledger, accounts payable, accounts receivable, inventory, account reconciliation and payroll and create financial statements.

CO3_Students will be equipped with knowledge about the Indian Taxation System and enhance their skills in the field of Taxation and online filing of tax return.

DSE 6.1A

Financial Reporting and Financial Statement Analysis

CO1_The students will be able to identify and understand different tools like Ratio analysis, comparative and common size income statement and balance sheet and cash flow statement

CO2_The students will understand the accounting concepts and conventions.

CO3_The students will be able to know about the issues of ethics sustaining true financial reporting of company assets, liabilities and profits.

DSE 6.2A

Financial Management

CO1_Developing basic knowledge of the students about the elementary concepts of finance, role and techniques of financial management with an insight into various decisions of the management.

CO2_Understanding the role and responsibilities of the financial manager and corporate financial activities

CO3_Developing concepts relating to management of finance, processing of financial information for the management decision-making in key areas like working capital management, capital budgeting decisions, dividend policy, etc.

DEPARTMENT OF CHEMISTRY

CHEMISTRY HONOURS (B.SC.) UNDER CBCS

Course Outcomes

Semester	Course Code	Course Outcomes
SEM - 1	*CC-1 (INORGANIC & ORGANIC CHEMISTRY)*	• To know extra nuclear structure of atom • To understand acid base reactions in Inorganic Chemistry • To know the basic concepts of redox reactions • To understand the basic concepts of organic chemistry based on chemical bonding and physical properties • To learn the basic reaction mechanism of Organic Chemistry • To study the estimation of ions or salts by acid-base titration method and oxidation-reduction titration method by hand-on practical • To learn experimentally about the separation of compounds from a solid binary mixture by using common laboratory reagents
	CC-2 (PHYSICAL & ORGANIC CHEMISTRY)	• To understand the basic concept of kinetic theory of gases and know how to solve numerical problems related to that topic. • To learn the transport processes of liquids and gases. • To understand the kinetics of the reactions • To learn the basic concepts of Stereochemistry of Organic molecules • To study about the formation and stability of reaction intermediates • To study the kinetics of decomposition of H_2O_2, acid-catalyzed hydrolysis of methyl acetate, viscosity measurement of unknown liquids, measurement of solubility of sparingly soluble salts.
		• To know experimentally how to determine the boiling points of organic liquid compounds.

SEM - 2	***CC-3 (ORGANIC CHEMISTRY)***	• To learn stereochemistry of chiral compounds arises due to presence of chiral-axis; concept of PR stereoisomerism and study of conformational analysis of some acyclic organic molecules. • To understand reaction kinetics, reaction thermodynamics and tautomerism of organic compounds. • To know reaction mechanisms of nucleophilic substitution reactions and elimination reactions. • To learn experimentally how to synthesize, calculate the yield percentage and determine melting point of pure organic compounds in the laboratory.
	CC-4 (INORGANIC CHEMISTRY)	• To learn about the basic concepts and types of chemical bonding, laws, rules and equations for formation of chemical bonds, solubility, hybridization and dipole moment of molecules. • To study the modern approaches of chemical bonding (Molecular Orbital Theory, Metallic Bonding concept, Role of weak intermolecular forces). • To understand about the concept of radioactivity and radioactive compounds, nuclear reactions, artificial radioactivity, radio carbon dating, hazards of radiation and safety measures. • To know experimentally how to estimate the percentage of chlorine in bleaching powder; vitamin C; arsenic and antimony in a sample by iodometric titration method. Students can also learn how to estimate Cu in brass, Cr and Mn in steel and Fe in cement.

SEM - 3	**CC-5 (PHYSICAL CHEMISTRY)**	• To learn in detail about the first and second laws of Chemical Thermodynamics and the related terms; to get idea about thermo-chemistry and thermodynamic relationships and system of variable compositions. • To gain vast knowledge on chemical equilibrium and electrochemistry. • To learn experimentally how to do the potentiometric and conductometric titrations of different compositions, determine the Ka of weak acid and heat of neutralization of a strong acid by a strong base.
	CC-6 (INORGANIC CHEMISTRY)	• To study in detail about modern periodic table, physical and chemical properties of the elements along a group or period, factors influence those properties, relativistic effects and inert pair effect. • To study the chemistry of s and p block elements including noble gases and compounds in detail. • To learn about inorganic polymers in detail. • To know the meaning of various terms involved in co-ordination chemistry, Werner's theory for complex formation, structural and stereoisomerism of co- ordination complexes. • To learn the complexometric and gravimetric estimation of different ions, chromatographic separation of (i) Ni (II) and Cu (II) ions, (ii) Fe (III) and Al (III) ions.
	CC-7 (ORGANIC CHEMISTRY)	• To learn in detail about the synthesis, properties, and reaction mechanisms of alkenes and alkynes • To understand about different types of electrophilic and nucleophilic aromatic substitution reactions, reaction intermediates and their mechanisms. • To study the properties and reactions of carbonyl compounds and corresponding reaction mechanisms. • To learn preparations, reactions and corresponding reaction mechanisms of organometallic compounds.

		• To study experimentally the qualitative detection solid and liquid organic compounds. • To learn experimentally the quantitative estimation of some organic compounds by titration method.
	SEC-A	**SEC-A-2. ANALYTICAL CLINICAL BIOCHEMISTRY** • Helps to understand about the preparation, structures, reactions and biological importance of carbohydrates, proteins, enzymes, lipids and lipoproteins. • To know the biochemistry of different diseases through a diagnostic approach by blood and urine analysis.
SEM - 4	**CC-8 (ORGANIC CHEMISTRY)**	• To understand in detail about the synthesis, separation, properties, identification, chemical reactions and their corresponding mechanism of nitrogen containing compounds. • Discussion about different kinds of rearrangement reactions. • Helps to know the logic of organic synthesis • To study UV-Visible, IR and ^{1}H NMR spectroscopy Helps to know experimentally the qualitative analysis of single solid organic compounds and know to prepare derivatives of functional groups.
	CC-9 (PHYSICAL CHEMISTRY)	• Helps to understand about the applications of Thermodynamics in Colligative Properties and Phase Equilibrium • To study the fundamentals of Quantum Mechanics • Helps to know the Bravais Lattice and Laws of Crystallography, Crystal Planes and Specific Heat of Solid • To know experimentally how to study phase diagram of a Phenol-Water system, kinetic study of inversion of cane sugar, determination of partition co-efficient value, pH of an unknown solution and • pH metric titration of an acid against strong base.

	CC-10 (INORGANIC CHEMISTRY)	• Helps to understand about the structures, stability, colour, magnetism and Orgel diagram of the co-ordination compounds on the basis of modern concepts of chemical bonding. • to study the chemical and physical properties of d and f Block elements and their compounds. • To learn the reaction kinetics and mechanisms of inorganic reactions. • To study experimentally how to synthesize inorganic complexes and determine the λ_{max} values of inorganic complexes. • To calculate the 10Dq value by spectrophotometric method.
	SEC - B	• **SEC-B-3. PHARMACEUTICALS CHEMISTRY** • Helps to understand about the drug discovery, design and development of representative drugs of the following classes: Antipyretic, Analgesics, Anti- inflammatory, Anti-bacterial, Antifungal, Antiviral, Antibiotics, Anti-leprosy, Central Nervous System agents, HIV-AIDS related drugs • To know about aerobic and anaerobic fermentation, importance of Vitamins and Amino acids, synthesis of Penicillin, Cephalosporin, Chloromycetin, Streptomycin and their role as an antibiotic. • **SEC-B-4. PESTICIDE CHEMISTRY** • Helps to understand about the preparation, structures, properties, reactions, benefits and adverse effects of pesticide compounds
	CC-11 (PHYSICAL CHEMISTRY)	• Helps to understand the fundamental concept, basic terms, derivation and application of Quantum Mechanics • To know about the necessary laws, rules, terms, expressions and derivations statistical thermodynamics

SEM-5		• To learn laws, rules and equations for numerical analysis of Roots of Equation and Least-Squares Fitting. • To study about the Computer Programming on Roots of equation, Numerical differentiation and Numerical integration.
	CC-12 (ORGANIC CHEMISTRY)	• To learn in detail about the synthesis, properties, chemical reactions and reaction mechanisms of polynuclear hydrocarbons and their derivatives. • To study the chemical reactions, properties and synthesis of heterocyclic compounds. • To know in detail about the stereochemistry, properties and chemical reactions of alicyclic compounds. • To learn the mechanism, stereochemistry and regioselectivity of pericyclic reactions. • Helps to understand about the classification, structure, properties, reactions and use of carbohydrate molecules. • Deals with the synthesis, structure, properties, chemical and biological reactions of amino acids, peptides and nucleic acids. • To learn experimentally how to separate molecules by chromatographic methods To study how to analyze the Organic compounds by spectroscopic techniques.
	DSE	• **A-2. APPLICATIONS OF COMPUTERS IN CHEMISTRY** • Helps to understand about the basics of computer programming (FORTRAN), creating and application of spreadsheet software (MS Excel) Helps to know about statistical data analysis. • To learn how to prepare graphs by using spreadsheet, help to determine vapour pressure, rate constant, equilibrium constant, molar extinction coefficient value, concentration of ions at equilibrium and molar enthalpy of vapourisation. • To study about the Acid-Base Titration Curve, Plotting of First and Second derivative Curve for

		pH metric and Potentiometric titrations, Calculation and Plotting of a Precipitation Titration Curve with MS Excel, Michaelis-Menten Kinetics for Enzyme Catalysis using Linear and Non - Linear Regression. **B-1. INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE** • Helps to understand about the manufacture, properties, compositions, classes and applications of industrially important materials such as ceramics, glasses, cements, fertilizers, surface coating materials and batteries. • To know about alloys, manufacture of steel, composition and properties of different types of steels. • To learn about the general principles, properties, classification, industrial use, deactivation and regeneration of catalysis. • Helps to understand about the preparation and explosive properties of organic and inorganic explosives and the basic idea of rocket propellant. • To learn how to analyze the composition of cement, composition of percentage of metals in alloy, electroless metallic coatings on ceramic and plastic. • To know how to determine free acidity in ammonium sulphate fertilizer, estimation of Calcium in Calcium ammonium nitrate fertilizer and phosphoric acid in superphosphate fertilizer. •

	CC-13 (PHYSICAL CHEMISTRY)	• To study the Theoretical Principles in Qualitative Analysis • To learn about Bioinorganic Chemistry and Organometallic Chemistry • To know about the catalytic role of organometallic compounds in different types of industrial processes. • To study experimentally the qualitative detection of known and unknown radicals and insoluble materials in a mixture.
SEM VI	**CC-14 (INORGANIC CHEMISTRY)**	• To learn in detail about molecular spectroscopy. • To understand about the basic principles and laws of Photochemistry and also get idea about the theory of reaction rate. • To know details about surface energy and surface tension; Classification, Adsorption Isotherms and applications of Adsorption; Classification, rules and properties of Colloids. • To learn about the fundamental concepts, important equations, properties and applications of polarizability and dipole moment. • To know how to determine surface tension of a liquid; Indicator constant of an acid base indicator; pH of an unknown buffer solution and CMC of a micelle experimentally. • To study the kinetics of $K_2S_2O_8$ + KI reaction and Verification of Beer and Lambert's Law for $KMnO_4$ and $K_2Cr_2O_7$ solution experimentally

	DSE	**A-3. GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS** • To learn about green chemistry and its necessity. • To study about the principles of green chemistry and designing the green synthetic routes. • To know about the examples of green reactions and future trends in green reaction. • To learn the synthesis, psychological properties, isolaton medicinal importance and other synthetic use of terpenes and alkaloids • To learn how to perform green synthesis of a number of organic compounds in the laboratory. **B-3. POLYMER CHEMISTRY** • To learn about the history, classification and functionality of polymeric materials. • To know about the kinetics of polymerization, details on crystallization and morphology of crystalline polymers, determination of crystalline melting point of a crystalline material and the factors effecting crystalline melting point. • To understand the nature and structure of polymers, determination of molecular weight of polymers and thermodynamics of polymer solution. • To study the preparation, structure, properties and application of different types of addition and condensation polymers. • To know how to prepare polymers by using free radical polymerization, redox polymerization, interfacial polymerization, precipitation polymerization, addition polymerization and condensation polymerization process. • To learn experimentally how to characterize and analyze a polymeric compound or material.

		4. DISSERTATION • To know how to do research work and write a review article on a particular • field/topic as assigned by the supervisor/guide • To know how to present the research works or the review article.

DEPARTMENT OF COMPUTER SCIENCE

COMPUTER SCIENCE HONOURS (B.SC.)

Programme Specific Outcomes

- **PSO1.** Develop ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.
- **PSO2.** To prepare students to undertake careers involving problem solving using computer science and technologies.
- **PSO 3.** Develop ability to pursue advanced studies and research in computer science.
- **PSO 4.** To produce entrepreneurs who can innovate and develop software product.
- **PSO 5** - Apply the knowledge of mathematics, science, Computer fundamentals, and specialization to the solution of complex problems.
- **PSO 6** - Problem analysis: Identify, formulate, review research literature, and analyze complex problems reaching substantiated conclusions using first principles of mathematics, natural sciences.
- **PSO 7** - Design/development of solutions: Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PSO 8** - Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PSO 9** - Modern tool usage: Create, select, and apply appropriate techniques, resources, and IT tools including prediction and modeling to complex activities with an understanding of the limitations.
- **PSO 10** - Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional practice.
- **PSO 11** - Environment and sustainability: Understand the impact of the professional solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

✍ **PSO 12** - Ethics: Apply ethical principles and commit to professional ethics and responsibilities.

✍ **PSO 13** - Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

✍ **PSO 14** - Communication: Communicate effectively on complex activities with the community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

✍ **PSO 15** - Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Outcome

Semester I

CMS-A-CC-1-1-TH:

Digital Logic

On completion of the course students will be able to

1. Realize basic gate operations and laws Boolean algebra
2. Understand basic structure of digital computer, stored program concept and different arithmetic and control unit operations.
3. Introduce the concept of digital and binary systems 4. Be able to design and analyze combinational logic circuits.
5. Be able to design and analyze sequential logic circuits.
6. Understand the basic software tools for the design and implementation of digital circuits and systems.
7. Reinforce theory and techniques taught in the classroom through experiments and projects in the laboratory.

CMS-A-CC-1-1-P:

Practical

Digital Circuits

1. Learn the basics of gates.

2. Construct basic combinational circuits and verify their functionalities

3. Apply the design procedures to design basic sequential circuits

4. Learn about counters CO5 Learn about Shift registers CO6 To understand the basic digital circuits and to verify their operation

CMS-A-CC-1-2-TH:

Programming Fundamentals using C

The student will learn

1. To formulate simple algorithms for arithmetic and logical problems.

2. To translate the algorithms to programs (in C language).

3. To test and execute the programs and correct syntax and logical errors.

4. To implement conditional branching, iteration and recursion.

5. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.

6. To use arrays, pointers and structures to formulate algorithms and programs.

7. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.

8. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration

CMS-A-CC-1-2-P:

Practical

Programming with C

After Completion of this course the student would be able to

1. Read, understand and trace the execution of programs written in C language.

2. Write the C code for a given algorithm.

3. Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.

4. Write programs that perform operations using derived data types.

Semester II

CMS-A-CC-2-3-TH:

Data Structure

On completion of the course students will be able to

1. Differentiate how the choices of data structure & algorithm methods impact the performance of program.
2. Solve problems based upon different data structure & also write programs.
3. Identify appropriate data structure & algorithmic methods in solving problem.
4. Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing
5. Compare and contrast the benefits of dynamic and static data structures implementations.

CMS-A-CC-2-3-P:

Practical

Data Structure Lab using C

At the end of this lab session, the student will

1. Be able to design and analyze the time and space efficiency of the data structure
2. Be capable to identity the appropriate data structure for given problem
3. Have practical knowledge on the applications of data structures

CMS-A-CC-2-4-TH:

Basic Electronic Devices and Circuits

1: Ability to analyze PN junctions in semiconductor devices under various conditions.

2: Ability to design and analyze simple rectifiers and voltage regulators using diodes.

3: Ability to describe the behaviour of special purpose diodes.

4: Ability to design and analyze simple BJT and MOSFET circuits.

CMS-A-CC-2-4-P:

Practical

Basic Electronic Devices and Circuits Lab.

1. Learn the characteristics of basic electronic devices.
2. Learn the Characteristics of UJT
3. Learn the Characteristics of FET
4. Learn about Power amplifiers.
5. Learn about Differential amplifiers
6. To understand the concepts of simulation by using Spice tool

Semester III

CMS-A-CC-3-5-TH:

Computer Organization and Architecture

On completion of the course students will be able to

1. Understand basic structure of digital computer, stored program concept and different arithmetic and control unit operations.
2. Understand basic structure of different combinational circuits multiplexer, decoder, encoder etc.
3. Perform different operations with sequential circuits.
5. Understand memory and I/O operations
6. Learn pipelining concepts with a prior knowledge of stored program methods
7. Learn about memory hierarchy and mapping techniques.
8. Study of parallel architecture and interconnection network

CMS-A-CC-3-5-P:

Practical

Computer Organization Lab.

1. Analyze the behaviour of Logic Gates with the help of HDL/ VHDL.
2. Implement sequential circuits and verify the results through simulation by VHDL.
3. Design 8-bit ALU.
4. Design 24X8 RAM.
5. Design 24X8 STACK.
6. Design 8-bit processor

CMS-A-CC-3-6-TH:

Computational Mathematics

On completion of the course students will be able to.

1. Express a logic sentence in terms of predicates, quantifiers, and logical connectives.
2. Derive the solution for a given problem using deductive logic and prove the solution based on logical inference
3. Classify its algebraic structure for a given a mathematical problem,
4. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
5. Develop the given problem as graph networks and solve with techniques of graph theory 6. Understand numerical techniques to find the roots of nonlinear equations and solution of system of linear equations.
7. Understand the difference operators and the use of Interpolation.
8. .Understand numerical Differentiation and Integration and numerical solutions of ordinary and partial differential equations.

CMS-A-CC-3-6-P:

Practical

Computational Mathematics Lab.

Upon successful completion of the course, students will be able to:

1. Write computer programs to solve engineering problems with C Language
2. Implement numerical methods in C Language.
3. Analyze the stability of algorithm.
4. Analyze and evaluate the accuracy of common numerical methods.
5. Ability to use approximation algorithm in real world problem.

CMS-A-CC-3-7-TH:

Operating Systems

On completion of the course students will be able to

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, and Response Time.

3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time. Design and implement file management system.

4. For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers

CMS-A-CC-3-7-P:

Practical

Operating Systems Lab.

1. Experiment with Unix commands and shell programming

2. Build 'C' program for process and file system management using system calls

3. Choose the best CPU scheduling algorithm for a given problem instance

4. Identify the performance of various page replacement algorithms

5. Develop algorithm for deadlock avoidance, detection and file allocation strategies

CMS-A-SEC-A-3-1-TH: Computer Graphics

Skill Enhancement Course: SEC-A:

After completion of this course the student should be able to:

1: To list the basic concepts used in computer graphics.

2: To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.

3: To describe the importance of viewing and projections.

4: To define the fundamentals of animation, virtual reality and its related technologies.

5: To understand a typical graphics pipeline

6: To design an application with the principles of virtual reality

Semester IV

Theory CMS-A-CC-4-8-TH

Data communication, Networking and Internet technology.

After completion of the course, the students will be able to:

1. Student will be able to understand network communication using the layered concept, Open System Interconnect (OSI) and the Internet Model.

2. Student will be able to understand various types of transmission media, network devices; and parameters of evaluation of performance for each media and device.

3. Student will be able to understand the concept of flow control, error control and LAN protocols; to explain the design of, and algorithms used in, the physical, data link layers.

4. Student will understand the working principles of LAN and the concepts behind physical and logical addressing, subnetting and super netting.

5. Student shall understand the functions performed by a Network Management System and to analyze connection establishment and congestion control with respect to TCP Protocol.

6. Student shall understand the principles and operations behind various application layer protocols like HTTP, SMTP, FTP.

Practical CMS-A-CC-4-8-P

Computer Networking and Web Design Lab.

After completing the course, students will be able to: ·

1.Understand the structure and organization of computer networks; including the division into network layers, role of each layer, and relationships between the layers.

2.Understand the basic concepts of application layer protocol design; including client/server models, peer to peer models, and network naming.

3. In depth understanding of transport layer concepts and protocol design; including connection oriented and connection-less models, techniques to provide reliable data delivery and algorithms for congestion control and flow control.

Theory CMS-A-CC-4-9-TH

Introduction to Algorithms & its application.

Students who complete the course will have demonstrated the ability to do the following:

1. Argue the correctness of algorithms using inductive proofs and invariants.

2. Analyze worst-case running times of algorithms using asymptotic analysis.

3. Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and-conquer algorithms.

4. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.

5. Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic programming algorithms, and analyze them.

6. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Synthesize greedy algorithms, and analyze them.

7. Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them.

8. Compare between different data structures. Pick an appropriate data structure for a design situation.

9. Explain what an approximation algorithm is, and the benefit of using approximation algorithms. Be familiar with some approximation algorithms, including algorithms that are PTAS or FPTAS. Analyze the approximation factor of an algorithm.

Practical CMS-A-CC-4-9-P Algorithms Lab.

At the end of this course student will solve the following problem using computer programming.

1. Understand the basic notation for analysing the performance of the algorithms using Computer programming.

2. Use divide-and-conquer techniques for solving suitable problems.

3. Use greedy approach to solve an appropriate problem for optimal solution using programming.

4. Apply dynamic programming approach to solve suitable problems

5. Understand the limitations of algorithm power and study how to cope with the limitations of algorithm power for various problems

Theory CMS-A-CC-4-10-P

Microprocessor and its Applications.

Students who complete the course will have demonstrated the ability to do the following:

1.Understand the taxonomy of microprocessors and knowledge of contemporary microprocessors.

2.Describe the architecture, bus structure and memory organization of 8085 as well as higher order microprocessors.

3.Explore techniques for interfacing I/O devices to the microprocessor 8085 including several specific standard I/O devices such as 8251 and 8255.

4.Demonstrate programming using the various addressing modes and instruction set of 8085 microprocessor

5.Design structured, well commented, understandable assembly language programs to provide solutions to real world control problem.

Practical CMS-A-CC-4-10-P

Programming with Microprocessor 8085.

1. Solve basic binary math operations using the instructions of microprocessor 8085.
2. Apply programming knowledge using the capabilities of the stack, the program counter
3. Design, code and debugs Assembly Language programs to implement simple programs
4. Execute a machine code program on the training boards.

Theory CMS-A-SEC-B-4-2-TH

E-Commerce

Upon completion of the course students should be able to:

1. Analyze the impact of E-commerce on business models and strategy. Describe the major types of E-commerce.
2. Explain the process that should be followed in building an E-commerce presence.
3. Identify the key security threats in the E-commerce environment.
4. Describe how procurement and supply chains relate to all types of e E-commerce.

Semester V

Theory CMS-A-CC-5-11-TH

Database Management system (DBMS):

At the end of this Database Management Systems course, students will be able to:

1. Model Entity-Relationship diagrams for enterprise level databases
2. Formulate Queries using SQL and Relational Formal Query Languages
3. Apply different normal forms to design the Database
4. Summarize concurrency control protocols and recovery algorithms
5. Identify suitable Indices and Hashing mechanisms for effective storage and retrieval of Data.

Practical CMS-A-CC-5-11-P

DBMS lab using My SQL & PHP

Upon successful completion of the course, participants should be able to:

1. List the major elements of the PHP & MySQL work and explain why PHP is good for web development

2. Learn how to take a static website and turn it into a dynamic website run from a database using PHP and MySQL.

3. Analyze the basic structure of a PHP web application and be able to install and maintain the web server, compile, and run a simple web application.

4. Learn how databases work and how to design one, as well as how to use phpMyAdmin to work with MySQL.

5. Learn different ways of connecting to MySQL through PHP, and how to create tables, enter data, select data, change data, and delete data. Connect to SQL Server and other

Theory CMS-A-CC-5-12-TH

Object Oriented Programming (OOPs)

1. Students will understand the need of object oriented programming, fundamental concepts and will be able to solve computational problems using basic constructs like if-else, control structures, array, and strings in Java environment.

2. Student will understand how to model the real-world scenario using class diagram and be able to exhibit communication between objects using sequence diagram.

3. Students will be able to implement relationships between classes.

4. Students will be able to demonstrate various collection classes.

5. Students will be able to create and user interfaces and packages.

6. The students will be able to demonstrate programs on exceptions, multithreading and applets.

7. Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.

8. Understand dynamic memory management techniques using pointers, constructors, destructors, etc

9. Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.

10. Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming. Demonstrate the use of various OOPs concepts with the help of programs.

Practical CMS-A-CC-5-12-P

OOPs Lab using JAVA

At the end of this course student will:

1. Understand the benefits of a well-structured program
2. Understand different computer programming paradigms
3. Understand underlying principles of Object-Oriented Programming in Java
4. Develop problem-solving and programming skills using OOP concepts
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java.

Theory CMS-A-DSE-A-1-TH

Digital Image Processing

At the end of this course student will:

1. Explain human visual perception.
2. Explain how images are acquired.
3. Explain the basic relationships between pixels.
4. Apply transformations on images.
5. Explain histograms and changes histograms of images.
6. Realize smoothing and sharpening in both spatial and frequency domains. Define image processing methods.
7. Explain image segmentation.
8. Express image compression methods.
9. Realize image recognition process.
10. Recognize morphological image processing techniques.
11. Process color images. Explains color models.
12. Construct color images. Extracts the gray-level components of a color image.
13. Apply image processing methods to color images.

Practical CMS-A-DSE-A-1-P

Image processing Lab

At the end of this course student will:

1. Describe digital image representation, manipulation and illustrate the use of histograms.
2. Apply various Geometric transformations on image and illustrate Two-dimensional Fourier transform.
3. Use and compare, various Linear filtering methods.
4. Apply various Ideal filters in the frequency domain and understand the concept of edge detection.
5. Compose various Morphological operations on binary images and generate their transformed images.

Theory CMS-A-DSE-B-2-TH

Programming using Python

At the end of this course student will:

1. Know the concept of functions in Python
2. Be capable of using basic functions like “if” and different types of loops
3. Be able to convert datatypes
4. Know how to work with lists
5. Know the difference between running Python programs on Mac and Windows
6. Be able to work with CSV files
7. Be able to use tuples and data dictionaries
8. Be able to build lists of various
9. Be able to sort lists -Be able to edit records and load them from CSV files

Practical CMS-A-DSE-B-2-P

Programming in Python Lab

At the end of this course student will:

1. Student should be able to understand the basic concepts of scripting and the contributions of scripting language Ability to explore python especially the object-oriented concepts and the built in objects of Python.

2. Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations.

3. Implement theory concept using Python Programming.

Semester VI

Theory CMS-A-CC-6-13-TH

Software Engineering

At the time of graduation, all Software Engineering students will have demonstrated:

1. How to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment

2.An ability to work in one or more significant application domains

3.Work as an individual and as part of a multidisciplinary team to develop and deliver quality software

4.Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle

5.Demonstrate an ability to use the techniques and tools necessary for engineering practice.

Theory CMS-A-CC-6-14-TH

Theory of Computation

Once the student has undergone the course of Theory of Computation will be:

1.Able to design Finite Automata machines for given problems;

2.Able to analyze a given Finite Automata machine and find out its Language;

3.Able to design Pushdown Automata machine for given CF language(s);

4.Able to generate the strings/sentences of a given context-free languages using its grammar;

5.Able to design Turing machines for given any computational problem.

Practical CMS-A-CC-6-14-P Project Work:

1. Students should be able to design and construct a hardware and software system, component, or process to meet desired needs.

2. Students are provided to work on multidisciplinary Problems.

3. Students should be able to work as professionals, with portfolio ranging from data management, network configuration, designing hardware, database and software design to management and administration of entire systems.

Theory CMS-A-DSE-A-4-TH

Multimedia and its Application:

At the end of this course student will:

1. Explain audio-based multimedia products.
2. Explain visual-based multimedia products.
3. Explain animation-based multimedia products.
4. Explain steps of multimedia development.
5. Develop static and dynamic images, sounds and graphics.
6. Organize static and dynamic images, sounds and graphics.

Practical CMS-A-DSE-A-4-P

Multimedia and its Application Lab

1.Integrate multimedia applications to instructional settings. a. Relate a developed multimedia application with instructional software.

2. Realize sample instructional activities using multimedia applications.
3. Develop multimedia applications.
4. Explain steps of multimedia development.
5. Develop static and dynamic images, sounds and graphics.
6. Organize static and dynamic images, sounds and graphics.
7. Prepare animations on audio-visual materials using animation software.

Theory CMS-A-DSE-B-3-TH

Introduction to Computational Intelligence

1. Gain a working knowledge of knowledge-based systems neural networks, fuzzy systems, and evolutionary computation;
2. Apply intelligent systems technologies in a variety of engineering applications;
3. Implement typical computational intelligence algorithms in MATLAB;
4. Present ideas and findings effectively;
5. Think critically and learn independently Computational Intelligence Lab:

Practical CMS-A-DSE-B-3-P

Computational Intelligence Lab

On concluding the course, candidates will be

1. Able to evaluate and contrast basic techniques and algorithms used in machine learning.
2. Able to formulate specific algorithmic requirements for a given problem and propose an appropriate solution.
3. Able to predict and judge the performance of a machine learning or a data mining method.

On concluding the course, candidates will be able to assess the nature of a problem at hand and determine whether a machine learning technique/algorithm can solve it efficiently enough.

DEPARTMENT OF GEOGRAPHY

GEOGRAPHY HONOURS AND GENERAL

Programme Specific Outcomes (PSOs) and Course Outcomes (COs)

PO 1. The three years' (six semesters) Honours course in Geography helps the students to develop strong insight into the different fields of Physical Geography like Geotectonics, Geomorphology, Climatology, Soil and Bio-geography, Hydrology, Oceanography etc.

PO 2. Along with the elements of Physical Geography, the programme also focuses on the components of Human, Economic, Social and Cultural Geography and enables the students to correlate these components in a meaningful manner.

PO 3. The programme helps to enhance the quantitative aptitude of the students through exercises on quantitative techniques and statistical methods.

PO4. Studying Cartographic Techniques, which is an important component of the curriculum of the programme, the students can acquire thorough knowledge in the field of surveying, map making, map projection and map reading. They also get opportunity to become conversant with different types of maps and with the essential components of a map.

PO5. The ICT based modules on Remote Sensing and Geographical Information System (RS – GIS) help them to be acquainted with the modern techniques of geographical data acquisition, data analysis, data interpretation, and data representation and enhances their computer usage skill.

PO6. The Programme also includes modules on Research Methodology, Field Work, Project report Preparation etc. and thereby provides the students with strong analytical skill, research aptitude, problem solving skill, critical thinking ability, observation power and management skill.

PO7. In course of their study, the students have to conduct questionnaire survey in the field, present posters, prepare project reports and appear before the subject experts for viva voce. All these help them to develop their communication skill, presentation skill and writing skill.

In a nutshell, studying the three years' UG Honours course in Geography, the students acquire the ability to synthesize geographical knowledge, apply it scientifically to solve various pressing problems of the community, the region and the world and communicate properly the solutions and findings both in oral and written format.

PO8. After completion of this programme, the students will be able to pursue higher studies (Master degree or equivalent) in Geography or in allied subjects like Urban and Regional Planning, Environmental Science, Archaeology, Marine Science, Meteorology, Remote Sensing and GIS etc. in different higher education institutions within India or in abroad.

PO9. The students may also opt for research career in different research institutes.

PO10. They may also enroll themselves for different professional courses like MBA, MCA, B.Ed, RS-GIS certificate course etc.

PO11. The knowledge and skills acquired by the students during their under graduate geography course, make them competent enough for multiple careers. After completion of the three years' honours course in Geography, a student may pursue his/her career as a -

Teacher in academic institutions
Research personnel in the research institutes
Cartographer
Environmental consultant/scientist
Town/urban planner
GIS professional
Geospatial Analyst
Remote sensing professional
Conservator of forest
Consultant in the field of soil and agriculture
Land use specialist and planner etc.
Market Research professional

PO12. Under graduate programme in Geography (Honours) offers opportunity to deal with some burning issues of the modern era and develop solutions to the same, like – global warming, climate change, hazard and disaster management, water conservation, urban expansion, population explosion, environmental pollution and sustainability.

Thus, the programme not only provides the graduates with solid knowledge base, research aptitude and professional skill, but helps them to be conscious, responsible and self reliant citizens also.

Course Outcome (CO)

Semester	Course Code	Course Name	Credit	Outcome
Sem 1	CC1	***Geotectonics & Geomorphology***	4(Th)+2(Pr)	☞ Understanding of the tectonic and structural characteristics of the earth and the resulting processes and landforms with special reference to the recent developments in plate tectonic theory. ☞ Idea about the different geomorphological agents, geomorphological processes and the resulting landforms. ☞ Knowledge about the theories on landform evolution with special reference to the concepts of some pioneers like Davis, Penck, Hack and King. ☞ Hands on knowledge about the use of clinometers and ability to measure dip and strike of rock beds in the field with the help of this instrument. ☞ Ability to identify different rocks and minerals in the field. ☞ Acquaintance with the basic features of SOI Topographical maps and ability to do some practical exercises on it and extract relevant information through application of morphometric techniques.
	CC 2	***Cartographic Techniques***	4(Th)+2(Pr)	☞ Familiarity with different types of maps and the components of map. ☞ Comprehensive knowledge on map making and associated issues like geographical coordinate system,

				linear and angular measurement, map projection and related concepts.
Sem 2	CC3	***Human Geography***	4(Th)+2(Pr)	☞ Understanding of the nature, scope, elements and recent trends in human geography. ☞ Concept on evolution of human society and man-environment relationship. ☞ Concept on demographic characteristics. ☞ Knowledge about rural and urban settlements.
	CC4	***Thematic Mapping and Surveying***	4(Th)+2(Pr)	☞ Development of knowledge on diagrammatic representation of data and ability to do the same using proper techniques. ☞ Acquaintance with the geological maps and weather maps and expertise in techniques necessary to interpret the same. ☞ Competence in usage of different surveying instruments like prismatic compass, dumpy level, theodolite etc. and collection of data in the field using the same.
Sem 3	CC5	***Climatology***	4(Th)+2(Pr)	☞ Comprehensive knowledge about the earth's atmosphere and the major atmospheric phenomena like atmospheric pressure and temperature, circulation, precipitation, cyclones and frontogenesis, thunderstorm etc. ☞ Knowledge about some special phenomena like monsoon, jet stream, el-nino etc. ☞ Acquaintance with the existing schemes of climatic classification. ☞ Ability to measure different climatic elements like rainfall, humidity, atmospheric temperature, air pressure etc. using analog instruments. ☞ Ability to interpret daily weather map and forecast the weather. ☞ Knowledge on graphical and diagrammatic representation of different weather phenomena.

	CC6	***Hydrology and Oceanography***	4(Th)+2(Pr)	☞ Understanding of the Global hydrological cycle, its various components and its role. ☞ Awareness about the need of water conservation and an overall understanding of the measures to be taken for the same. ☞ Development of an overall knowledge on Ocean water, its properties, circulation, underwater topography etc. ☞ Understanding of the significance of sea level change and its impact. ☞ A general idea about marine resources and their sustainable utilization. ☞ Ability to represent the hydrological data graphically and diagrammatically and interpret the same.
	CC7	***Statistical methods in Geography***	4(Th)+2(Pr)	☞ Understanding of the importance of statistical data in Geography ☞ Theoretical knowledge on statistical methods and techniques like measuring central tendency, sampling, correlation regression etc. ☞ Ability to apply those techniques using real life geographical data. ☞ Development of quantitative aptitude and analytical skill.
	SEC A3	***Tourism Management***	2(Th) No practical component	☞ Development of skill in the field of tourism management, tourism planning and tourism marketing. ☞ Comprehensive knowledge about the different sectors of tourism like eco-tourism, medical tourism, cultural tourism, adventure tourism, pilgrimage tourism etc. ☞ Awareness on the impact of tourism and need of sustainable tourism.
Sem 4	CC8	***Economic Geography***	4(Th)+2(Pr)	☞ Comprehensive knowledge about the fundamental concepts of economic geography.

				☞ Knowledge about economic activities (primary, secondary and tertiary) and the location theories of economic activities. ☞ Ability to represent different types of economic data diagrammatically, using suitable techniques.
	CC 9	***Regional Planning and Development***	4(Th)+2(Pr)	☞ An understanding of the concept, types and principles of Regional Planning. ☞ Knowledge about the theories of regional development and the relevant models. ☞ Familiarity with the concepts of development and under development with reference to the causes. ☞ Ability to represent economic data diagrammatically, using suitable techniques.
	CC10	***Soil and Biogeography***	4(Th)+2(Pr)	☞ Knowledge about the factors of soil formation and the physical and chemical properties of soil. ☞ An insight into the origin and characteristics of some major soil types. ☞ Understanding of the causes and consequences of soil erosion and degradation. ☞ Acquaintance with the major schemes of soil classification. ☞ Development of clear conception about the different elements of biogeography like biosphere, ecosystem, biome, food chain, food web, energy flow etc. ☞ Knowledge of bio-geochemical cycles. ☞ Understanding of the causes of deforestation and its management. ☞ Understanding of the types, threats and conservation of biodiversity, ☞ Expertise in determining the soil properties in the laboratory.

				☞ Ability to represent soil data and bio-geographical data using suitable cartographic techniques.
	SEC B4	***Sustainable Development***	2(Th) No practical component	☞ A comprehensive understanding of global environmental issues, the necessity of sustainable development and the conflicts, crisis and compromises, associated in this context.
Sem 5	CC11	***Research Methodology and Field work***	4(Th)+2(Pr)	☞ A detailed theoretical knowledge about the different components of research methodology. ☞ Ability to choose an appropriate and relevant research problem and chalk out a systematic and effective plan to resolve the same. ☞ Ability to integrate theoretical knowledge with practical experience. ☞ Development of analytical skill and good observation power. ☞ Development of data analysis and presentation skill. ☞ Enhancement of writing skill.
	CC12	***Remote Sensing, GIS and GNSS***	4(Th)+2(Pr)	☞ A comprehensive knowhow about the theoretical principles associated with remote sensing like – types of RS satellite, types of sensors, image referencing schemes, acquisition of satellite data, preparation of FCC, image interpretation etc. ☞ Hands on experience of image georeferencing, image enhancement, preparation of reflectance libraries of land use land cover features, supervised classification, post-classification analysis etc. using IRS LISS 3 and Landsat OLI data. ☞ Understanding of the basic principles of Geographical Information System (GIS) including types of data, preparation of attribute

				table, data manipulation and overlay analysis. ☞ Expertise in preparation of annotated thematic maps using GIS. ☞ Both theoretical and practical knowledge on GNSS positioning, waypoint collection and exporting to GIS database.
	DSE A - 2	***Climate Change: Vulnerability and Adaptation***	4(Th)+2(Pr)	☞ An overall knowledge and awareness about the burning issue of climate change. ☞ Understanding of the causes of climate change on a global scale. ☞ Ability to understand the significance of climate change both theoretically as well as through preparation and interpretation of the graphical representations of data on different climatic parameters (over a period of at least 30 years). ☞ Ability to assess the vulnerability of climate change and the adaptive measures
	DSE B-5	***Cultural and Settlement Geography***	4(Th)+2(Pr)	☞ Knowledge on scope and content of cultural geography, its development in relation to other disciplines, cultural realm, cultural diffusion, major races, religions and languages of the world. ☞ Knowledge on nature, characteristics, site, situation and morphology of both rural and urban settlements and the relevant models. ☞ Understanding of the different schemes of functional classification of cities. ☞ Ability to represent social and cultural data cartographically and to identify different types of settlements using Survey of India 1:50k topographical maps.
	CC 13	***Evolution of Geographical Thought***	4(Th)+2(Pr)	☞ Perception on the evolution of philosophy of Geography from ancient period to modern era. ☞ Ability to integrate geography with other disciplines and

				to understand man-environment relationship. ☞ Knowledge on different approaches of geographical thought and contribution of their proponents. ☞ Ability to present the basic concepts of different schools of geographical thought by means of poster, which not only ensures clear understanding of the subject matter, but also enhances the students' communication and presentation skill.
	CC 14	***Hazard Management***	4(Th)+2(Pr)	☞ Perception on hazards and disasters, assessment of risk and vulnerability associated with hazards and responses to hazards. ☞ Knowledge on vulnerability, consequences and management of different hazards like earthquake, landslide, land subsidence, tropical cyclone, flood, river bank erosion, coastal erosion, fire and different types of biohazards with special reference to India and West Bengal. ☞ Ability to prepare a project report on any of the above-mentioned hazards using secondary data, which enhances their reading habit, writing skill, presentation skill, critical thinking ability etc.
	DSE A - 4	***Resource Geography***	4(Th)+2(Pr)	☞ Knowledge about significance, classification, utilization, depletion and conservation of resources. ☞ Comprehensive idea about the contemporary energy crisis and political conflicts associated with the same. ☞ Understanding of the concept of sustainable resource management and its significance. ☞ Ability of mapping different resources and identification of the changes. ☞ Ability to compute Human Development Index (HDI).

	DSE B-8	***Geography of India***	4(Th)+2(Pr)	☞ Comprehensive knowledge of physical, economic and socio-cultural characteristics (physiography, climate, soil, vegetation, population, agriculture, industry, power resources) of India and West Bengal. ☞ Idea on regionalization of India. ☞ Awareness on some regional issues of West Bengal. ☞ Skill to portray the regional characteristics using different cartographic techniques.

B. Sc General with Geography – GEOG (under CBCS)

Programme Specific Outcomes:

PSO 1. Knowledge and Skill development:

✍ It is expected that after completion of the three years' (six semesters) General degree course in Geography, a student will have an overall knowledge on different components of physical and human geography like Geotectonics, Geomorphology, Climatology, hydrology, oceanography, Soil and Bio-geography, economic activities, socio-cultural activities etc.

✍ The students can acquire knowledge on basic elements of map making.

✍ The Programme also helps the students to enhance their ability of representing different types of geographical data, by means of graphs, charts, diagrams and thematic maps.

✍ In course of this three years' curriculum, the students get opportunity to learn the basic principles of some relevant modern technology like Remote Sensing and GIS.

✍ The Programme includes modules on skill enhancement courses which help the students to get acquainted with the very contemporary issues like sustainability, coastal hazards, tourism hazards etc.

✍ The entire curriculum, especially the modules on practical exercises, project work etc. provides the students with problem solving skill, critical thinking ability, observation power.

PSO 2. Opportunity in the field of Higher Studies:

✍ After completion of this Programme, the students will be able to pursue regular post-graduate courses in those institutions where there is provision of bridge course or equivalent.

✍ The students may also opt for post-graduate courses under distance learning programmes of the affiliated universities.

✍ They may also enroll themselves for different professional courses like draftsmanship course, Primary teachers' training course. B.Ed., BBA etc.

PSO 3. Career Opportunity:

Obtaining a General degree in Geography, a student may pursue his/her career as a –

- Teacher in primary or junior high school
- Survey and mapping technician
- Data collector and analyst
- Draftsman in mapping organizations
- GIS technician
- Tour programmer

Course Outcome (CO):

Semester	Course Code	Course Name	Credit	Course Outcome
Sem 1	CC 1	***Physical Geography***	4(Th)+2(Pr)	☞ A general understanding of the internal structure of the earth. ☞ Knowledge about the global tectonic theory and formation of the major relief features of the ocean floor and continents according to this theory. ☞ An idea on surface expressions of folds and faults. ☞ Understanding of the different degradational processes. ☞ A general idea about the different geomorphological agents like running water, moving ice, sea waves, wind etc. and the resulting landforms. ☞ Familiarity with the basic models of slope evolution. ☞ Knowledge about global hydrological cycle and its role. ☞ Conception of runoff and associated factors. ☞ Acquaintance with the principles of watershed management. ☞ Development of knowledge about physical and chemical properties of ocean water, oceanic circulation, marine resources, their classification and sustainable utilization.

				☞ Ability to extract physiographic and drainage information from Survey of India 1:50k topographical map using different morphometric techniques and interpret the same. ☞ Expertise in megascopic identification of samples of some common rocks and minerals.
Sem 2	CC 2	***Environmental Geography***	4(Th)+2(Pr)	☞ Comprehensive knowledge about different parameters of climate, like insolation and heat budget, atmospheric pressure and wind circulation, greenhouse gases, global warming, climate change etc. ☞ Familiarity with the world climatic classification scheme of Koppen. ☞ Understanding of soil profile development, physical and chemical properties of soil, USDA classification of soil, soil erosion and its management. ☞ Knowledge about ecosystem, biome, occurrence of plant types and their ecological adaptations and biodiversity. ☞ Practical experience of weather map interpretation, construction of graphs and diagrams using climatic data, preparation of ternary diagram depicting soil types, preparation of biodiversity register.
Sem 3	CC 3	***Human Geography***	4(Th)+2(Pr)	☞ Knowledge about different sectors of economy. ☞ Understanding of the theories of location of the economic activities. ☞ Concept on industrial location in Indian perspective. ☞ Perception on globalization and integration of world economies. ☞ Knowledge about human society and population, different social organizations, characteristics and spatial variations of race, language, religion. ☞ Perception on social issues like diversity, conflict and transformation. ☞ Concept on cultural landscape and its differentiation, cultural region and realm, diffusion of culture and innovations.

				☞ Ability to represent socio-economic and cultural data using proper cartographic techniques.
	SEC A-1	***Coastal management***	2(Th) No practical component	☞ Theoretical knowledge on coastal landforms and associated coastal morpho dynamic variables. ☞ A comprehensive knowledge about the impacts of some common practices like mining, oil exploration, salt manufacturing, tourism etc. on coastal environment and their management. ☞ Understanding of the different coastal hazards and their management strategies. ☞ Acquaintance with the principles of different coastal zone management schemes with reference to India.
Sem 4	CC 4	***Cartography***	4(Th)+2(Pr)	☞ Familiarity with different types of maps, their components and map projection. ☞ Comprehensive knowledge on different techniques of thematic mapping and its practical application. ☞ Theoretical knowledge on different aspects of remote sensing and GIS. ☞ Ability to apply all these acquired knowledge in the practical field and work with real life data.
	SEC B-4	***Sustainable Development***	2(Th) No practical component	☞ Comprehensive knowledge about the concept of sustainable development, its components, determinants, limitations etc. ☞ Understanding of the conflicts, crisis and compromise in the context of global goals for sustainable development and the associated global environmental issues.
Sem 5	DSE A-2	***Geography of Tourism***	4(Th)+2(Pr)	☞ Knowledge on scope and nature of tourism, its spatial pattern and the factors influencing tourism. ☞ Clear idea about the different types of tourism. ☞ Perception on impact of tourism as well as impact of globalization and global politics on tourism.

				☞ Understanding of different aspects of Indian tourism like – infrastructure, support system, tourism circuit etc. ☞ Development of necessary skill to prepare different types of maps depicting tourism related information and questionnaire for conducting field survey.
Sem 6	DSE B-6	***Population Geography***	4(Th)+2(Pr)	☞ Knowledge about evolution of the subject of population geography. ☞ Clear conception about population growth, density and distribution in the world as well as in India. ☞ Familiarity with the classical as well as modern theories of population growth and demographic transition model. ☞ Knowledge on population composition – age-sex, rural-urban, literate-illiterate etc. ☞ Understanding of migration, its causes, types and pattern in the world and in India. ☞ Ability to conceptualize some contemporary issues related to population like – population and development, population and environment, declining sex ratio, impact of HIV, AIDS etc. ☞ Ability to graphically represent population data and interpret the same.

DEPARTMENT OF MATHEMATICS

MATHEMATICS HONOURS AND GENERAL UNDER CBCS

Program Outcomes

1. Science-based knowledge

Students earn basic knowledge about the working principle of different fundamental phenomena. It helps students to understand how this physical world and universe governed by laws of Physics.

2. Critical thinking

They acquire knowledge to identify, formulate, analysis and solve problems. They are able to express their creativity to see the world in a new way.

3. Skill enhancement

Students can enhance themselves by various skills like problem-solving, communication, technical skills and research/project development skills which are effective in social and professional fields.

4. Science and society

Students learn the necessity and impact of science especially Physics in society. They also learn how to use modern tools in our day-today life.

5. Ethics

Applying ethical principles and knowledge of Physics they commit to professional activities and responsibilities based on science and engineering.

6. Environment and sustainability

Understanding the impact of science and engineering on environment. Students are being self-conscious for use of environment friendly alternate energy resources and activities for its sustainability. They are also encouraged for inventory works on renewable energy and energy harvesting.

7. Communication

Students are being able to communicate effectively via the process of exchanging ideas, thoughts, opinions and data among various science communities and people in society. They may able to design documentations and write effective articles and spread it to people via social media.

8. Life-long learning

Continuous knowledge gathering from science and engineering helps independent, self-motivated, life-long learning.

In B.Sc. Under-graduate CBCS System (Duration 3 years, divided into 6 Semesters), the MTMA (B.Sc. Honours in Mathematics) students, after three years (6 semesters) of study, achieve the following.

1. **ACHADEMIC DEVELOPMENT**

They get a good grounding in rudiments of higher mathematics, both pure and applied. This should prepare them for post graduate studies and doing research in various field of Mathematics and its allied areas.

2. **SKILL DEVELOPMENT**

The students learn “C”, a high-level computer language, SAGEMATH as skill developing software. As this knowledge are in much demand in the job market, it should help them in their career. Students are also skilled with the study of Boolean Algebra, Modelling theory and Discrete Mathematics, Numerical Analysis, Linear programming problems which are very demandable in various field in academic and corporate sectors.

3. **JOB ORIENTED COURSE**

Statistics, Discrete Mathematics, Computer programming are all part of the syllabus. The students may pursue higher studies in Statistics or related fields like big data analytics, financial statistics etc. These also have high demand in the job market and students are able to succeed in the competitive examinations.

Paper	Topic	Course Outcomes
Honours Papers		
SEM I **CC-1**	***Calculus, Geometry & Vector Analysis*** ***Unit – I: Calculus*** ***Unit – II: Geometry*** ***Unit – III: Vector Analysis***	☞ The learners mainly gain the nature of curves in Cartesian or polar coordinates. Moreover, (a) there is a scope to obtain higher order derivatives and apply further wherever necessary. (b) the students learn reduction formula of integration and L Hospital's rule of limit to find hard integration and limit. (c) they obtain the knowledge of curve tracing and to obtain different curve characteristic terms like length of curve, curvature, envelope curve etc. (d) students acquire the knowledge of the behaviour of plane, line and surface in space. (e) students obtain skill to classify conics in 2D and 3D Geometry. (f) get idea of vector product, vector function, limit, continuity, differentiation and integration. (g) obtain the ability to apply vector concept in different brunch of applied mathematics. (h) they are able to solve various problems related to vector equations, application to geometry and mechanics of vector analysis, which has useful applications in various branches of Mathematics and Physics.
SEM I **CC 2**	***Algebra*** ***Unit – I: Classical Algebra*** ***Unit – II: Abstract Algebra***	☞ On completion of this course, students gain the knowledge about 1. Complex number, polynomials, inequality which will be needed in studies of real and complex analysis in coming semesters. 2. Sets, relation, mapping and notions of integer, congruence relation are foundation of Modern Algebra as well

	Unit – III: Linear Algebra	as discrete mathematics, which is also in UG Course. Moreover, they have important implications in practical field like to prepare Credit card, Debit Card, ISBN, ISSN etc. 3. application to linear system of equations will help students in linear algebra course in semesters 4,5,6. Matrix theory plays one of the most important roles in various other subjects like computer science, operational research etc. which have nowadays direct implications in almost every aspect of life.
SEM II CC3	***Real Analysis*** ***Unit – I: Real numbers*** ***Unit – II: Sequence of Reals*** ***Unit – III: Infinite series of Reals.***	This course is intended to expose students to the basic ideas of Real Analysis, a part of mathematical analysis which is considered to be the base of mathematics. 1. This will introduce students to notions of boundedness, completeness, neighbourhood, open set, closed set etc. and pioneer theorems like Bolzano – Weierstrass theorem. Hiene Borel Theorem etc. to be mentioned among various other important results. 2. Students will know about sequences, subsequences and their convergence along with important theorems like sandwich theorem, Nested Interval theorem, Cauchy criterion etc. 3. Infinite series and their convergence and various tests for convergence like comparison test, limit test, Gauss test etc and alternate series are points of highlight in this unit. This course will help students in further studies of real and complex analysis in coming semesters.
SEM II CC4	***Group Theory-I*** ***Unit – I: Basic theory of Group***	This course is designed as basic theory of Abstract Algebra. In this course students are go through 1. the study of definition and examples of groups, subgroups & their properties which are the pivotal concepts of modern algebra.

	Unit – II: Cyclic Group ***Unit – III: Normal Sub Group and Homomorphism of groups.***	2. the next step of defining special types of groups i.e., cyclic groups and its properties 3. the concept of permutations their types and algebra of permutations. 4. the ideas of cosets, order of group & its elements, Lagrange's theorem & its consequences including Fermat's Little theorem. 5. the study of Normal subgroups, Quotient group, Cayley's theorem, Homomorphism and Isomorphism of groups which are very essential to study unknown groups.
SEM III **CC5**	***Theory of Real Functions*** ***Unit I: Limit and Continuity of functions*** ***Unit II: Differentiability of functions.***	This course will help students to know about 1. Very important notions of limit, continuity, uniform continuity of a real function with $\varepsilon - \delta$ approach. Many important results including Sequential criterion will help students in due courses. 2. Differentiability of a real function at a point, relation between continuity and differentiability of a function and related theorems, Rolle's theorem, Cauchy's MVT to be specially mentioned with. 3. The concept of maxima, minima of a function in an interval and their application. This portion plays important role in applied sciences, specially on ODE and Multivariate Calculus which is also in the UG course. This course is the base for any further studies of analysis and many other fields and also help them to grow analytical ideas in real field and make mathematical arguments within this system.
SEM III **CC6**	***Ring Theory & Linear Algebra I*** ***Unit – I: Ring Theory.***	**Ring Theory** Ring is an ordered structure with two operators and it is a generalization of group theory which the students have already read in CC4 (semester 1). In this course the students

	Unit – II: Linear Algebra	1. Get to study ring as arbitrary set with two operators. Definition, examples, properties of subring, subfield, integral domains and field and their properties. 2. Acquire knowledge about some well-known theorems such as isomorphism theorem, correspondence theorem. 3. These ideas are very important to study advanced algebra, linear algebra in semester 5 of undergraduate course as well as for further study of any branch of mathematics. **Linear algebra** The students already had preliminary ideas of vectors and its analysis in semester 1, but in this course, they study its algebra. They 1. Get knowledge about vector spaces and its algebra, subspaces of $\mathbb{R}^n$ and its geometric significance which helps them to connect algebra with geometry. 2. Get to know linear transformations, its algebra and representations, Eigen values, Eigen vectors, characteristic equations, Cayley-Hamilton theorem which gives a new method for finding the inverse of a matrix.
SEM III **CC7**	***Ordinary differential equation & Multivariate calculus I*** ***Unit – I ODE*** ***Unit – II Multivariate Calculus – I***	On completion of this course, the students will acquire knowledge on 1. acquire elementary knowledge and skill of solving problems on certain types of linear and non- linear ordinary differential equations, also acquire knowledge on certain types of second order ordinary differential equations and their applications in Applied Science. 2. solving various problems related to Power series solution, Biological & Mechanical model, vector calculus which has useful applications in various branches of Mathematics and Physics.

		3. solving various problems related to multivariate calculus, which is a powerful tool for understanding the geometry of real n-dimensional space. 4. Obtain the knowledge on limit, continuity and differentiability of n-dimensional space curves and surfaces.
SEM IV **CC8**	***Riemann Integration &Series of functions*** ***Unit – I: Riemann Integration*** ***Unit – II: Improper Integral*** ***Unit – III: Series of functions***	This course will help students to acquire knowledge about 1. Riemann integration which is a generalisation of definite integration. Concept of negligible set, primitive, application of Lebesgue theorem and many important properties and theorems. 2. Improper integral and existence of their finite values and Beta Gamma functions with their application. 3. Sequence and series of functions, power series and their pointwise convergence, uniform convergence to limit function. All these concepts are widely applied in integral and differential calculus, differential equations to physics problems.
SEM IV **CC9**	***Partial Differential Equation & Multivariate Calculus-II*** ***Unit – I: Partial Differential Equation*** ***Unit – II: Multivariate Calculus-II***	On completion of this course, the students will acquire 1. elementary knowledge and skill for solving problems of certain types of linear and non-linear partial differential equations, also acquire knowledge on certain types of second order partial differential equations and their applications in Mathematical Physics. 2. Concept of Cauchy problem, Cauchy-Kowalewskaya theorem, Cauchy problem of finite & infinite string and their applications in Mathematical Physics. 3. elementary knowledge and skill of solving problems on multiple integral and centre of gravity, surface and volume of revolution. knowledge on vector calculus and their applications in Mathematical Physics.

SEM IV **CC10**	***Mechanics*** ***Unit – I: Statics*** ***Unit – II: Particle Dynamics*** ***Unit – III: Many Particles System***	On completion of this course, the students will acquire knowledge on (a) Reduction of forces in 2D and 3D system. (b) condition of stability and instability of a system by a system of forces (c) how the frictional force work with the interaction two bodies and also the stability in the environment of frictional force (d) virtual work and one can check the condition of stability using virtual work done. (e) rectilinear motion of a particle in straight line and in two and three dimension (f) orbital motion and its stability. It will help in research of artificial satellite. (g) work, power, energy and energy conservation maintain in different systems. (h) linear and angular momentum principal and energy conservation in many particle systems. (i) over all study help to research in particle physics.
SEM V **CC11**	***Probability and Statistics.*** ***Unit I: Probability*** ***Unit II: Statistics.***	This course will introduce students to 1. the theory of probability, basic knowledge about one- and two-dimensional probability distribution, distribution function, conditional probability, expectation, some special distributions, generating functions etc. and problems related to all these topics. 2. the statistical theory builds up on the basis of probability theory and help students in solving problems on parameter estimation viz., point and interval estimation, level of significance, concept of hypothesis and their various applications based on real life data. This course lay foundation to one of the most beautiful and practically oriented subject Statistics.
SEM V		**Group theory II**

CC12	***Group theory II & Linear Algebra II*** ***Unit I: Group theory.*** ***Unit II: Linear Algebra***	The students who had preliminary ideas of definition and properties of groups, now in this course 1. Acquire conceptual knowledge about automorphism group and its properties and applications of factor group to automorphism groups. 2. Can extend their skills to study further about external and internal direct product of groups, the existence of some well-known theorems such as Cauchy theorem, converse of Lagrange's theorem and Fundamental theorem only on finite Abelian groups. **Linear Algebra II** This course is an extension of Linear Algebra I in CC6. In this course the students go through the study of advanced linear algebra such as 1. Inner product spaces, Gram-Schmidt process of orthogonalization and orthonormalization of vectors, Bessel's inequality, linear operators, linear bilinear quadratic form of vectors, Sylvester's law of inertia etc. 2. Dual spaces, transpose of linear transformation and its matrix in the dual basis, annihilators, eigen spaces, diagonalizability, inverse and subspaces, Jordan and rational canonical form. These concepts are very essentials for further studies as well as for competitive examinations.
SEM VI **CC13**	***Metric space & Complex analysis***	**Metric space** Metric space is a generalization of Real line. On completion of study of metric space, the students

	Unit I: Metric space. ***Unit II: Complex analysis***	1. get the idea of abstraction of modulus distance function from real line to abstract field to form a metric space by axiomatic approach. 2. acquire knowledge of extension of real analysis i.e., open set, interiors, closure, convergence of sequence, continuity, uniform continuity, various types of compactness, connectedness, contraction maps, etc. in arbitrary Meric space. 3. know about Banach Fixed Point theorem which has an application for solving ordinary differential equations. These ideas help the students to study arbitrary vector spaces and topological spaces. **Complex analysis:** In semester 2, the students already had ideas of real analysis and a set of complex numbers in a superset of real numbers. Here, in this course, students get to know about 1. Well-known stereographic projection, complex plane, differential calculus and integral calculus of complex numbers 2. Uniform and absolute convergence of power series, radius of convergence Difference between real analysis and complex analysis.
SEM VI **CC14**	***Numerical Analysis*** ***Unit I: Rounding of real and machine numbers,***	Nowadays, application of numerical analysis spreads in various areas in social sciences. Those problems are difficult to solve in an analytic method but it can be solved through a numerical method. But has a limitation that there may involve small errors that do not affect much. On completion of this course, the students will acquire knowledge on

	Errors, Numerical algorithms ***Unit II: Approximations, Interpolations.*** ***Unit III: Numerical Differentiations.*** ***Unit IV: Solution of Transcendental and Polynomial equations*** ***Unit V: Solution of Ordinary Differential equations.***	(a) numerical calculation, which gives most of the time some errors. Here is a scope to learn different types of errors that appear during calculation. (b) different interpolation, numerical differentiation and numerical integration rule. (c) finding roots of polynomial and transcendental equations in different methods. In general, we cannot find the roots of transcendental equations in an analytic method. (d) to find the solution of a system of linear equations in different numerical methods. (e) to find the eigen values of a real symmetric matrix. (f) solution of initial and boundary value problem. All the above said numerical methods are hugely used in solving different research problems in the real world. So it gained serious attention to the students of science background.
SEM III **SEC – A**	***C Programming Language***	Computer programming is now very much essential for the study of different areas of social science. Software wholly depends on computer programming. On completion of this course, the students will acquire knowledge (a) on basic keywords, functions and data type used in C programming language (b) on condition, loop and structure that used to make computer program (c) on defining array, user defined function, pointer and creating a file through C. Thus, students will learn a soft-skill in the area of computer science and can take entry to the software industry.
SEM IV **SEC – B**	***Sage Math***	On completion of this course, the students will acquire knowledge (a) on advance computing up to desired accuracy (b) on programming technique

		(c) on plotting different kinds of function that help to predict the behaviour of the function. This is an extra feature inbuilt in this software than other programming compilers. Thus, study of Sage Math helps students to move in research motivation.
SEM V **DSE – A1**	***Advanced Algebra*** ***Unit – I: Group Theory*** ***Unit – II: Ring Theory***	After successful completion of this particular course the students has extended their knowledge about 1. Group action & permutation representation associated with a given group action, basic applications of group actions, Generalised Cayley's theorem and Index theorem 2. Generalised theory of Ring, basic idea of which they have already read in CC6. In this part of ring theory, they also acquire knowledge about Principal Ideal Domain and Its properties Euclidean domain, Factorisation domain, Unique factorisation Domain & inter relations among them. 3. Polynomial ring as an example of Factorisation domain, Euclidean algorithm, Eisenstein criterion etc. 4. Regular rings, its examples & properties ideals etc. which are very much essential to study higher course of pure mathematics as well as in the research field.
SEM VI **DSE – A2**	***Mathematical Modelling***	On completion of this course, the students will acquire knowledge 1. Concept of power series solution of Bessel's & Legendre's equation, Laplace transform and their application in Mathematical Physics.
SEM V **DSE – B1**	***Linear Programming & Game Theory***	On completion of this course, the students will acquire 1. fundamental knowledge on the theory of basic and basic feasible solutions and their properties, convex sets based on

		the knowledge of linear algebra studied in previous semesters. 2. the skills on the solution of a Linear Programming Problem by Simplex Method. Also acquire knowledge on duality, transportation problem, assignment problem and travelling salesman problem. This course is very much important in present day Mathematics, like in the field of Operation Research, Modelling, Financial Mathematics.
SEM VI **DSE – B2**	***Point Set Topology*** ***Unit – I: Topological spaces.*** ***Unit – II: Countability and Separation Axioms*** ***Unit – III: Compactness and Connectedness***	Topology is an abstraction of real analysis and a generalization of metric spaces which the students have already read in 1st semester CC3 and 6th semester CC13 courses. In this course the students 1. Realize that there are various extensions of real numbers in which the set of reals is a subset of them. 2. Understand the construction of real numbers is relatively unimportant to get a topology on it. 3. Get knowledge about axiomatic set theory which is one of the pivotal concepts of set theoretic approach of topology. 4. Get ideas of the extension of topological open sets, closed sets limit points, neighbourhood, convergence, continuity etc. from the set of real numbers to arbitrary topological spaces and topological properties like compactness, connectedness, separation axioms etc., some of which hold in the set of real numbers but not all. 5. Acquire knowledge about $\mathbb{R}^n$ (n copies of $\mathbb{R}$) as well as $\mathbb{R}w$ arbitrary product of $\mathbb{R}$. Not only that, but they also come to know about many well-known examples of topological space. 6. Get experience to construct topology in an arbitrary space and can solve problems which makes them able to study further branch of advanced theory of pure mathematics.

MATHEMATICS General Course (MTMG)

SEM I CC1/ GE1	***Unit-1: Algebra-I*** ***Unit-2: Differential Calculus-I*** ***Unit-3: Differential Equation-I*** ***Unit-4: Coordinate Geometry***	The knowledge of basic mathematical ideas of algebra, differential calculus and its applications, 1st and 2nd order differential equations and two- and three-dimensional geometry, which are generalization of mathematics syllabus which students already studied at +2 level. These ideas will help them to develop mathematical practice to enter in the next level of study in GE2.
SEM II CC2/ GE2	***Unit-1: Differential Calculus-II*** ***Unit-2: Differential Equation-II*** ***Unit-3: Vector Algebra*** ***Unit-4: Discrete Mathematics***	The course of GE2 is so designed that students will be able to gain the knowledge about the next part of GE1, i.e., differential calculus II, differential equation II, vector algebra as a generalization of geometry and discrete mathematics which is very essential nowadays in application to computer science and modern algebra, graph theory as well as in our Everyday life while using Debit and Credit Cards, ISBN number for Books, Bar code for any product etc..
SEM III CC3/ GE3	***Unit-1: Integral Calculus*** ***Unit-2: Numerical Methods*** ***Unit-3: Linear Programming***	From this course, students acquire knowledge of integral calculus and its application in geometry, numerical analysis and linear programming problems, each of which is very necessary for further study in any field of science as well as in the competitive examinations.
SEM IV CC4/GE 4	***Unit-1: Algebra-II*** ***Unit-2: Computer Science & Programming*** ***Unit-3: Probability & Statistics***	In this course students study modern algebra, computer science and methods of programming and also probability and statistics which play important roles in present day mathematics.
SEM V DSE – A	***Particle Dynamics***	Students acquire the knowledge of

(Any one)		(a) rectilinear motion of a particle in straight line and in two and three dimensions (b) orbital motion and its stability. It will help in research of artificial satellites. (c) work, power, energy and energy conservation are maintained in different systems. (d) linear and angular momentum principle and energy conservation in many particle systems.
	Graph Theory	On Completion of This Course, the students will acquire knowledge of basic graph theory, paths, circuits, trees and their application in Mathematical algorithms. To find the shortest path using Dijkstra's algorithm, Floyd-Warshall algorithm.
SEM VI DSE B	***Advanced Calculus***	This course is an extension of Real Analysis. Here students will study the concept of point-wise and Uniform convergence of sequence of functions and series of functions. They also learn periodic Fourier series and its convergence, Laplace Transform, it's properties and application to the solution of ordinary Differential equations.
SEM VI SEC - B	***Boolean Algebra***	Boolean algebra as a skill enhancement course is very helpful for students to develop skill about Boolean algebra as a distributive lattice, Boolean polynomials, Karnaugh diagram, switching circuits which plays a very crucial role in present day Mathematics and Computer science.

DEPARTMENT OF MICROBIOLOGY

MICROBIOLOGY HONOURS UNDER CBCS

Programme Specific Outcome

✍ Extensive knowledge of classical Microbiology and contemporary subjects spanning various aspects of basic microbiology such as Bacteriology, Virology, Biochemistry, Microbial Physiology, Immunology, Cell Biology, Molecular Biology, Genetics, Systems Biology, Immunology and Molecular biology. In addition to this the course also covers the applied aspects of Microbiology such as Industrial Microbiology, Food and Dairy Microbiology, Environmental Microbiology and Medical Microbiology.

✍ The course aims to train the students to learn and appreciate the biological diversity of microbial forms so that they can explore and explain the processes used by microorganisms for their replication, survival, and interaction with their environment, hosts, and host populations. They will become aware of the important role microorganisms played in maintenance of a clean and healthy environment. They will learn the role of microorganisms in plant, animal and human health and disease.

✍ The course also aims to expose the students to various biotechnological applications of microorganisms, the industrially important substances produced by microorganisms and the unique role of microbes in genetic modification technologies.

✍ The practical aspects of the Programme aim to make the students familiar with scientific methodology and execution of experiments. Students will develop the ability to think critically and to read and analyses scientific literature. Students will acquire and demonstrate proficiency in good laboratory practices in a microbiological laboratory and be able to explain the theoretical basis and practical skills of the tools/technologies commonly used to study this field.

✍ There is immense scope of hands-on training of microbiological laboratory through extensive practical classes and learning of microbes handling skill and exposure to extensive knowledge of molecular biological techniques used in research works.

✍ Graduates of the B.Sc. (Honours) Microbiology Programme will understand and evaluate the impact of new research discoveries in the field of 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, in food industry, pharmaceuticals and biotechnology industries. They also have the option of taking up teaching as a profession.

Semester	Course Topics	☞ Course Outcomes
I	***CC-1: Introduction to Microbiology and Microbial Diversity***	☞ To understand the history of development of Microbiology starting from the early years ☞ To study the diversity of Microbial World and Systems of classification of microorganisms ☞ To understand the scope of microbiology
	CC-2: Bacteriology	☞ To understand bacteriology including the morphology, metabolism and nutrition patterns of various bacteria, their systematics and taxonomic positions. ☞ To study the important archaeal and eubacterial groups in order to understand the basic microorganisms
II	***CC-3: Biochemistry***	☞ To understand the basic concepts of Bioenergetics and thermodynamics ☞ To study and understand the macromolecules ☞ To study the different types of macromolecules, their structure, function and role in metabolism in living organisms ☞ To apply the basic knowledge for studying the metabolism of microorganisms
	CC-4: Cell Biology	☞ To study the organization of cells ☞ To understand the detailed structure of all cell organelles ☞ To understand the process of cell signaling and sorting of proteins ☞ To understand the process of cell cycle, cell death and renewal

III	***CC-5: Virology***	☞ To study the Nature and Properties of Viruses and Bacteriophages ☞ To Study Viral Transmission, Salient features of viral nucleic acids and Replication ☞ To understand the role of viruses in cancer and different viral diseases ☞ To study the importance and application of virology
	C-6: Microbial Physiology and Metabolism	☞ To study Effect of Environment on Microbial growth and related Nutrient uptake and Transport ☞ To Study Chemoheterotrophic, Chemo lithotrophic and Phototrophic Metabolism ☞ To study the role of Nitrogen Metabolism in Microbial Physiology
	C-7: Molecular Biology	☞ To Study Structures of DNA and RNA / Genetic Material ☞ To study Replication of DNA in Prokaryotes and Eukaryotes ☞ To study Transcription and Post Transcriptional modifications in Prokaryotes and Eukaryotes ☞ To study Transcription of DNA and Regulation of gene Expression in Prokaryotes and Eukaryotes

	SEC-A ***A1. Microbial Quality Control in Food and Pharmaceutical Industries***	☞ To learn the microbiological laboratory and safe practices ☞ To determine microbes in food and pharmaceutical samples ☞ Learning the importance of pathogenic organisms in food and water Learning the principles of food safety and microbial standards of different foods and water
IV	***CC-8: Microbial Genetics***	☞ Learning of Genome Organization and Mutagenesis and Molecular basis of mutations ☞ Learning the Mechanisms of Genetic Exchange Conjugation, Transformation, Transduction ☞ To study Phage Genetics and Plasmids ☞ To study Transposable elements and Uses of transposons and transposition
	CC-9: Environmental Microbiology	☞ Students develop an understanding about Microorganisms and their Habitats Structure and function of ecosystems in of plant organic matter ☞ Learning of Microbial Interactions, Microbe-Plant interaction and Microbe-animal interaction ☞ They develop an understanding of Biogeochemical Cycling, Waste Management and Microbial Bioremediation
	CC-10: Recombinant DNA Technology	☞ To learn Milestones in genetic engineering and biotechnology and Applications of Recombinant DNA Technology ☞ They develop an understanding of Tools and Strategies of Molecular Cloning ☞ Learning of Methods in Molecular Cloning ☞ Learning of DNA Amplification and DNA

		sequencing ☞ Learning of Construction and Screening of Genomic and cDNA libraries
	SEC-B ***B2. Microbiological Analysis of Air and Water***	☞ To learn about Aero Microbiology, sample collection, analysis and control measures ☞ To learn Water Microbiology, analysis, treatment and control measures
V	***CC-11: Food and Dairy Microbiology***	☞ Student develop an understanding of the concepts of Foods as a substrate for microorganisms and Intrinsic and extrinsic factors that affect growth and survival of microbes in foods ☞ Learning of Microbial spoilage of various foods and different Principles and methods of food preservation ☞ To study the Food borne diseases and Food sanitation and control ☞ Understanding Fermented foods, Probiotics and their Health benefits ☞ Knowledge on Cultural and rapid detection methods of food borne pathogens in foods and introduction to predictive microbiology
	CC-12: Industrial Microbiology	☞ To learn the Isolation of industrially important microbial strains and fermentation media ☞ Learning of Types of fermentation processes, bio-reactors and measurement of fermentation parameters ☞ Knowledge on Down-stream processing and

		Enzyme immobilization ☞ To learn Microbial production of industrial products (micro-organisms involved, media, fermentation conditions, downstream processing and uses)
	DSE-A ***A1. Microbial Biotechnology***	☞ To learn microbial, industrial and therapeutic biotechnology with its application ☞ To learn the purification and recovery of microbial products ☞ To learn about the application of microbes in biotransformation, bioenergy and environment ☞ Learning about RNAi and IPR
	DSE-B ***B1. Inheritance Biology***	☞ To understand the historical development in genetics ☞ To learn about the Mendelian principles, linkage and crossing over ☞ To learn the structural organization of Chromosomes, extra chromosomal inheritance and recombination ☞ Learning human and quantitative genetics
VI	***CC-13: Immunology***	☞ To understand Concept of Innate and Adaptive immunity and Contributions of scientists to the development of field of immunology ☞ To study the Immune Cells and Organs, Antigens and Antibodies and Immunological Disorders and Tumor Immunity ☞ Learning of the role of the Major Histocompatibility Complex and Complement System

		in Immunology ☞ Learning of Immunological Techniques for the benefit of mankind
	CC-14: Medical Microbiology	☞ To study the Normal microflora of the human body and host pathogen interaction ☞ Learning of diseases of various organ systems caused by Bacterial, Viral, Fungal and Protozoan infections ☞ Gaining knowledge on Collection, transport and culturing of clinical samples and principles of different diagnostic tests ☞ To learn the antimicrobial agents their general characteristics and mode of action
	DSE-A ***A3. Plant Pathology***	☞ To understand the history of plant pathology. ☞ Learning about the overall stages of evelopment of a plant disease, its epidemiology, about the host pathogen interaction, mechanism and the control measures ☞ To learn about some specific plant diseases giving emphasis on its etiological agent, symptoms, dissemination, life cycle and preventive measures
	DSE-B ***3. Instrumentation and Biotechniques***	☞ To understand different techniques of instrumentation giving emphasis on microscopy, chromatography, electrophoresis, spectrophotometry and centrifugation

DEPARTMENT OF PHYSICS

PHYSICS HONOURS AND GENERAL UNDER CBCS

Course Outcomes

Physics Honours (PHSA)

Semester	Name of Course	Course Outcomes
I	***PHS-A-CC-1-1 Mathematical Physics I***	1) The students will get an overview on mathematical tools required to study theoretical and experimental physics. 2) They learn basic computation using python and 2D plotting using Gnuplot.
I	***PHS-A-CC-1-2 Mechanics***	1) Students will learn basics Physics based on Newtonian Mechanics and earn general ideas about how the universe works. 2) They learn to experimentally verify different laws based on Newtonian Mechanics.
II	***PHS-A-CC-2-3 Electricity & Magnetism***	1) The students will be given an idea about electricity and magnetism with various electromagnetic phenomena such as electromagnetic induction, electrical circuits, etc. 2) It explains the students about various applications of electricity and magnetism in our daily life. 3) The students will be able to perform various experiments on electricity and magnetism and will learn to handle various electrical equipment.
II	***PHS-A-CC-2-4 Waves & Optics***	1) The students will be given basic knowledge in vibration and wave motion. 2) They will get an insight about various optical phenomena like interference, diffraction and polarization of light. 3) They will learn applications of optics and familiarizes with experimental instruments.

III	***PHS-A-CC-3-5 Mathematical Physics II***	1) Students will learn more advanced topics of mathematical physics like Fourier series, series solutions of the differential equations, some special functions and their applications. 2) Students will familiar with different packages of Python like NumPy, scipy, matplotlib etc. and apply them to find the solutions of matrix algebra, numerical integration, interpolation, differential equation and curve fitting.
III	***PHS-A-CC-3-6 Thermal Physics***	1) In this course, students learn the fundamental laws of thermodynamics, the principle of operation of engines and refrigerators and limitations related to ideal gas. 2) They will perform different experiments on heat and thermodynamics that will enhance their experimental skill.
III	***PHS-A-CC-3-7 Modern Physics***	1) Students learn about old quantum theory, Schrodinger's equation, basics of nuclear physics and radioactivity. 2) They will also learn fundamental principle of Laser and its applications. 3) Laboratory classes will enable students to determine the value of Planck's constant, study of photoelectric effect, verification of Stefan's law of radiation, determination of e/m of electron and behavior of tunnel diode.
III	***PHS-A SEC-A 1 Scientific Writing***	1) Students will familiar with scientific writing tool LATEX. 2) They learn how LaTeX makes all writing tasks simpler, more visually appealing, more consistent, more reproducible and transparent. 3) They will learn how to prepare a scientific article containing figures, tables and mathematical equations in a presentable form.
IV	***PHS-A-CC-4-8***	1) The students will learn advanced mathematical physics such as complex analysis and its application, integral transform, probability theory.

	Mathematical Physics III	2) They will also learn concept of special theory of relativity which is extremely essential for understanding the physical world beyond Newtonian mechanics. 3) They learn to handle numerical problems involving solutions of ODEs, PDEs and complex analysis using Python.
IV	***PHS-A-CC-4-9 Analog Systems and Applications***	1) They learn basics of analog electronics, fundamentals of semiconductor physics and its application which is the heart of the modern-day electronic devices. 2) In laboratory classes, they are familiarized with the electronic devices and to design and perform experiments with electronic components.
IV	***PHS-A-CC-4-10 Quantum Mechanics***	1) Students will be taught quantum mechanics theory based on Schrodinger equation. 2) They also learn atomic spectra and energy distribution in electric and magnetic fields. 3) The numerical solution of some of the Schrodinger equations in Python will be taught in the laboratory.
IV	***PHS-A-SEC-B 1 Arduino***	1) Arduino offers to learn basic electronics, circuit connection to breadboard, programming language and IDE. 2) Projects based on Arduino enable students to design circuits and enrich their computer programming skills.
V	***PHS-A-CC-5-11 Electromagnetic Theory***	1) This course teaches the students about the origin and different properties of the EM waves in bounded and unbounded media. 2) Electromagnetic origin of wave optics and polarization is also being discussed in this course. 3) Students learn the verification of different physical laws related to the EM wave propagation and polarization in laboratory classes.
V	***PHS-A-CC-5-12 Statistical Physics***	1) Students will be able to understand the behavior and dynamics of a system comprising of a large number of particles both classically and quantum mechanically.

		2) They learn Python programming to analyze the behavior of a collection of particles through numerically calculate partition function and other physical properties.
V	***PHS-A-DSE-A1 (b) Laser and Fiber Optics***	1) Students will be able to learn the basic and the generation of different types of LASER and their applications. 2) They learn principles and applications of holography.
V	***PHS-A-DSE-B1 (b) Nuclear and Particle Physics***	1) Nuclear Physics introduces the student to the concept of nuclear reaction, interaction of nuclear radiation with matter and detectors for nuclear radiation. 2) They also learn about fundamental particles and their properties.
VI	***PHS-A-CC-6-14 Digital Systems and Applications***	1) Students learn about number systems, basic gates, counters and registers. 2) In practical classes, they learn to design and construct universal gates, half adders and full adders, flip-flops on breadboard.
VI	***PHS-A-CC-6-13 Solid State Physics***	1) This course explains the physical properties of the material in solid states as an application of quantum mechanics. 2) The details of crystallography, basis of semiconductors and superconductors are also theoretically addressed. 3) They learn to verify different laws and properties of materials in laboratory.
VI	***PHS-A-DSE-A2 (a) Nano Materials and Applications***	1) The exciting world of nanoscience and nanotechnology is being discussed here through the basic physics underlying the concept of nanoparticles. 2) Students learn the synthesis, properties and various applications of the nano materials.

VI	***PHS-A-DSE-B2 (a) Communication Electronics***	1) In this course, the basics of electronic communications, analog and digital modulations are addressed. 2) Students get an idea about how navigation system works.

Physics General (PHSG)

Semester	Name of Course	Course Outcomes
I	***PHS-G-CC-1-1 Mechanics***	1) This course offers Newtonian mechanics and its application in explaining various classical phenomena. 2) Students learn to perform experiments to calculate different quantities related to Newtonian mechanics.
II	***PHS-G-CC-2-2 Electricity and Magnetism***	1) Students will earn knowledge about electricity and magnetism and various electromagnetic phenomena such as electromagnetic induction, electrical circuits, etc. 2) They will be familiar with various experiments on electricity and magnetism.
III	***PHS-G-CC-3-3 Thermal Physics and Statistical Mechanics***	1) In this course, students will learn thermodynamics to explain the fundamental laws of nature and brief outline of statistical mechanics. 2) They will perform different experiments on heat and thermodynamics that will enhance their experimental skill.
III	***PHS-G-SEC-B Renewable energy and Energy Harvesting***	1) Students are able to understand the concept of fossil fuels and alternate Sources of energy. 2) They learn in detail about various renewable energy sources like solar energy, wind energy harvesting, geothermal energy, hydro energy, piezoelectric Energy harvesting and electromagnetic energy harvesting.
IV	***PHS-G-CC-4-4 Waves and Optics***	4) The students will be given basic knowledge in vibration and wave motion. 5) They will get an idea about various optical phenomena like interference, diffraction and polarization of light.

		6) They will learn applications of optics and familiarizes with experimental instruments.
IV	***PHS-G-SEC-B Arduino***	3) Arduino offers to learn basic electronics, circuit connection to breadboard, programming language and IDE. 4) Projects based on Arduino enable students to design circuits and enrich their computer programming skills.
V	***PHS-G-DSE-A Analog Electronics***	3) They learn basics of analog electronics, fundamentals of semiconductor physics and its application which is the heart of the modern-day electronic devices. 4) In laboratory classes, they are familiarized with the electronic devices and to design and perform experiments with electronic components.
VI	***PHS-G-DSE-B Digital Electronics***	3) Students learn about number systems, basic gates, counters and registers. 4) In practical classes, they learn to design and construct universal gates, half adders and full adders, flip-flops on breadboard.

DEPARTMENT OF ZOOLOGY

Programme Outcomes:

The core courses of Zoology would fortify the students with in-depth subject knowledge concurrently; the discipline specific electives will add additional knowledge about applied aspects of the program as well as its applicability in both academia and industry. The skill enhancement courses would further add additional skills related to the subject as well as other than subject. 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.

The course content has been divided into units with a breakup of the topics to be covered to provide the students better understanding of the main theme represented in the title of each unit. Such type of design is to indicate the breadth of content to be taught thus ensuring more or less uniform coverage of information on a certain theme.

Zoology is the study of all animal life; from primitive microscopic malaria-causing protozoa to large advanced mammals, across all environmental spheres from red deer in mountain forests to dolphins in deep oceans, and from underground burrowing voles to golden eagles in the skies. Some of these animals are useful to us and we nurture them as pets or livestock; some are serious pests or disease-causing; and some are simply splendid and awe-inspiring.

No matter what our relation with the animals is, we need to understand their behaviour, population dynamics, physiology and the way they interact with other species and their environments. It provides students with the knowledge and skill base that would enable them to undertake further studies in Zoology and related areas or in multidisciplinary areas that involve advanced or modern biology and help develop a range of skills that are relevant to wage employment, self-employment and entrepreneurship.

The modern era requires a classical zoologist with a modern approach to master many subjects of Zoology. There is a need for the students to compete with the globe; therefore,

the main focus of this curriculum is to enable the student to be professionally competent and successful in a career. Having Zoology as backbone of the curriculum, this course, with the department centric electives will enhance the skills required to perform research in laboratory and experimental research. The students can choose to focus on a "whole animal" or a "bits of animals" approach. The "whole animal" pathway makes the students proficient in the identification and study of animals while the latter approach provides the skills required to pursue laboratory and experimental work such as disease research, DNA technologies, wildlife forensics etc. Through this curriculum a student at B.Sc. level can be a specialist in immunology, animal behaviour or genetics in future which maximise the students' employment probability.

Course Outcomes

ZOOLOGY HONOURS	
SEM I	
CC 1	Students will be able to acquire an in-depth knowledge in Non-Chordates specially from Protists to Pseudocoelomates
CC 2	Students will able to understand the structure of DNA, central dogma, gene regulation and different techniques in Molecular Biology
SEM II	
CC 3	This course will illustrate all Coelomate Phyla of Non Chordata
CC 4	Students will learn basic concepts of Cell biology, cell cycle and cell signalling mechanisms
SEM III	
CC 5	Student will gain knowledge about different classes of Chordata
CC 6	Student will gain in-depth knowledge in Animal Physiology related to Controlling & Co-ordinating System
CC 7	Students will be able to understand about the importance and scope of Biochemistry. They will learn about structures of carbohydrates, lipids, proteins, nucleic acids and enzyme kinetics

SEC-A (1/2)	Student should be able to learn principles of sustainable Sericulture and how these principles can guide silk moth rearing into an enduring practice in Sericulture. Student also should be able to know about tools and equipment of Apiculture along with principles of sustainable beekeeping
SEM IV	
CC 8	Student will gain knowledge about Comparative Anatomy of different Vertebrate systems
CC 9	Student will gain in-depth knowledge in Animal physiology emphasizing Life sustaining system
CC 10	Students will learn basic concepts of Immunology along with hypersensitivity and vaccines
SEC- B(1/2)	Learners will be able to develop and implement public health interventions and will able to apply knowledge of the principlesof disease, injury prevention and control Medical diagnosis. In Aquarium Fisheries learners will be able to learn the scientific methods of setting an Aquarium and will know culture breeding and marketing techniques of common indigenous ornamentalFishes
SEM V	
CC 11	Students will be able to know the evolutionary and functional basis of ecology, understand what makes the scientific study of ecology a crucial and exciting endeavour, engage in field-based research activities to understand well the theoretical aspects taught besides learning techniques for gathering data in the field.
CC 12	Students should be equipped to understand basic Principle of Genetics to Genetic fine structure
DSE A(1/2)	Students will be able to identify the types of insect pests particularly the most common one, know the methods of sampling of the pests, and understand the effective way of insectpest management strategy. Students will also be able to identify different types of parasites and diseases caused by the parasites

DSE B (1/2)	Endocrinology will give general idea of Endocrine systems. Whereas Reproductive Biology gives idea of Histoarchitechtureof reproductive organs in human, functional anatomy of male and female reproduction and reproductive health
SEM VI	
CC 13	This domain will illustrate the students about Developmental aspects in chordates. It also deals with a comparative account of development in some select groups of animals
CC 14	Students would be able to disseminate knowledge about Evolutionary Biology, from origin of life to Geological timescale, from species concept to population genetics, and Phylogeny
DSE A (1/2)	Animal Biotechnology would fortify the students with techniques in gene manipulation, animal cell culture and application of techniques in health. From Animal Cell Biotechnology students will learn Molecular Techniques in Genemanipulation, Genetically Modified Organisms, and different Culture Techniques and Applications
DSE B (1/2)	Students will be able to learn Patterns of Behaviour, Social andSexual Behaviour, Chronobiology & Biological Rhythm in Animal Behaviour. Students will learn about basic concepts of aquaculture, fisheries, and fish in research in Fish & Fisheries

ZOOLOGY GENERAL

ZOOLOGY GENERAL	
SEM I	
CC 1/ GE1	Students will be able to understand Animal Diversity from Kingdom Protista to Mammals
SEM II	
CC 2/GE2	Students will be able to develop critical understanding how a single-celled fertilized egg becomes an embryo and then a fully formed adult by going through three important processes of cell division, cell differentiation and morphogenesis. Students will also realize the Comparative Anatomy of different systems in chordate
SEM III	
CC 3/GE3	Students will be able to understand about the importance and scope of Physiology and Biochemistry
SEC-A (1)	Student should be able to know about tools and equipment of Apiculture along with principles of sustainable beekeeping and how these principles can guide beekeeping into an enduring practice
SEM IV	
CC 4/GE4	Students will be able to acquire an in-depth knowledge in Genetics and Evolutionary Biology
SEC- B(1)	Learners will be able to learn the scientific method of setting an Aquarium and will know culture breeding and marketing techniques of common indigenous ornamental Fishes
SEM V	
DSE A (1)	From this course students will gain knowledge about the commercial and industrial significance of animals, the techniques of rearing of animals for commercial usage and the prerequisites for their successful maintenance and sustenance.

DSE B (1)	Learners will be able to understand the Aquaculture systems and environmental impacts of aquaculture
SEC-A (1)	Student should be able to learn principles of sustainable Sericulture and how these principles can guide silk moth rearing into an enduring Practice
SEM VI	
DSE A (1)	Students will be able to identify the types of insect pests particularly the most common one, know the methods of sampling of the pests, understand the effective way of insect pest management strategy
DSE B (2)	Students will be able to know the evolutionary and functional basis of ecology, understand what makes the scientific study of ecology a crucial and exciting endeavour, engage in field-based research activities to understand well the theoretical aspects taught besides learning techniques for gathering data in the field. Students will also know about Wildlife Conservation, necessity for wildlife conservation, about National parks and sanctuaries etc.
SEC-B (1)	Learners will be able to develop and implement public health interventions and will able to apply knowledge of the principles of disease, injury prevention and control Medical diagnosis

DEPARTMENT OF BOTANY

Program Learning Outcomes:

1. Define the fundamental concepts underlying the physiological and genetic characteristics of plant species.
2. Comprehend the use of taxonomic tools essential for plant identification and classification.
3. Identify the interrelationship of evolution, ecological interactions, and biodiversity.
4. Apply basic scientific concepts to explain plant-related phenomena.
5. Organize learning concepts into coherent frameworks as the foundation of critical thinking.

Course Learning Outcomes:

a. Microbiology

1. Describe microbial diversity relating to the cell structure, function, growth, and metabolism.
2. Explain the basic genetic systems of bacteria and viruses.
3. Demonstrate practical skills in fundamental microbiological techniques
4. Discuss the importance of fungi in various ecological and economic roles.

b. Mycology

1. Identify the morphological and physiological traits characterizi**n**g Fungi.
2. Analyze how the fungi relate to other organisms.
3. Compare the traits of the major classes of fungi.
4. Discuss the importance of fungi in various ecological and economic roles.

c. Phycology

1. Identify the morphological and physiological traits characterizing algae.

2. Compare the traits of the major algal groups.
3. Review algal features that are related to the evolutionary history of plants.
4. Classify the role of algae as environmental and economic resources.

d. Embryophytes: Bryophytes, Pteridophytes, Gymnosperms, Angiosperms

1. Identify distinguishing morphological, anatomical, physiological, reproductive, and adaptive characteristics of the major groups.
2. Describe the distributions and classification systems.
3. To recognize the major groups and their evolutionary relationships.
4. Use keys and identification manuals for identifying plants.
5. Review the ecological and economic importance.

e. Palaeobotany

1. Define the basic concepts and scope of Paleobotany.
2. Classify the types of fossils and fossilization events of organisms.
3. Differentiate changes in plants throughout the geological time scale and describe their evolutionary relationships.

f. Cell Biology and Genetics

1. Describe the structural organization and function of intracellular organelles chromosomes and genes
2. Identify the structure and function of atoms, biomolecules, and chemical bonds
3. Differentiate between Mendelian and extra-chromosomal inheritance
4. Analyze the fundamental processes of cell signaling
5. Explain the DNA replication, damage, and repair mechanisms
6. Describe RNA synthesis and processing, Protein synthesis and processing, and the control of gene expression.

g. Plant Pathology

1. Define the scope and importance of Plant Pathology.
2. Describe the principles and types of sterilization methods.
3. Discuss the prevention and control measures of plant diseases.

h. Plant breeding and Biometry

1. Describe the techniques in types of plant breeding and commercial plant tissue culture.
2. Define the application of tissue culture in forestry, horticulture, agriculture, and pharmaceutical industry.

i. Plant Physiology and Metabolism

1. Evaluate the abiotic and biotic factors that affect plant growth.
2. Describe the processes of Photosynthesis, Respiration, Nitrogen metabolism, Sensory photobiology, and Stress physiology
3. Define and interconnect the role of plant Growth hormones (Auxins, Gibberellins. Cytokinins, Ethylene) in plant physiology
4. Outline the biosynthesis and function of terpenes, phenols, and nitrogenous compounds

j. Plant Biotechnology

1. Define and illustrate the fundamentals of Recombinant DNA Technology.
2. Categorize the methods of gene transfer
3. Evaluate the role of Biotechnology in Plant, Animal and Human welfare

k. Phytochemistry and Medicinal Botany

1. Explore the uses of plants as medicine by traditional indigenous approaches.
2. Classify the techniques for drug evaluation.
3. Specify the methods of the conservation practices of medicinal plants.