NARAJOLE RAJ COLLEGE

(NAAC Accredited 'B' Grade Govt. Aided College)
NARAJOLE: PASCHIM MEDINIPUR: WEST BENGAL: Pin-721211
E-mail: narajolerajcollege@rediffmail.com
Website: https://www.narajolerajcollege.ac.in

Course Outcome

CCFUP- NEP
Bengali – 2024 (Hons)

Semester	I
Paper	Major -1
Paper Code	BENHMJ101
Title of the Paper	Bangla Bhukhondo, Bangali Jati o Bangla Bhasar Porihoy
Credit	4
Classes/ Week	04

The student of Bengali (Hons) of Semester -I will acquire the knowledge about the origin of' Bengalees', - study on anthropological, social identity of 'Bengalees', geographical aspects of ancient Bengal, origin and development of Bengali language by studying tis course.

This course provides the students with -

CO 1 – knowledge on Boundaries of Ancient Bengal, its division, rivers etc.

CO2 – Anthropological features of Bengalee people.

CO3 – Origin and development of Bengali Language, stages of Bengali language, dialects, and folk language.

CO4 – Bengali Phonetics, IPA, Morphology, Bengali Semantics, Bengali Grammar, - Dhati O Pratyaya, Karak O Bibhokti,Linga,Bachan, Samas.

Semester	I
Paper	Minor Ben (Disc -1)
Paper Code	BENM101
Title of the Paper	Bangla Bhasar Udbhov, Vikash o Bhasatatwik porichoy
Credit	4
Classes/ Week	04

The students of Bengali (Hons) of Semester -I will acquire the knowledge about origin and development of Bengali language, Bengali linguistics and Bengali grammar by studying this course.

This course provides the students with –

CO1 – Origin and development of Bengali Language, stages of Bengali language, dialects, and folk languages.

CO2 – Bengali Phonetics, IPA, Morphology, Bengali Semantics, Bengali Grammar, - Dhati O Pratyaya, Karak O Bibhokti, Linga, Bachan, Samas.

Semester	I
Paper	SEC
Paper Code	BENSSEC01
Title of the Paper	Bangla DTP o Proof Reading
Credit	3
Classes/ Week	03 (P)

The students of Bengali (Hons) of Semester -I will acquire the practical knowledge about Bengali DTP and techniques Bengali proof reading by studying this course.

This course provides the students with –

CO1 – Practical Knowledge on operating Bangla DTP.

CO2 – Practical knowledge on Bengali Proof-reading techniques.

Semester	II
Paper	Major -2
Paper Code	BENHMJ102
Title of the Paper	Bangalir dhormo o Sanskriti ebong Bangla Sahityer Sadharon Porichoy.
Credit	4
Classes/ Week	04

The student of Bengali (Hons) of Semester -II will acquire the knowledge about the history of religion and culture of ancient Bengal and history of Bengali literature by studying this course.

This course provides the students with **-**

CO 1 – knowledge on cultural and religious history of ancient Bengal.

CO2 – history of Bengali literature of ancient period.

CO3 – history of Bengali literature of medieval period.

CO4 – history of Bengali literature of Bengal of modern period.

Semester	II
Paper	Minor Ben (Disc -2)
Paper Code	BENM102
Title of the Paper	Bangalir dhormo o Sanskriti ebong Bangla Sahityer Sadharon Porichoy.
Credit	4
Classes/ Week	04

The student of Bengali (Hons) of Semester -II will acquire the knowledge about the history of religion and culture of ancient Bengal and history of Bengali literature by studying this course.

This course provides the students with **–**

CO 1 – knowledge on cultural and religious history of ancient Bengal.

CO2 – history of Bengali literature of ancient period.

CO3 – history of Bengali literature of medieval period.

CO4 – history of Bengali literature of Bengal of modern period.

Semester	II
Paper	SEC
Paper Code	BENSSEC02
Title of the Paper	Bangla Pratibedan Rachana/ Sambad Path o Tatkhonik Biboron
Credit	3
Classes/ Week	03 (P)

The students of Bengali (Hons) of Semester -II will acquire the practical knowledge about Bengali reportage writing, news reading and commentary by studying this course.

This course provides the students with –

CO1 – Practical Knowledge on reportage writing.

CO2 – Practical knowledge on news reading and commentary.

Course Outcome

CCFUP- NEP
Bengali – 2024 (MDP)

Semester	I
Paper	Major -1
Paper Code	BENHPJ101
Title of the Paper	Bangla Bhasar Udbhov, Vikash o Bhasatatwik porichoy
Credit	4
Classes/ Week	04

The students of Bengali (Multidisciplinary) of Semester -I will acquire the knowledge about origin and development of Bengali language, Bengali linguistics, and Bengali grammar by studying this course.

This course provides the students with **-**

CO1 – Origin and development of Bengali Language, stages of Bengali language, dialects, and folk languages.

CO2 – Bengali Phonetics, IPA, Morphology, Bengali Semantics, Bengali Grammar, - Dhati O Pratyaya, Karak O Bibhokti, Linga, Bachan, Samas.

Semester	I
Paper	Minor Ben (Disc -1)
Paper Code	BENM101
Title of the Paper	Bangla Bhasar Udbhov, Vikash o Bhasatatwik porichoy
Credit	4
Classes/ Week	04

The students of Bengali (Multidisciplinary) of Semester -I will acquire the knowledge about origin and development of Bengali language, Bengali linguistics and Bengali grammar by studying this course.

This course provides the students with **–**

CO1 – Origin and development of Bengali Language, stages of Bengali language, dialects, and folk languages.

CO2 – Bengali Phonetics, IPA, Morphology, Bengali Semantics, Bengali Grammar, - Dhati O Pratyaya, Karak O Bibhokti, Linga, Bachan, Samas.

Semester	I
Paper	SEC
Paper Code	BENSSEC01
Title of the Paper	Bangla DTP o Proof Reading
Credit	3
Classes/ Week	03 (P)

The students of Bengali (Hons) of Semester -I will acquire the practical knowledge about Bengali DTP and techniques Bengali proof reading by studying this course.

This course provides the students with –

CO1 – Practical Knowledge on operating Bangla DTP.

CO2 – Practical knowledge on Bengali Proof-reading techniques.

Semester	II
Paper	Major -2 (Course B1)
Paper Code	BENHMJ102
Title of the Paper	Bangla Bhasar Udbhov, Vikash o Bhasatatwik porichoy (Same as A1)
Credit	4
Classes/ Week	04

The students of Bengali (Mutidisciplinary) of Semester -II will acquire the knowledge about origin and development of Bengali language, Bengali linguistics and Bengali grammar by studying this course.

This course provides the students with -

CO1 – Origin and development of Bengali Language, stages of Bengali language, dialects, and folk languages.

CO2 – Bengali Phonetics, IPA, Morphology, Bengali Semantics, Bengali Grammar, - Dhati O Pratyaya, Karak O Bibhokti, Linga, Bachan, Samas.

Semester	II
Paper	Minor Ben (Disc -2)
Paper Code	BENM102
Title of the Paper	Bangalir dhormo o Sanskriti ebong Bangla Sahityer Sadharon Porichoy.
Credit	4
Classes/ Week	04

The student of Bengali (Multidisciplinary) of Semester -II will acquire the knowledge about the history of religion and culture of ancient Bengal and history of Bengali literature by studying this course.

This course provides the students with –

CO 1 – knowledge on cultural and religious history of ancient Bengal.

CO2 – history of Bengali literature of ancient period.

CO3 – history of Bengali literature of medieval period.

Semester	II
Paper	SEC
Paper Code	BENSSEC02
Title of the Paper	Bangla Pratibedan Rachana/ Sambad Path o Tatkhonik Biboron.
Credit	3
Classes/ Week	03 (P)

The students of Bengali (Multidisciplinary) of Semester -II will acquire the practical knowledge about Bengali reportage writing, news reading and commentary by studying this course.

This course provides the students with –

CO1 – Practical Knowledge on reportage writing.

CO2 – Practical knowledge on news reading and commentary.

Course Outcome

Common Course
For Hons. and MDP

Semester	II
Paper	AEC
Paper Code	AEC -2T:MIL-01
Title of the Paper	Bangla Bhasa -Prasanga o Onobad
Credit	02
Classes/ Week	02

The students of Honours and Multidisciplinary of Semester -II will acquire the knowledge about socio linguistics; theoretical and practical knowledge on translation; linguistics, and grammatical features of contemporary by studying this course.

This course provides the students with –

CO1 – Knowledge on Socio linguistics i.e. language planning, spelling rules in Bengali Language,

CO2 – Theoretical and Practical knowledge on translation.

CO3 – Bengali Language in the perspective of religion, profession, gender.

CO4 – Contemporary Bengali language: Standard and colloquial, its grammatical features.

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DEPARTMENT OF BENGALI (PG)

Course Outcome

Semester	I
Title of Paper	BHASAR ITIHAS O PARICHOY
Course Code	BNG 101

After gone through this paper students will be able to attain the knowledge on Origin and development of Bengali linguistics, about the origin and development of Bengali scripts, which are the basis of Bengali Literature.

This course (BNG 101) provides the student with-

CO1: Outline of Indo-European Language groups; its branches, origin of Indo-Aryan languages, its historical development and transformations.

CO2: Discussion on Middle -Indo- Aryan languages, its classifications, linguistic features, transformations.

CO3: Discussion on Neo -Indo- Aryan languages, its classifications, linguistic features, transformations.

CO4: Discussion on languages, originated from Magahi – Prakrit, its phonics and morphological features.

CO5: Origin of Bengali languages, its development, three stages of its development.

CO6: Origin and development of scripts, historical development of Bengali scripts.

Semester	I
Title of Paper	PRACHIN O MADHYAJUGER BANGLA SAHITYA OSAMAJ SANSKRITIR PORICHOY
Course Code	BNG 102

After gone through this paper students will be able to attain the knowledge on different trends of ancient and medieval Bengali literature, will be enriched themselves with knowledge of socio economic, cultural,historical, religious streams of ancient and medieval Bengali literature.

This course (BNG 102) provides the student with-

CO1: History of Bengal, - its political, socio economic, cultural features religious perspectives with special focus on ninth to twelfth century Bengal.

CO2: Discussion on pre-chaitanya sahitya in connection with Charyagiti, S rikrishnakirtan, Mongal kabya, Baishnava padabali.

CO3: Discussion on various trends of medieval Bengali literature, in connection with Influence of Sri Chaitanya deva, development of translated verses, biography-oriented verses, Vaishnava literature.

CO4: Discussion on Nath Sahitya, its features, literary qualities, elements of acculturation in it.

CO5: Discussion on Mangal Sahitya, its classification, impact of sociological changes in it, its literary value, different poets of this stream.

CO6: Discussion on Arakan Court literature, its distinctive features which reflects in its humanitarian view, poets of this stream, literary values.

Semester	I
Title of Paper	PRACHIN O MODHYAJUGERSAHITYAPATH
Course Code	BNG 103

After gone through this paper students will be able to attain the knowledge on Origin and development of Bengali language through the literature, about the development of Bengali lyrical attitude, which are the basis of Bengali Literature.

This course (BNG 103) provides the student with-

CO1: Discussion and selected reading on prakritopaingal, text analysis, literary and linguistic features.

CO2: Discussion and selected reading on Gitagobindam, text analysis, literary and linguistic features, trends of Baishnava lyrics.

CO3: Discussion and selected reading Charyapada, text analysis, literary and linguistic features.

CO4: Discussion and selected reading on Sri Krishnakirtan Kavya, text analysis, literary and linguistics features.

CO5: Discussion and selected reading on Ramayana by Krittibas Ojha, text analysis, literary features.

CO6: Origin and development of Bengali language through literature, historical development of Bengali language, society, aesthetic features reflected in early Bengali verses.

Semester	I
Title of Paper	MADHYAJUGER SAHITYAPATH
Course Code	BNG 104

After gone through this paper students will be able to attain the knowledge on Origin and development of Bengali language through literature, about the development of late - medieval Bengali literature, its features which are the basis of Bengali Literature.

This course (BNG 104) provides the student with-

CO1: Verses of Vidyapati,- selected text reading, its literary values, features of pre-Chaitynya Baishnava traits in Baishnava texts.

CO2: Verses of Chandidasa,- selected text reading, its literary values, features of pre-Chaitynya Baishnava traits in Baishnava texts.

CO3: Verses by Gyanadasa,- selected text reading, its literary values, features of post-Chaitynya Baishnava traits in Baishnava texts.

CO4: Verses by Gobindadasa,- selected text reading, its literary values, features of post-Chaitynya Baishnava traits in Baishnava texts.

CO5: Discussion and selected reading on Chitaynya Charitamrita, features of Gouriyo baishnava philosophy reflected in it, its literary values, historical elements.
CO6: Discussion and selected reading on Chandimongal Kabya, its literary values, historical elements, about the poets.
CO7: Discussion and selected reading on Padmavati Kabya, its literary values, historical elements, about the poets.

Semester	I
Title of Paper	BANGLA GODYA O PRABANDHA SAHITYER ITIHAS O PATH
Course Code	BNG 105

After gone through this paper students will be able to attain the knowledge on Origin and development of Bengali literature in its modern periods through literature, about the development of Bengali prose, essays, - factors related to Bengal Renaissance.

This course (BNG 105) provides the student with-

CO1: Development of Bengali Prose, its styles, contents through the essays written by Scholars of Fort William College; contribution of Rammohan Roy, Bhabani Charan Bandopadhyaya, Pyarichand Mitra, Kaliprassana Singha, Vidyasagar, Akshay Kumar Dutta, Bankimchandra, Rabindranath, Vivekananda, Haraprasad Shastri, Ramendra sundar Trivedi,Pramatha Chaudhury, Abanindranath Thakr,Annadasankar Roy, Buddhadev Basu,Abu Sayed Ayub, Shankha Ghosh,- content of their writing, style of writing, literary values.

CO2: Discussion and reading on the text Shakuntala by Vidysagar, features of Vidyasagar's writing, style of proses reflected in it, its literary values, socio -cultural elements and comparison of this translation work with its original written by Kalidasa in Sanskrit.

CO3: Discussion and selected reading on the essays, Kamalakanter Dofter by Bankim Chandra Chattopadhyaya, content of the book, features of Bankim Chandra's writing, styles of proses reflected in it, its literary values, socio -cultural elements and impact of Dequincy reflected on it.

CO4: Discussion and selected reading on the essays, - Bangalar Itihas, Monpasssant, Chekhov O Rabindranath, shikha o sanskriti, Sukh Na dukkho, Bharat Chandra, Samajtantra- content of the essays, different styles of proses reflected in it, its literary values, socio -cultural elements.

Semester	II
Title of Paper	SADHRAN BHASABIGYAN
Course Code	BNG 201

After gone through this paper students will be able to attain the knowledge on the development of Bengali linguistics, Socio linguistics, which knowledge are the basis of studies of Bengali Language and Literature.

This course (BNG 201) provides the student with-

CO1: Bengali Phonetics, its basic elements, - Phone, Phonemes, Alophones; undistributed vowels, positions of vowels, about vowels and consonents, International phonetic alphabets and its applications.

CO2: Morphology and its elements, - morph, morphemes, Allomorphs, varieties in Bengali morphology.

CO3: Sentence, Part of sentences, structure of Bengali sentences, transformations theories- its discussion and classifications.

CO4: Socio-linguistics and its components, - social dialect, its discussion; register, diglossia, definition, features; languages through variation of age, religion, profession, gender; language planning and its development and features.

Semester	II
Title of Paper	BANGLA KABYA_KOBITAR ITIHAS O PATH
Course Code	BNG 202

After gone through this paper students will be able to attain the knowledge on the development of Bengali verses in nineteenth and twentieth centuries, text reading, its styles, contents, impact of Bengal Renaissance and other western theories in this period.

This course (BNG 202) provides the student with-

CO1: Discussion on literary works of selected poets, - Iswar Chandra Gupta, Madhusudan Dutta, Biharilal Chakraborty, Hemchandra Bandopahyaya, Nabin chandra Sen, Girindramohini Dasi, Rabindranath Tagore, Satyendranath Dutta, Jatindranath Sengupta, Mohitlal Majumdar,Kalidas Ray,Najrul Islam, Jibananda Das,Bisnu De,Amiya Chakraborty,Sudhindranath Dutta,Arun Mitra, Samar Sen,Subhas Mukhopadhyaya,Sakti Chattopadhyaya,Shankha Ghosh,Kabita Singha.

CO2: Text reading on 'Meghnadbodh kabya' by Madhusudan dutta, its content, styles, Blank verse introduced by poet known as amitrakhor chhanda, influence of oriental and western elements in this text, features of literary epic in it, literary values.

CO2: Text reading on collected poems by the poets of nineteenth and twentieth century, its content, styles, features of pre and post -Tagore writings in it, influence of oriental and western elements in these texts, patriotism, romanticism, images of these texts, neo- romanticism, impact of second world war reflected in it, literary values.

CO3: Text reading on 'Banalata Sen' by Jibinanda Das, its content, style, features of post -Tagore writings in it, influence of oriental and western elements in this text, images of this text, neo- romanticism reflected in it, literary values.

Semester	II
Title of Paper	RABINDRA SAHITYA PATH
Course Code	BNG 203

After gone through this paper students will be able to attain the knowledge on theTagorean literature written in nineteenth and twentieth centuries, text reading, its styles, contents, forms, development of new trends in Bengali literature through the creation of Rabindranath Tagore.

This course (BNG 203) provides the student with-

CO1: Discussion on poetical works of Rabindranath Tagore through selected poems of Tagore, - its content, styles, philosophy of mortality and immortality reflected in

this poem, images used in this text, meters of this book, significance of these texts amongst Tagore,s creations.

CO2: Text reading on 'Raktakorobi' by Rabindranath Tagore, its content, styles, philosophy and social conflict reflected in this drama, images and songs used in this text, songs dialogues, characters of this text, significance of this text amongst Tagore's creations.

CO3: Text reading on 'Chaturanga' by Rabindranath Tagore, its content, styles, philosophy and social conflict reflected in this novel, images used in this text, plot, dialogues, characters of this text, significance of this text amongst Tagore's creations.

CO4: Text reading on selected short stories by Rabindranath Tagore, its content, styles, philosophy, and social conflict reflected in this story, images used in this text, plot, dialogues, characters of those texts, treatment of nature, super-naturalism, significance of those texts amongst Tagore's creations.

Semester	II
Title of Paper	BANGLA BHASA O SAHITYER PATH (MADHYA YUG)
Course Code	BNG 204 (CBCS)

This paper is aimed to the students who are not belonging to Bengali postgraduate course. After gone through this paper students will be able to attain the knowledge on the Bengali language and literature of medieval period. They will get basic knowledge on Bengali linguistics; will be enriched themselves with the Bengali literature written in medieval period of Bengali literature, - text reading, its styles, contents, forms.

This course (BNG 204) provides the student with-

CO1: Origin and development of Bengali language, Vowels and Consonants, International phonetic alphabet (IPA), - general idea, translation methodologies.

CO2: Discussion on medieval Bengali literature in connection with Baishnavapada, text reading, its religious aspects, philosophy reflected in it,difference between pre and post baishnava traits, literary values, eminent poets and their poetic features.

CO3: Discussion on medieval Bengali literature in connection with Shaktapada, text reading, its religious aspects, philosophy, socio - polotical aspects reflected in it, literary values, eminent poets and their poetic features.

CO4: Discussion on 'Thakumar jhuli' collected by Dakshinaranjan Mitra Majumdar in connection with Rupa katha – a division of folk tale, - text reading, its folk element, philosophy, ethics, social aspects reflected in it, literary values.

CO5: Discussion on 'Mahua' of 'Moimonsingha gitika' in connection with Gitika i.e. Ballad – a division of folk literature, - text reading, its folk element, philosophy, ethics, social aspects reflected in it, literary values.

Semester	II
Title of Paper	GOBESHONA DHORMI PROKOLPO ROCHONA
Course Code	BNG 205

After completion of this paper, students will be able to write a Project Paper with applying proper methodologies.

This course (BNG 205) provides the student with-

CO1: Discussion on research methodologies, its definition, different views with suitable examples.

CO2: Discussion on different components of a Project paper as mentioned by affiliating university with suitable examples.

CO3: Discussion on the process of selection of title of the project.

CO4: Practical work on writing of a Project paper.

Semester	III
Title of Paper	BANGLA UPONYASER ITIHAS O PATH
Course Code	BNG 301

After gone through this paper, students will get knowledge on development of Bengali novels, its historical outlines, text reading, narratology, socio-cultural perspective, literary values as well.

This course (BNG 301) provides the student with-

CO1: Historical outline and development of Bengali novels of nineteenth and twentieth century; its contents, forms, socio -cultural perspectives reflected in it, literary values through the writings of Bankimchandra, Swarnakumari Devi,Rabindranath,Saratchandra, Bibhutibhusan Bandipadhyaya, Tarasankar Bandopadhyaya, Manik Bandopadhyaya, Banaphool, Saradindu Bandopadhyaya, Satinath Bhaduri, Asapurna Devi,Samaresh Basu, Mahasweta Devi.

CO2: Text reading on 'Kapalkundala' by Bankim Chandra Chattopadhyaya, its content, style, philosophy and social conflict reflected in this novel, significance of this text in the stream of Bengali novels.

CO3: Text reading on 'Aronyok' by Bibhutibhusan Bandopadhyaya, its content, style, philosophy and treatment of nature reflected in this novel, significance of this text in the stream of Bengali novels.

CO4: Text reading on 'Prothom protisruti' by Ashapurna Devi, its content, style, philosophy, and protest patriarchal structure of the socity, journey of a women for her identity - reflected in this novel, significance of this text in the stream of Bengali novels.

Semester	III
Title of Paper	BANGLA CHHOTOGOLPER ITIHAS O PATH
Course Code	BNG 302

After gone through this paper, students will get knowledge on development of short stories, its historical outlines, text reading, narratology, socio-cultural perspective, literary values as well in the light of selected short stories of Bengali literature, Stories from other Indin regional and world literature.

This course (BNG 302) provides the student with-

CO1: Historical outline and development of Bengali short stories of twentieth century; its contents, forms, socio -cultural perpectives reflected in it, literary values through the writings of Rabindranath, Pravat Kumar Mukhopadhyaya, Parosuram,Jagadish Gupta, Bibhutibhusan Bandopadhyaya, Tarasankar Bandopadhyaya, Manik Bandopadhyaya,Banaphool, saradindu Bandopadhyaya,Premendra Mitra,Asapurna

devi, Subodh Ghosh, jyotirindra Nandy,Narendranath Mitra, Narayan Gangopadhyaya,Bimal Kar,Samasesh Basu, Mahasweta Devi.

CO2: Text reading on collected short stories by the eminent and contemporary writers of Bengali literature, - contents, styles, philosophy and social conflict reflected in these short stories, impact of second world war, impact of contemporary social changes in it.

CO3: Text reading on collected short stories written by the eminent writers of world literature, - contents, styles, philosophy and social conflict reflected in these short stories, enlightenment of the students with the masterworks of short stories of world literature, their literary values; revelation of pan humanistic approach and struggle reflected in these stories.

CO4: Text reading on collected short stories written by the eminent writers of regional Indian literature, - its content, styles, philosophy and social conflict reflected in these short stories, to enlighten the students with the masterworks of Indian regional short stories, their literary values; revelation of common Indian human life and struggle reflected in these stories.

Semester	III
Title of Paper	BANGLA NATYA SAHITYER ITIHAS O PATH
Course Code	BNG 303

After gone through this paper, students will get knowledge on development of Bengali dramas, in Nineteenth and Twentieth century, - historical outlines, text reading, socio-cultural perspective,literary values, concept of theatre literacy as well.

<u>This course (BNG 303) provides the student with-</u>

CO1: Historical outline and development of Bengali dramas and Bengali farses of Nineteenth and Twentieth century; its contents, forms, socio -cultural perspectives reflected in it; literary values through the writings of Ramnarayan Tarkaratna, Madhusudan Dutta, Dinabandhu Mitra, Girish Chandra Ghosh, Jyotirindranath Tagore, Rabindranath Tagore, Diwedjadralal Roy, Bijan Bhattacharya, Manmatha Roy, Utpal Dutta, Manoj Mitra, Badal Sarkar.

CO2: Text reading on 'Bur Salikher Ghare Roan' by Madhusudan Dutta, its content, style, philosophy and social conflict reflected in this text, impact of Young Bengal movement in it.

CO3: Text reading on 'Nurjahan' by Dwijendralal Roy, its content, style, literary values as historical drama.

CO4: Text reading on 'Nabanna' by Bijan Bhattacharya, its content, style, impact of People's theatre movement (Gana natya Andolan) of Bengal in it.

Semester	III
Title of Paper	BANGLA BHASA O SAHITYA PATH (ADHUNIK)
Course Code	BNG 304(CBCS)

After gone through this paper, students will get the concept on oriental poetics and its applications, development of Bengali literature, in Nineteenth and Twentieth century, its historical outlines, text reading, socio-cultural perspective, literary values.

This course (BNG 304) provides the student with-

CO1: Text reading on collected poems by the poets of nineteenth and twentieth century, its content, styles, features of pre and post -Tagore writings in it, influence of oriental and western elements in these texts, patriotism, romanticism, images of these texts, neo- romanticism, impact of second world war reflected in it, literary values.

CO2: Text reading on 'Sajano Bagan' by Manoj Mitra, its content, form, style, uniqueness amongst Bengali theatre, characteristics of Manoj Mitra's writngs reflected in this text, literary values.

CO3: Text reading on 'Srikanta' (1st part) by Sarat Chandra Chattopadhyaya, its content, distinctive features reflected in the work, - romanticism, auto- biographical element in it; social conflict and approach of critical realism, literary appreciation of the text.

CO4: Text reading on collected short stories by the eminent writers of twentieth century Bengali literature, - its content, socio -pollical background, distinctive features reflected in the work; social conflict and approach of critical realism, literary appreciation of those texts.

Semester	III
Title of Paper	BISHES POTRER PROKOLPA PATRO UPOSTHAPON
Course Code	BNG 305

After completion of this paper, students will be able to write a Project Paper with applying proper methodologies.

This course (BNG 305) provides the student with-

CO1: Discussion on research methodologies, its definition, different views with suitable examples.

CO2: Discussion on different components of a project paper as mentioned by affiliating university with suitable examples.

CO3: Discussion on the process of selection of title of the project.

CO4: Practical work on writing of a Project paper.

CO 5: Application of their knowledge regarding their concerned special papers.

Semester	IV
Title of Paper	SAHITYEE KATHANTOR, PATHANTOR, RUPANTOR O ONUBAD
Course Code	BNG 401

After gone through this paper, students will get the concept and knowledge on transformation of a text, re-structuring of a text, translation of a text.

This course (BNG 401) provides the student with-

CO1: Discussion on the transformation of folk literature.

CO2: Text reading on 'Rajani' by Bankim Chandra Chattopadhyaya and its comparative study of multiple editions and find out the differences among the texts and evaluation of the changes done by the author.

CO3: Discussion on the transcreation with reference to the text 'Rajarshi', - a novel to 'Bisarjan', a drama by Rabindranath Tagore, - change of genre in a same plot strcture, its evaluation from a creation to transcreation.

CO4: Discussion on the translation works of 'Meghdoot by Rajsekhar Basu, its evaluation as a translation work, comparison with original text of Kalidasa and other Bengali translations on the text which are available.

Semester	IV
Title of Paper	PRACHYA SAHITYATATWA
Course Code	BNG 402

After gone through this paper, students will get the concept and knowledge on Oriental poetics, Sanskrit poetics by Viswanath Kabiraj, Rupa Goswami, Tagorean vision on aesthetics.

This course (BNG 402) provides the student with-

CO1: Discussion on the oriental concept of poetics, - Alonkar, definition, explanations, application on contemporary literature.

CO2: Riti, definition, explanations, application on contemporary literature

CO3: Bokrokti, definition, explanations, application on contemporary literature.

CO4: Oichitya, its definitions, features, applications, possibilities, limitations, application on contemporary literature. Comparative study with Western concept of aesthetics.

CO5: Dhwani, its definitions, features, applications, possibilities, limitations, application on contemporary literature. Comparative study with Western concept of aesthetics.

CO6: Rasa, its definitions, features, applications, possibilities, limitations, application on contemporary literature. Comparative study with Western concept of aesthetics

CO7: Text reading on Sahitya Darpan by Viswanath Kabiraj, its analysis on Sthayi bhab, its merits, limitations, its influence on Bengali Texts.

CO8: Text reading on 'Ujjwal Nilmani' by Rupa Goswami, its analysis on bheda prakarana, - nayaka, nayika, Haripriya; its analysis in the light of gouriya baishnava darshan.

CO9: Discussion on the works of Rabindranath on aesthetics in the text Sahitya, - text reading, analysis on concept of literature, concept of literary criticism, concept of beauty, concept of truth, connection between picture and literature, search for humanity and eternity in literature.

Semester	IV
Title of Paper	PASCHATYA SAHITYATATWA
Course Code	BNG 403

After gone through this paper, students will get the concept and knowledge on classical and contemporaryWestern poetics, historical outline of Western literary movements and Criticism of theories; Comparative study of western aesthetics with oriental theories.

This course (BNG 403) provides the student with-

CO1: Discussion on Western literary movements, its background, traits, impact on world literature, influence on Bengali literature.

CO2: Discussion on Western theory of criticism, its background, traits, impact on world literature, influence on Bengali literature, literary analysis of the text with studied theories.

CO3: Discussion on 'Poetics' by Aristotle, features of Greek aesthetics, analysis on the book Poetics, features of tragedy, epic, comparison between tragedy and epic, possibilities of Aristotle's concept, its limitations.

CO4: Discussion on 'Biographia Literaria' by Colridge, - conflicts in the poet's mind, the incongruities between the text and meaning, the probable difficulties in writing, reading, formimg a critical discourse, editing the text etc.

CO5: Discussion on 'Defence of poetry' by P.B. Shelly, - its analysis and critical appreciation.

CO6: Discussion on 'Symbolism in painting' by W.B Yeats, - its analysis and critical appreciation.

C O7: Discussion on 'Tradition and individual talent' by T.S.Eliot ,- its analysis and critical appreciation.

Semester	IV
Title of Paper	BHASA ANDOLON, BAHIRBONGIYO BANGLA SAHITYA EBONG BANGLA O PRATIBESHI SAHITYER TULONAMULOK CHARCHA
Course Code	BNG 404

After gone through this paper, students will get the concept and knowledge on Bengali literature created and nurtured in outside Bengal and in Bangladesh. This course will enhance the knowledge sphere of the students and widen the geographical boundaries of the literature and encourage the concept of acculturation amongst the literature in the light of comparative study of regional literature. Students also get the knowledge on freedom movements happened due to freedom of the language.

This course (BNG 404) provides the student with-

CO1: Discussion on the freedom movements occurred for the liberty of mother language, its history, description, its overall impact on the people, region and language with a special focus on language movement in Bangladesh, Manbhum, Barak.

CO2: Historical back ground and discussion on Bengali literature inculcated in undivided Bihar; about the writers, how the local factors influenced the Bengali literature.

CO3: Historical background and discussion on Bengali literature inculcated in Uttar pradesh; about the writers, how the local factors influenced the Bengali literature.

CO4: Historical background and discussion on Bengali literature inculcated in Assam and Tripura; about the writers, how the local factors influenced the Bengali literature.

CO5: Comparative study of Bengali literature with regional literature with special focus on Rabindranath Tagore and Mahadevi Barma; Jytirindranath Tagore and

Jyotiprasad Agarwala; Sarat Chandra Chattopadhyaya and Munsi Premchand in the light of their selected texts.

CO6: Brief history of literature of Bangladesh, - its content, style, features.

Semester	IV
Title of Paper	SPECIAL PAPER: i. DRAMA ii. FICTION
Course Code	BNG i. 405E and ii. 405G

After gone through this paper, students will get the enhanced knowledge on Bengali Drama. Students will be acquainted with the theories of the drama; besides that, student will get the experience of reading of path breaking Bengali dramas which will not only widen the knowledge sphere of the students but also connected them with world theatre and drama as well.

This course (BNG 405E) provides the student with-

CO1: Historical back ground and theoretical discussion on Bengali drama, its definition, classifications.

CO2: Discussion on theatres, classifications of the theatres, origin and development of Bengali theatres.

CO3: Text reading and critical appreciation on the drama' Ebong Indrajit by Badal Sarkar'.

CO4: Text reading and critical appreciation on the drama' Ja Nei Bharate by Manoj Mitra.

CO5: Text reading and discussion on' collected' one act play, critical appreciation of the texts.

This course (BNG 405G) provides the student with-

CO1: Historical back ground and theoretical discussion on Bengali Fiction, its definition, classifications.

CO2: Discussion on Novel and short stories, classifications of the Novel and short stories, origin, and development of Bengali Fiction.

CO3: Text reading and critical appreciation on the novel 'Tungabhadrar teere' by Saradindu Bandipadhyaya.

CO4: Text reading and critical appreciation on the novel 'Sambo' by Kalkuta.

CO5: Text reading and discussion on' collected' short stories and critical appreciation of the texts.

NARAJOLE RAJ COLLEGE

(NAAC Accredited 'B' Grade Govt. Aided College)
NARAJOLE: PASCHIM MEDINIPUR: WEST BENGAL: Pin-721211
Phone and Fax: +91- 9933881131: E-mail: *narajoleracollege@rediffmail.com*
Website: http://www.narajolerajcollege.ac.in

Programme Specific Outcomes (PSOs)

Bengali (Hons.)

Bengali literature is very significant and rich from different aspects. Bengali is not only our vernacular language; but also, our proud possession. Many famous writers and poets have contributed their immortal works in Bengali language. Rabindranath Tagore, being a writer of a regional language, earned world fame and was awarded Nobel prize for his literature. Nirod Chandra Chowdhury, Jiban Ananda Das also drawn world fame for their creative minds. Bengali literature is much needed in the field of Indian language. After completion of the programme students will attain the knowledge on Bengali linguistics, Bengali literature, get training on methodologiesof various professional writings i.e., reportwriting, interviews, drafting of advertisements.

After completion of the programme, the graduates will be capable of-

PSO1: The human aspects and subtle senses get widen in the close touch of literature.

PSO2: The evolution of Bengali language since the ancient period and the medieval ages and its present position has fully been described in the Bengali language and literature.

PSO3: The History of Bengali literature gives us an idea about the economic, social, political, cultural history of Bengal.

PSO4: Drama, Novel, Short stories, Poems which are written in Bengali were transformed into performingart.

PSO5: Students of Bengali literature are taught how to make a critical appreciation of a text.

PSO6: Bengali literature has contributed to the world cinema, Indian cinema, Theatres with its many rich creations. Transformations of art forms is discussed in course of learning.

PSO7: Studies of regional literature and world literature widen the scope of comparative studies and analysis.

PSO8: Through the studies of skill enhancement courses, the practical skill of the students i.e., skill of script writing,report writing, interviews, creative writing, preparing of project papers are taught.

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E-mail: *narajolerajcollege@rediffmail.com*
Website: *thtps://www.narajolerajcollege.ac.in*

Programme Specific Outcomes (PSOs)

Bengali (General)

Bengali literature is very significant and rich from different aspects. Bengali is not only our vernacular language; but also, our proud possession. Many famous writers and poets have contributed their immortal works in Bengali language. After completion of the programme students will attain the knowledge on Bengali linguistics, Bengali literature, get training on methodologies of various professional writings i.e., writing of formal letters, reprts, drafting of advertisements, writing of abstracts, explanations, paragraphs.

After completion of the programme, the graduates will be capable of-

PSO1: The human aspects and subtle senses get widen in the close touch of literature.

PSO2: The evolution of Bengali language since the ancient period and the medieval ages and its present position has fully been described in the Bengali language and literature.

PSO3: The History of Bengali literature gives us an idea about the economic, social, political, cultural history of Bengal

PSO4: Drama, Novel, Short stories, Poems which are written in Bengali were transformed into performingart.

PSO5: Students of Bengali literature are taught how to make a critical appreciation of a text.

PSO6: Methodologies of various professional writings are practiced which enhance the employability of the programme

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NARAJOLE: PASCHIM MEDINIPUR: WEST BENGAL: Pin-721211
E-mail: narajolerajcollege@rediffmail.com
Website: https://www.narajolerajcollege.ac.in

Course Outcome

Bengali (Hons.)

Semester	I
Title of Course	Bangla Bhasar Udbhab O Parichay
Paper Code	CC1
Credits	06
Hours	06 hours/week

After gone through this paper, students will be able to attain the knowledge on linguistic features of Bengali Language. As language is the basis of literature, so it is essential to acquire the knowledge of this specific language to get deep knowledge of Bengali literature. Besides that, the development of Indo -Aryan language, comparative analysis of different stages of Indo-Aryan language are discussed in this paper.

This course (CC-1) provides the students with-

CO1: Origin and development of Indo-European languages and its different branches and origin of Indo-Aryan Language and its historical analysis and descriptions.

CO2: Different Stages of transformation of Indo-Aryan languages, -Old Indo Aryan, Middle- Indo Aryan, Neo- Indo Aryan.

CO3: Development of Bengali Vocabulary, - its different sources, - tat-sama, tat-bhaba desi, bi-desi, their description, uses with suitable examples.

CO4: Bengali Phonetics and its definition, classifications, features with suitable examples.

CO5: Bengali Semantics and its classifications, rules of transformations of words.

CO6: Bengali Grammar and its usages.

CO7: Bengali Folk languages and local dialects, - their phonetical and morphological features.

Semester	I
Title of Course	Bangla Sahityer Itihas (Prachin O Madhyayug)
Paper Code	CC2
Credits	06
Hours	06 hours/week

After completion of this course students are able to get the knowledge on Old and Medieval Bengali literature. Through these studies, students also know the socio - cultural, religious aspects of Old and Medieval Bengal which also reflected in its Literature. Students are also be aware of linguistics features of these periods. Students will also learn the difference of literary views of Old and Middle ages of Bengal with its modern ages.

This course (CC-2) provides the studenst with-

CO1: Historical and aesthetical studies of Old Bengali Literature with special reference to Charyapada, social structure reflected in the text, religion, poets, their features.

CO2: Studies of Sahajiya Buddhist cult with refenrence to Charyapada.

CO3: Studies of Baishnavapadabali and its aesthetic approaches, philosophical aspects,.poets, their features.

CO4: Influence of Chaitynyadeva in medieval Bengali literature, origin and development of Translated Verses and Biographical Verses in medieval Bengali literature.

CO5: Critique on Mangal Kabya sahitya, its literary value, religious aspects, socio-cultural perspective in reference with historical reading of different Mangal Kabya.

CO6: Introducing Humanity in medieval Bengali literature to the reference with Arakan Court Literature.

CO7: Critique on Late Eighteenth-Century literary elements, - Nath Sahitya, Baul gitika etc.

Semester	II
Title of Course	Prachin O Madhya Yuger Padapath
Paper Code	CC3
Credits	06
Hours	06 hours/week

After completion of this course Students will get an introduction with Old and Medieval verses of Bengali Literature. They Will be capable to appreciate the text of Old and Medieval literature, will get an idea on language, meters and figures of speeches of those days, will be able to compare the literature of Modern period with Ancient and Medieval ages.

This course (CC3) provides the students with:

CO1: Text reading, critique on Charayapada, Socio-cultural perspectives of the text, about the Poets, - their works, religious aspects, historical value, linguistic features, literary value.

CO2: Critique on Baishnavapadabali , text reading, its religious features, aesthetic approaches , differences between pre and post Chaitynadeva period, Baishnava cult and its reflections on these poems.

CO4: About the poets of Baisnavapada,-Vidyapati, Chandidasa, Jyanadasa, Govindadasa; their poetic features, influence of Jayadeva on vidyapati, influence of Vidyapati on Govindadasa, influence of Chandidasa on Jyanadasa,- their comparasions.

CO4: Socio- cultural perpective of Eighteen century Bengali literature with reference to Shaktapadabali; its religious aspects, aesthetic approach and text reading of poems of Eminent Poets of this section, literary value of the texts.

Semester	II
Title of Paper	Chaityanya Jiboni O Mangal Sahitya Path
Course Code	CC4
Credit	06
Hours	6hrs/Week

After completion of this course Students will get an introduction with Medieval verses of Bengali Literature. They Will be capable to appreciate the text of Medieval literature, will get an idea on language, meters and figures of speeches of those days, will be able to compare the literature of Modern period with Medieval ages.

This course (CC4) provides the students with:

CO1: Critique on biography- verse of Chaityanyadeva and socio-cultural analysis of the text 'Chaitanya Bhagabat', about the poet Vrindaban Das, comparative study with other Biographies on Chaitynyadeva.

CO2: Critique on 'Chandimangal Kabya' and features of medieval literature with the light of the text, about the poet, socio cultural perspective of the text, literary values.

CO3: Critique on 'Annadamangal Kabya' and features of late eighteenth-century court literature with the light of the text, about the poet, craftmanship of Bharatchandra, comparative study with other medieval poets, socio cultural perspective of the text, literary values.

Semester	III
Title of Paper	Unis -Bis Sataker Probondho O Kabya Sahityer Itihas
Course Code	CC5
Credit	06
Hours	6hrs/Week

After completion of this course, Students will get an introduction with nineteenth and twentieth century Bengali essays and Poetries. They Will be capable to appreciate the text, will get an idea on Style, content, socio-cultural study of the text, western and oriental influence on them.

This course (CC5) provides the students with:

CO1: Outline of Nineteenth century Bengali essays, development and growth, social purposes of the texts, impact of renaissance on them.

CO2: Outline of Twentieth century Bengali essays, development and growth, relationship with the Bengali periodicals.

CO3: Discussion on Nineteenth and Twentieth century Bengali essays and its content, about the essayists, literary aspects.

CO4: Formal Study of modern Bengali essays.

CO5: Outline of Nineteenth century Bengali poetries, development and growth, western influence on it.

CO6: Outline of Twentieth century Bengali poetries, development and growth, western influence on it.

CO7: Comparative study amongst the poets and their poetries, oriental philosophies which have impact on Bengali Modern poetries.

CO8: Formal Study of modern Bengali poetries.

Semester	III
Title of Paper	Chhanda -Alonkar O Nirbachito Kobita Path
Course Code	CC6
Credit	06
Hours	6hrs/Week

After completion of this course, Students will get an introduction with Bengali metres and figure of speeches and Poetries. They Will be capable to appreciate the text, will get an idea on scansion of a text, will be able to identify the figure of speeches, text reading of a poetry, socio-cultural study of the text, western and oriental influence on them.

This course (CC6) provides the students with

CO1: Studies on Bengali meters and its classifications, methodologies, scansion of a text.

CO2: Studies on Bengali Figure of Speeches and its classification and process of its identifications.

CO3: Applications of various meters in Bengali poetries with suitable examples.

CO4: Applications of various Figures of speeches in Bengali poetries and proses with suitable examples.

CO5: Critique on modern Bengali poetries; text reading and stylistics of the poems, about the poets and their poetic features.

Semester	III
Title of Paper	Probondho Sahityo Path
Course Code	CC7
Credit	06
Hours	6hrs/Week

After completion of this course, Students will get an introduction with Bengali essays, its development and growth. They Will be capable to appreciate the text, will get an idea on contemporary polemics, polities exist in the society through this study, socio-cultural study of the text, western and oriental influence on them.

This course (CC7) provides the students with:

CO1: Critique on Essays of Bankimchandra Chattapadhyaya, development of Bengali essays, the purposes of the introduction of such literary forms.

CO2: Features of Bankimchandra Chattopadhyaya's writing.

CO3: Reflections of Nineteenth century's Renaissance and Revivalism reflected in Bankimchandra Chattapadhyaya's essays.

CO4: studies on eminent Bengali essayist accordance with their essays; development of Bengali essays in styles and contents.

CO5: Studies on essays of Ramendrasundar Trivedi, an eminent scientist and essayist of Bengali language and literature; his style, variety of contents, reflection of Bengal renaissance in his writings.

Semester	III
Title of Paper	Bangla Byakaron O Onubadtatwa
Course Code	SEC1
Credit	02
Hours	2hrs/Week

After gone through this paper, Students will attain the specialised knowledge on Bengali grammar, constructions of Bengali words, its applications, translations and its theories, and its applications.

<u>This course (SEC1) provides the students with:</u>

CO1: Selected studies on Bengali Grammar which is applicable in the case formation of Bengali words.

CO2: Theories of translations; its classifications, Features.

CO3: Studies on Bengali Terminology, its historical development, recent trends.

Semester	IV
Title of Paper	Unis O Bis Sataker Natya O Kathasahityer Itihas Ebong Chhotogolpo Path
Course Code	CC8
Credit	06
Hours	6hrs/Week

After completion of this course, Students will get an introduction with Bengali drama and theatre and fictions, its development and growth. They Will be capable to appreciate the text of short stories, will get an idea on socio-cultural study of the text, narratology of a text, about the writers and their style of the writing.

This course (CC8) provides the students with:

CO1: Outline of Nineteenth century Bengali Theatre; its development and discussion and Oriental and Western influence on it.

CO2: Outline of Twentieth century Bengali Theatre; Development of Concept of Amateur and Professional Theatre, how the Popularization Mechanisms influence in it, Development of Peoples 'theatre concept, Development of Third theatre concept in Bengali Theatre.

CO3: Sketches of Nineteenth and twentieth Century Bengali Novels; origin and development of Bengali Novels, Inculcation of Romanticism, Realism, Naturalism, Stream of Consciousness, Marxism in Bengali Novels.

CO4: Socio- cultural studies on Bengali Novels; Stylistics of Bengali Novels.

CO5: Outline of Bengali Short stories; its development, development of Romantic and realistic approaches in Bengali short stories, Western influence in it, impact of World War -II in Bengali short stories, Impact of Feminist movement in Bengali Short stories.

CO6: Text reading of Short stories by Rabindranath, development of romanticism in Tagore's stories.

CO7: Features of Bibhtibhsan Bandopadhyaya's stories with special reference to Story "Umarani".

CO8: Imapact of naturalism in Tarasankar Bandopadhyaya's stories in connection with Story "Tarini Majhi".

CO9: Features of Rajsekhar Basu's stories with reference to story ' Kachi samsad".

CO10: Crisis of mediocre Bengali people, his ambiguity in class-struggle and in morality, reflected in Bengali short stories with reference to stories "Fossil" by Subodh Ghosh and 'Telenapota Abiskar" by Premendra Mitra.

Semester	IV
Title of Paper	Kabya Path
Course Code	CC9
Credit	06
Hours	6hrs/Week

After completion of this course, Students will get an introduction with Bengali poetries, its development and growth. They Will be capable to appreciate the text of poetries, will get an idea on socio-cultural study of the text, aesthetic analysis of the texts, metres and figures of speeches used in it, about the poets and their style of the writings.

This course (CC9) provides the students with:

CO1: Impact of Nineteenth Century Bengal Renaissance in Bengali Verses with special reference to "Virangana Kabya" By M.S. Dutt.

CO2: Features and style of M.S. Dutt's verses with reference to "Virangana Kabya".

CO3: Text reading, content study and significance of the Book "Balaka" in Tagores creations.

CO4: Styles of the book "Balaka".

CO5: Features of post-tagore Bengali Poetries in reference to 'Banalata Sen' by Jibonanada Das.

CO6 Influence of western poets in post – Tagore Bengali poetry, in reference with 'Banalata Sen'.

CO7 Influence of modern Philosophical and Art movements in Jibonanda Das's Poem with reference to 'Banalata Sen'.

Semester	IV
Title of Paper	Uponyas Path
Course Code	CC10
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain the knowledge on text - reading i.e., critical appreciation of a text, stylistics of novels, narratology, comparative study on forms and contents of a text with the light of Bengali Fictions.

This course (CC10) provides the students with:

CO1: Development and growth of Nineteenth - twentieth Century Bengali novels. CO2: The features of Bankim Chandra Chattopadhyay's novels.

CO3: The differences between novel and romance and features of Bankim Chandra Chattopadhyay's writings.

CO4: The concept of 'modernity' in Bengali novels and Tagorean concept of modernity' and its reflection on his novels.

CO5: The features of 'verse – novel' in Tagore's writings.

CO6: Features of 'Post – Tagore' Bengali novels.

CO7: The 'regionality' and' local colour' in Tarasankar Bandyopadhyay's writings with a special focus on the novel 'Kobi'.

CO8: Variant styles and forms of nineteenth and twentieth century Bengali Novels with a special reference to' Kapalkundala', 'Sesher Kobita' and 'Kobi'.

CO9: The sociological features that depicted in nineteenth and twentieth century Bengali novels with a special reference to 'Kapalkundala',' Sesherkobita' and 'Kobi'.

CO10: The culture - perspectives reflected in Bengali novels with a special reference to 'Kapalkundala', 'Sesher Kobita' and 'Kobi'.

Semester	IV
Title of Paper	Bangla Bhasa o Sahitya Bisoyok Prokolpo rochona
Course Code	SEC2
Credit	02
Hours	2hrs/Week

After gone through this paper, Students will attain the specialised knowledge on Project , methods of project writings, practical work on writings of projects.

This course (SEC2) provides the students with:

CO 1: How to write a project with proper methodologies.

CO 2: Practical work and writings of projects.

Semester	V
Title of Paper	Natya Path
Course Code	CC11
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain the knowledge on text - reading i.e., critical appreciation of a text, stylistics of dramas, comparative study on forms and contents of a text with the light of Bengali drama.

This course (CC11) provides the students with:

CO1: Discussion on Dinabondhu Mitra's Dramas with reference to 'Sadhabar Ekadashi'.

CO2: Impact of Young Bengal movement in Bengali drama with reference to "Sadhabar Ekadashi".

CO3: Features of Dinbondhu Mitra's writing s with reference to the text 'Sadhabar Ekadasi.'

CO4: Development of Bengali historical tragedies with reference to 'Sahajahan' by Dwijendralal Roy.

CO5: Text reading and critical appreciation of the drama 'Sahajahan'.

CO6: Development of the concept of Symbol and Symbolic Drama in Bengali drama in reference with "Dakghor' By Rabindranath Tagore.

CO7: Text reading and critical appreciation of the drama 'Dakghor", Concept of eternal reflected in it, western influence on the text, literary value.

Semester	V
Title of Paper	Kabyatatwa, Paschatya Sahitya Samalochona O Sahityer rupriti
Course Code	CC12
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain the knowledge on Oriental poetics, western literary theories, literary forms, comparative study on criticism and types, its influence on Bengali literature.

This course (CC12) provides the students with:

CO1: Studies on Oriental poetics with reference to "Kabyajiggasa". Concept of Rasa, Dwani, how it is applicable in Literary criticism.

CO2: Origin and development of concept of Classicism, Romanticism, Surrealism, Realism, Symbolism in Literature; their application in Bengali literature with reference to relevant Bengali texts.

CO3: Origin and development of Different forms of literature in Western concept, its influence on Bengali literature, features of those with suitable examples.

CO4: Differentiation amongst various literary types of Novels, Dramas, Versres.

Semester	V
Title of Paper	Prachin Sahitya tatwa O Sahityatatwik
Course Code	DSE 1
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain the knowledge on Oriental poetics, the description of theories, analysis of the theories, its impact on Bengali literature; life and work of its theoreticians.

This course (DSE1) provides the students with:

CO1: Oriental concept of litearay types of verses and dramas, its definitions, features, examples, diffrences with modern concepts.

CO2: Different theories on Ritibad, Alonkar, Guna, Ochitya, Bokrokti ; its origin and development, merits. Demerits, its application in old Sanskrit literature.

CO3: Life and work of Bharat, Bhamaha, Bamana, Dondi, Anondobardhan, Abhinavagupta, Biswanath Kabiraj.

Semester	V
Title of Paper	Bangla Bitorkomulok, Soudorjomulok, ebong Bijganchetonamulok gronthopath.
Course Code	DSE 2
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain the knowledge on various contents of Bengali Essays the description of texts, analysis of the texts, its impact on Bengali literature.

This course (DSE2) provides the students with:

CO1: Critique on the text Brajabilas by Iswarchandra Vidyasagar, its social and literay value, historical impact of the text.

CO2: Critique On the text Bageswari Shilpa probondhaboli by Abanindranath Thakur, concept of art, artistic view, concept of beauty and ugliness depicted in it, concept of form and content, concept of internal and external approaches in art, style of writing.

CO3: Critique On the text Obyokto by Jagadish Chandra Bose,text analysis, content and form, style of writing .

Semester	VI
Title of Paper	Lok Sahitya
Course Code	CC13
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain the knowledge on Bengali Folk literature, text reading on lyrical ballads, studies on criticism on folk culture.

This course (CC13) provides the students with

CO1: Definition, Characteristics, features of Folk literature; difference between folk and urban literature, socio- cultural- anthropological studies on folk literature.

CO2: Discuss on various forms of folk literature, - Riddles, rhymes, Proverbs, Folktales, Fairy tales, Folk Drama, Folk songs with suitable examples.

CO3: Text reading of Maimon singha gitika,- regional colour of the text, dramatic elements, lyricism in it.

CO4: Analysis on folk concept with reference to the text 'Banglar Brata',- Aryan- non – Aryan acculturation, regionality, impact of Brahminesses on it.

Semester	VI
Title of Paper	History of Sanskrit, English and Regional Indian literature
Course Code	CC14
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain the knowledge on Sanskrit, English and Regional Indian literature. Comparative studies amongst the texts, revelation of eternal humanity beyond the time and geographical barriers.

This course (CC14) provides the students with:

CO1: Outline of history of Sanskrit literature with reference to studies on Vedic literature, Ramayana, Mahabharata, Kalidasa, Aswaghosh, Bhasa.

CO2: Outline of history of English literature with reference to studies on Shakespeare, Wordsworth, Charles Dickence, Byron, Shelly, T.S. Eliot.

CO3: Outline of history of Regional Indian literature with reference to studies on Hindi Bhaki Sahitya, Premchand, Mahadevi Barma, Fakirmohan Senapati, Ramakanta Rath, Kalindicharan Panigrahi, Laxmikanta Bejbarua, Rajakanta Bordalai, Birinchi kumar Barua.

CO4: Knowledge on Oriental literature, English literature and Regional literature of India which will enrich the concept of comparative study on literature.

CO5: To get an idea on versatile human life, human nature and revelation of humanity across caste, time, gender etc.

Semester	VI
Title of Paper	Godya Sahitya Path
Course Code	DSE 3
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain the knowledge on development of Bengali proses, the description of texts, analysis of the texts, its impact on Bengali literature.

This course (DSE3) provides the students with:

CO1: Critique on the text Alaler ghorer Dulal By PayriChand Mitra, its content, style, historical value of the text, language used in it and its features.

CO2: Critique on the text Kamalakanter Doftor By Bankim cahndra Chattopadhyaya, its content, style, social message, humour of the text, western influence in it.

CO3: Critique on the text Panchtantra By Syad Mujtaba Ali,content, style, significance of the text.

Semester	VI
Title of Paper	Rabindra Sahitya Path
Course Code	DSE 4
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain the specialised knowledge on the literature of Rabindranath Tagore, the description of texts, analysis of the texts, its impact on Bengali literature.

This course (DSE4) provides the students with:

CO 1: Critique on the text 'Se' by Rabindranath Tagore, its content, style, significance of the text.

CO2: Critique on the text 'Muktadhara' by Rabindranath Tagore, its content, style, social conflict reflected in it, features of allegorical drama, literary value.

CO3: Critique on the selected poems of Rabindranath Tagore, reading of the text, analysis, philosophy reflected in it, imageries, figures of speeches used in it, literary value.

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(NAAC Accredited 'B' Grade Govt. Aided College)
NARAJOLE: PASCHIM MEDINIPUR: WEST BENGAL: Pin-721211
Phone and Fax: +91- 9933881131: E-mail: *narajoleracollege@rediffmail.com*
Website: http://www.narajolerajcollege.ac.in

Course Outcome

Bengali (GE)

Semester	I
Title of Paper	BanglarBhukhanda, Jatirutpotti o Bangla Bhukhonderitihas
Course Code	GE1
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain the specialised knowledge on Cultural and anthropological history of Bengal, about the folk literature of Bengal, its components.

This course (GE1) provides the students with:

CO 1 Origin of Bengali people and History of Bengal territory.

CO 2 Outline and description of Bengali religion, culture, food habits,

rituals. CO 3 Definition of Folk literature, its features and characteristics.

CO 4 Definition of riddles, rhymes, proverbs, rituals, ballads, folktales, folk drama, folksongs with suitable examples.

Semester	II
Title of Paper	KabyaSahityer Dhara O Baishnava Padabali Path
Course Code	GE2
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain theknowledge on Ancient and medieval Bengali literature, texts reading, analysis of the texts, tendencies and trends of medieval Bengali literature, significance of the texts in the history of Bengali literature.

This course (GE2) provides the students with:

CO 1 Outline on Ancient and Medieval verses; History of literature, its features.

CO 2 Outline of Modern Bengali poetries, features of nineteenth century poetries, features of Twentieth century poetries.

CO 3 Text reading of BaishnavaPadabali , differences between pre and post Chaitynyapadabalies, its rhetorical elements.

Semester	III
Title of Paper	Bangla Probondho O KathasahityerDhara O Probondho Path
Course Code	GE3
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain theknowledge on Bengali essays and fictions, reading of the texts, analysis of the text, literary value of the text.

This course (GE3) provides the students with:

CO 1 Outline of Nineteenth and Twentieth century Bengali essays, its varity of contents, different styles of writing.

CO 2 Outline of Nineteenth and Twentieth century Bengali fictions, its varity of contents, different styles of writing.

CO 3 Text reading of Lokrahasya by Bankim Chandra chattopadhyaya; its contents, styles, significance of the text in Bengali prose stream.

Semester	IV
Title of Paper	Bangla Giti sahitya, Shishusahitya, o ramyarachonardhara
Course Code	GE4
Credit	06
Hours	6hrs/Week

After gone through this paper, Students will attain theknowledge on Bengali literature aimed to the children, about Bengali lyrics, and informal essays, reading of the texts, analysis of the text, literary value of the text.

This course (GE4) provides the students with:

CO 1 Outline of Bengali lyrics.

CO 2 Discussion on Bengali Children Literature, its development, About the writers and writings, Variety of contents.

CO 3 Discussion on Bengali informal essays, its development, About the writers and writings, Variety of contents.

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Website: https://www.narajolerajcollege.ac.in

Course Outcome

Bengali (DSC)

Semester	I
Title of Course	Bangla Sahityer Itihas O Bangla Bhasatatwa
Paper Code	DSC1AT
Credits	06
Hours	06 hours/week

After gone through this paper students will be able to attain the knowledge on Origin and development of Bengali linguistics, about the origin and development of Bengali scripts, which knowledge are the basis of studies of Bengali Literature.

This course (CC-1) provides the student with-

CO1: Origin of Bengali language, its historical development and transformations.

CO2: Bengali vowels, its features, procedures and pronunciation, its

classifications.

CO3: Bengali semantics, rules of transformations of meaning of a word; different sources in Bengali vocabulary.

CO4: Bengali Phonetics, its classifications, procedures of transformations, comparative study amongst processes.

CO 5: Bengali dialects, its classifications, Phonetics and morphological features of those with suitable examples.

CO6: Outline of old and medieval history of Bengali literature; discussion of the texts, significance of the texts, overview on the Poets and their poetic works.

CO7: Origin and development of Bengali proses, contribution of Fort William college, Rammohun Roy, Vidyasagar, Pyarichand Mitra, Kaliprassana Sinha and Bankim Chandra Chattopadhyay, - discussion of their texts, significance of their texts in the history of Bengali literature.

CO8: Development of Bengali poetries in nineteenth and twentieth centuries, Contribution of Madhusudan Dutta, Rabindranath Tagore, Kaji Najrul Islam, Jibonanondo Das, conents and styles of their writings, impact of Bengal renaissance, impact of European romantic movememt, impact of T. S Eliot, Ezra Pound and others in their works respectively.

CO9: Development of Bengali fictions in nineteenth and twentieth centuries, Contribution of Bankim Chandra Chattopadhyay, Rabindranath Tagore, Bibhutibhusan Bandopadhyaya, overview of their texts, significance of their works in the stream of Bengali fictions.

Semester	II
Title of Course	Kabya - Kobita
Paper Code	DSC1BT
Credits	06
Hours	06 hours/week

After gone through this paper students will be able to attain the knowledge on different trends of medieval and modern Bengali literature, will be enriched themselves with knowledge of literary, historical, religious streams of medieval Bengali literature and they will also be acquainted themselves with modern Bengali poetry.

This course (CC-2) provides the student with-

CO1: Various trends of medieval Bengali literature, in connection with Vaishnava padabali, text reading, critical appreciation, about the poets, philosophy reflected in it.

CO2: Shaktapadabali, text reading, critical appreciation, about the poets, social issues reflected in it.

CO3: 'Virangana Kavya', text reading, critical appreciation, Western and Oriental influence in it, style, form and impact of nineteenth century renaissance in the text.

CO4: Poetries of nineteenth and early twentieth centuries, - text reading, features, content, influence of Tagore on Bengali poetry, about those poets who creates new trends beyond Tagore's influence, - their features, their individuality.

CO5: Text reading of the Poetries of late Twenties, their novelty, individuality, setting of new trends in the stream of Bengali poetries.

Semester	III
Title of Course	Bangla Kathasahitya, Natok O Probondho
Paper Code	DSC1CT
Credits	06
Hours	06 hours/week

After gone through this paper students will be able to attain the knowledge on the development of Bengali literature through the fictions, essays and drama, they will get an idea on growth of the Bengali literature through those literary types.

This course (CC-3) provides the student with-

CO1: Text reading of 'Sahajahan' by D.L. Roy, features of tragedy reflected in it, comparison with western tragedy, critical appreciation of the text, style, songs used in the text, qualities of acceptance in professional theatre.

CO2: Text reading of collected essays, their content, styles, about the essayist, significance of the texts in Bengali essays.

CO3: Text reading of Bengali short stories, their content, style, social issues reflected in it, comparison amongst the authors.

CO4: Text reading of the novel 'Pother Panchali' by Bibhutibhusan Bandopadhyaya; its content, style, treatment of nature reflected in it, novelty of the text in the Bengali, comparative study with other rural life-oriented stories.

Semester	IV
Title of Course	Sahityatatwa O Sahitya Nirmankala
Paper Code	DSC1DT
Credits	06
Hours	06 hours/week

After gone through this paper students will be able to attain the knowledge on aesthetics, Sanskrit aesthetics, it will enrich the analytical sense of the students. Knowledge of metres will capable them to read poetry well, knowledge of rhetoric enhances the literary sense of the students.

This course (CC-4) provides the student with-

CO1: Studies of Rasa and Dhawni, the analysis of sanskrit poetics, its definition, examples, application in Sanskrit literature, applicability in Bengali literature.

CO2: Studies on Bengali metres, definition, classifications, features, scantion of a text, comparison amongst their varieties.

CO3: Studies on Bengali rhetorics, definition, classifications, features, applications in a text, identification of a rhetoric in a poetic language, comparison amongst their varieties

Semester	V
Title of Course	Bangla Natok O Kobita
Paper Code	DSE1TA/ 2TA
Credits	06
Hours	06 hours/week

After gone through this paper students will be able to attain the knowledge on development of Bengali literature in its modern periods through the text reading of a drama. Students may get an idea on influence of Greek tragedy in Bengali drama in the light of the text specified for. Students have to read collected Bengali poems of nineteen and twentieth century for acquiring knowledge on growth of Bengali poetries for nineteenth century, its variant contents, forms reveals the richness of the Bengali literature.

This course (DSE-1) provides the student with-

CO1: Text reading of the drama 'Krishnakumari', its content, form, influence of oriental history and antiquities in it, impact of Greek tragedy on the plot, significance of the text in the perspective of Bengali drama, craftmanship of Madhusudan Dutta reflected in it, novelty of the text.

CO2: Text reading of nineteenth century Bengali poetry through the sonnet by Madhusudan Dutta, content, patriotism of nineteenth century reflected in it, structure of sonnets and its application in Bengali literature.

CO3: Text reading of 'Balaka' by Rabindranath Tagore, content, philosophy reflected in the poetry, influence of world war in it, style, significance of the text in Tagore's creation and Bengali literature as well.

CO4: Text reading on Tagore-contemporary and post- Tagore poetries, its content, style, influence of western poets on post – Tagore poetries, significance of the poems in Bengali poetries, literary values.

Semester	V
Title of Course	Shisusahitya O Goyenda Kahini
Paper Code	GE1T
Credits	06
Hours	06 hours/week

After gone through this paper students will be able to attain the knowledge on the development of Bengali literature through children literature and detective literature. Students will get an idea on that less discussed stream of Bengali literature, which will widen their knowledge on Bengali literature.

This course (GE1) provides the student with-

CO1: Text reading of' Rajkahini' By Abanindranath Tagore, content, history of Bengal, its heroism, style, development of characters, literary values.

CO2: Text reading of 'Se' by Rabindranath Tagore, content, style, significance of the text in Bengali literature.

Semester	VI
Paper	DSE -1B/2B
Paper Code	BENGDSE
Title of the Paper	Uponyas o chhotogolpo
Credit	6
Classes/ Week	6

The student of Bengali (Gen.) of Semester -VI will acquire the knowledge about the Novel and Short stories of twentieth century Bengali Fiction by studying this course.

This course provides the students with -

CO 1 – knowledge about trends and features of twentieth century Bengali short stories.

CO2 – Critical appreciation of Bengali short stories through the selected stories titled, - Kachi Samsad, Mayakurangi, Obhagir swargo, Bedini, Bhikhari saheb.

CO3 – knowledge about Novel of Tarasankar Bandopadhyaya, eminent writer of Bengali fiction.

CO4 – Acquaintance about a genre of Bengali fiction namely Bengali regional novel.

CO 5 - Critical appreciation of Bengali Novel through the selected novel titled 'Radha'.

Semester	VI
Paper	GE2T
Paper Code	BENGGE
Title of the Paper	Ekanko natok o Goyenda kahini
Credit	6
Classes/ Week	6

The student of Bengali (Gen.) of Semester -VI will acquire the knowledge about the one act play and of twentieth century Bengali detective novel by studying this course.

This course provides the students with –

CO 1 – knowledge about trends and features of twentieth century Bengali one -act play.

CO2 – Critical appreciation of Bengali through selected one -act plays titled, - Rajpuri, Devi, Sikkabab, Ek pasla bristi.

CO3 – knowledge about detective story of Saradindu Bandopadhyaya, eminent writer of Bengali detective fiction.

CO4 – acquaintance about a genre of Bengali fiction namely Bengali detective story.

CO 5 - Critical appreciation of Bengali detective stories through the selected story titled 'Sajarur Kanta'.

SKILL ENHANCEMENT PAPERS

Semester	II
Title of Course	Likhan Naipunya Briddhi
Paper Code	SEC1T
Credits	02
Hours	02 hours/week

After gone through this paper students will be able to attain the knowledge on development of writing skill, through the practice of extempore writing and format-oriented writing. The course will enhance their application skill and will develop their command over the language.

This course (SEC-1) provides the student with-

CO1: Practice of writing of explanation and summary, its technique, how to write the effective language through this practice.

CO2: How to write an effective news features, its techniques and skills which will be practiced.

CO3: How to write effective Paragraphs on different topics, its techniques, improvement of vocabulary, practice of effective sentence constructions.

CO4: How to write a Formal letter, its forms, specifications in presentations.

CO5: How to draft an effective advertisement write up, classifications of advertisements, its purpose, techniques of writing.

Semester	IV
Title of Course	Bangla Dhwanitatwa O Ruptatwa
Paper Code	SEC2T
Credits	02
Hours	02 hours/week

After gone through this paper students will attain the knowledge on Bengali Phonetics and Bengali morphology. Phonetics and Morphology of a language are the important factors of a word which explained the rules of transformation and construction of a word respectively.

This course (SEC-2) provides the student with-

CO1: Bengali phonetics, - its description, definition, classifications, rules with suitable examples.

CO2: Bengali morphology- its description, definition, classifications, rules with suitable examples.

CO3: Bengali suffixes, its descriptions, definitions, examples; 'Pratyayas' and 'Bibhakties' used in Bengali words, definitions, examples, constructions of Bengali words – its applications.

Semester	V
Title of Course	Saili, Kabyasaili Bichar, Godya Saili O Natya Saili Bichar
Paper Code	SEC3T
Credits	02
Hours	02 hours/week

After gone through this paper students will attain the knowledge on Stylistics, different types of styles used in prose, poetry and in dramas, their expiations, applications, with suitable examples.

<u>This course (SEC-3) provides the student with-</u>

CO1: Definition of stylistics, theories, its component, classifications – relation between style and content.

CO2: Stylistics of poetries, its applications, rules, examples, stylistic analysis of a text.

CO3: Stylistics of proses, its applications, rules, examples, stylistic analysis of a text.

CO4: Stylistics of dramas, its applications, rules, examples, stylistic analysis of a text.

Semester	VI
Paper	SEC4
Paper Code	BENGSE
Title of the Paper	Bisoy bhittik alochona o alochona patro uposthapon
Credit	2
Classes/ Week	2

The student of Bengali (Gen.) of Semester -VI will acquire the knowledge regarding techniques of writing of dissertation paper by studying this course.

This course provides the students with –

CO 1 – knowledge about different types of criticism.
CO 2 – methodologies of writing a dissertation Paper.

Semester	I
Title of Course	Bangla Bhasa Prosongo, Onubad O Kothon Dokshota
Paper Code	AECC-MIL
Credits	02
Hours	02 hours/week

After completion of this paper, students will be able to get knowledge on Bengali social - linguistics, Translations and its methodologies, about oration and techniques of oration.

This course (AECC-MIL) provides the student with-

CO1: Definition of Socio-linguistic, development of the concept of socio linguistics, Language planning, history of its development, definition of language planning,its features.

CO2: Bengali social linguistics, its components, factors, discussion on Religion, Profession, Age groups as a deciding factor of creating of social language groups.

CO3: Contemporary Standard colloquial Bengali language, its features, its phonetics and morphological features, regions where the language is used, examples.

CO4: Translations, its classifications, rules, practice on translation from Bengali to English and English to Bengali.

CO5: Practice of orations, definition of Oration, why it is important, practice of two types of orations, - Interview and delivery of a speech, its techniques, with suitable examples.

Semester	II
Title of Course	Kobita O Chhotogolpo
Paper Code	AECC-MIL-CL-1
Credits	06
Hours	06 hours/week

After gone through this paper, students will get knowledge on development of Bengali poetries since the era of Tagore and its changing trends. Student will also acquire knowledge on Bengali Short stories and its Varient contents and styles.

This course (AECC-MIL-CL-1) provides the student with-

CO1: Text reading of a poetry 'Ami' by Tagore, its features, comparative study of the text, philosophy reflected in it, significance of the poem in Tagore's creation.

CO2: Text reading on 'Mohuyar desh' by Samar Sen, its features, comparative study of the text, philosophy reflected in it, significance of the poem in Bengali poetries.

CO3: Text reading on 'Samyabadi' by Kaji Najrul Islam, its features, comparative study of the text, philosophy reflected in it, social message lying behind the thought, significance of the poem in Bengali poetries.

CO4: Text reading on 'Utpakhi' by Sudhindranath Dutta, its features, comparative study of the text, philosophy reflected in it, significance of the poem amongst Bengali poetries.

CO5: Text reading on' Barababur Kachhe nibedon' by Amiya Chakraborty, its features, comparative study of the text, philosophy reflected in it, significance of the poem amongst Bengali poetries.

CO6: Text reading 'Mahesh', short story by Sarat Chandra Chattopadhyay, its features, comparative study of the text, philosophy reflected in it, significance of the story in the stream of Bengali short stories.

CO7: Text reading, - 'Lambakorno', short story by Rajsekhar Bosu, its features, humour and social satire of the text, style, significance of the story in the stream of Bengali short stories.

CO8: Text reading, - 'Puimancha', short story by Bibhuti bhusan Bandopadhyaya, its features, treatment of nature in the story and social crisis reflected in the text, style, significance of the story in the stream of Bengali short stories.

CO9: Text reading, - 'Girgiti', short story by Jyotirindra Nandi, psychological perspective reflected in the text, style, significance of the story in the stream of Bengali short stories.

CO10: Text reading, - 'Teacher', short story by Manik Bandopadhyayay, social crisis reflected in the text, style, significance of the story in the stream of Bengali short stories.

CO10: Text reading, 'Tarini Majhi', short story by Tarasankar Bandopadhyayay, regionality of the text, crisis in human nature reflected in the text, style, significance of the story in the stream of Bengali short stories.

Semester	IV
Title of Course	Unis Sataker Bangla Probondho O Loksahitya
Paper Code	AECC-MIL-CL-2
Credits	06
Hours	06 hours/week

After gone through this paper, students will get knowledge on development of Bengali essays in nineteenth century and its changing trends. Student will also acquire knowledge on Bengali folk literature and its Variant contents and styles.

This course (AECC-MIL-CL-2) provides the student with-

CO1: Text reading, - 'Gitikabya', an essay by Bankim Chandra Chattopadhyay, its features, comparative study of the text, style, philosophy reflected in it, significance of the essay in the stream of Bengali proses.

CO2: Text reading, - 'Vidyasagar', an essay by Ramendra Sundar Trivedi, its style, comparative study of the text, philosophy reflected in it, significance of the essay in the stream of Bengali proses.

CO3: Text reading, - 'BhabbarKotha', an essay by Swami Vivekananada, its style, comparative study of the text, philosophy reflected in it, significance of the essay in the stream of Bengali proses.

CO4: Text reading, - 'Musalmanibangla', an essay by Haraprasad Shastri, its style, comparative study of the text, philosophy reflected in it, significance of the essay in the stream of Bengali proses.

CO5: Text reading, - 'Mohuya pala', a lyrical ballad of Maimansingha, Characters, dialogue, conflict of the story, its style, comparative study of the text, social crisis and philosophy reflected in it, significance of the story in the stream of Bengali folk literature.

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Course Outcome

Botany (Hons.)

Semester	I
Title of Course	Plants and Microbial Diversity and its Evolution (MJ-1)
Paper Code	MJ-1T (Theory)
Credits	03
Hours	03 hours/week

The theory paper (MI-1T) of this course (MI-1) provides the student with-

The students of Botany (H)of Semester-I will acquire the knowledge about general characteristics of virus, bacteria, algae, fungi, bryophytes, pteridophytes, gymnosperms withtheir classification system and economic importance.Idea aboutmorphology and life cycle pattern of some plant genus. Study about palaeobotany, geological time scale, fossils types, factors of fossilization.

CO1: Theory of introduction to microbial diversity; Whittaker's five-kingdom system and Carl Richard Woese's three-domain system.

CO2: Ideas of general characteristics of virus; classification (Baltimore), idea aboutviroids and prions; detailed structure T4-phage and SARS-COV2, lytic and lysogenic cycle; Economic importance of viruses.

CO3: Concept of general characteristics of bacteria; Types of bacteria, archaebacteria, eubacteria, wall-less forms (mycoplasma and spheroplasts); Bergey's classification, Cell structure; Nutritional types; vegetative and Reproductive structure - asexual and recombination (conjugation, transformation and transduction). Economic importance of bacteria.

CO4: Theory of General characteristics of algae; Ecology and distribution; range of thallus organization; Classification (Van Den Hoek, 1995), reproduction and life cycles of *Nostoc*, *Oedogonium, Chara,* and *Polysiphonia*.

CO5:Concept of general characteristics of fungi; Affinities with plants and animals; Thallus organization; Heterothallism and parasexuality. Classification Ainsworth (up to Order). Life cycles of *Synchitrium, Saccharomyces, Ascobolus*, *Agaricus*. Symbiotic associations: Lichen and Mycorrhiza. Economic importance.

CO6: Idea of unifying features of archegoniates, general characteristics of bryophytes; Adaptations to land habit; Range of thallus organization. Idea about different orders. Outline classification (Mishler), Morphology, anatomy and reproduction of *Marchantia, Porella, Anthoceros, Notothylas and Funaria*; Economic importance with special reference to *Sphagnum*.

CO7: Idea of general characteristics of pteridophytes; Idea about different orders. Classification (Sporne, 1975), Early land plants (*Rhynia* and *Asteroxylon*) Morphology, anatomy and reproduction of *Lycopodium, Selaginella, Equisetum* and *Pteris. E*conomic importance.

CO8: Idea of general characteristics of gymnosperms, idea about different orders, Classification (Sporne, 1965), morphology, anatomy and reproduction of *Cycas*, *Pinus* and *Gnetum*; Economic importance

CO9: Understanding the palaeobotany, Geological time scale and important events, Types of plant fossils - impressions, compressions, petrifaction. Stromatolites, Factors for fossilization

Semester	I
Title of Course	Plants and Microbial Diversity and its Evolution (MJ-1)
Paper Code	MJ-1P (Lab)
Credits	01
Hours	02 hours/week

The students Botany (H) of Semester-I will acquire the practical knowledge about the virus, bacteria, algae, fungi, lichen,bryophyte, pteridophyte gymnosperm and fossil genera.

<u>The lab paper (MI-1P) of this course (MI-1) provides the student with-</u>

CO1: Study of electron micrographs/Models of viruses – T-Phage and Sars-CoV2.

CO2: Study of sketches of Lytic and Lysogenic Cycle.

CO3: Study ofcurd organisms curd through Gram staining.

CO4: Study of endospore staining.

CO5: Study of vegetative and reproductive structures of *Nostoc*, *Oedogonium* and *Polysiphonia*.

CO6: Study of reproductive structures of *Ascobolus*, and *Agaricus.*

CO7: Study of reproductive structure of *Saccharomyces* and *Penicillium*.

CO8: Study of lichens: Photomicrographs of different types of Lichens.

CO9: Study of *Marchantia*- Morphology of thallus, whole mount of rhizoids & Scales, vertical section of thallus through Gemma cup, whole mount of Gemmae (all temporary slides), vertical section of antheridiophore, archegoniophore, longitudinal section of sporophyte (all permanent slides).

CO10: Study of *Anthoceros*- Morphology of thallus, dissection of sporophyte (to show spores, pseudoelaters, columella) (temporary slide), vertical section of thallus (permanent slide).

CO11: Study of *Pogonetum*- Morphology, whole mount of leaf, rhizoids, operculum, peristome, annulus, spores (temporary slides); Permanent slides showing antheridial and archegonial heads, longitudinal section of capsule and protonema.

CO12: Study of *Selaginella*- Morphology, whole mount of leaf with ligule, transverse section of stem, whole mount of strobilus, whole mount of microsporophyll and megasporophyll (temporary slides), longitudinal section of strobilus (permanent slide).

CO13: Study of *Equisetum*- Morphology, transverse section of internode, longitudinal section of strobilus, transverse section of strobilus, whole mount of sporangiophore, whole mount of spores, transverse section of rhizome (all permanent slide).

CO14: Study of *Pteris*- Morphology, transverse section of rachis, vertical section of sporophyll, wholemount of sporangium, whole mount of spores (temporary slides), transverse section of rhizome, whole mount of prothallus with sex organs and young sporophyte (permanent slide).

CO15: Study of *Cycas*- Morphology (leaf), vertical section of leaflet, vertical section of microsporophyll, whole mount of spores (temporary slides), longitudinal section of ovule, transverse section of root (permanent slide).

CO16: Study of *Pinus*- Morphology (long and dwarf shoots, whole mount of dwarf shoot, male and female cones), transverse section of Needle (temporary slide), transverse section of stem, longitudinal section of / transverse section of male cone,

whole mount of microsporophyll, whole mount of Microspores (temporary slides), longitudinal section of female cone, tangential longitudinal section &radial longitudinal sections stem (permanent slide).

CO17: Study of *Gnetum*- Morphology (stem, male & female cones), transverse section of stem, vertical section of ovule (all permanent slide).

CO18: Study of fossil genera - *Rhynia, Cooksonia, Lepidodendron*and*Lepidocarpon*through photographs.

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Course Outcome

Botany (Hons.)

Semester	I
Title of Course	Biofertilizers (SEC-1)
Paper Code	SEC-1P (Lab)
Credits	03
Hours	03 hours/week

The students of Botany (H) of Semester-I will acquire the practical knowledge about the microbes used as biofertilizers, mycorrhizal association, types of mycorrhiza and organic farming.

The lab paper (MI-1P) of this course (MI-1) provides the student with-

CO1: Study of general account about the microbes used as biofertilizer - Rhizobium - isolation, identification, mass multiplication, carrier-based inoculants, Actinorrhizal symbiosis.

CO2: Study of *Azospirillum:* isolation and mass multiplication - carrier-based inoculant, associative effect of different microorganisms. *Azotobacter*: classification, characteristics - crop response to *Azotobacter* inoculum, maintenance and mass multiplication.

CO3: Study ofCyanobacteria (blue green algae), *Azolla* and *Anabaena azollae* association, nitrogen fixation, factors affecting growth, blue green algae and *Azolla* in rice cultivation.

CO4: Study of mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield - colonization of VAM - isolation and inoculum production of VAM, and its influence on growth and yield of crop plants.

CO5: Study of organic farming - Green manuring and organic fertilizers, Recycling of biodegradable municipal, agricultural and Industrial wastes - biocompost making methods, types and method of vermicomposting - field Application.

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Course Outcome

BOTANY

Multidisciplinary Studies

Semester	I
Title of Course	Plant Groups and Taxa(MJ-1)
Paper Code	MJ-1T (Theory)
Credits	03
Hours	03 hours/week

The students with Botany Multidisciplinary studies of Semester-I will acquire the knowledge about general characteristics of virus, bacteria, algae, fungi, bryophytes, pteridophytes, gymnosperms withtheir classification system and economic importance.Idea aboutmorphology and life cycle pattern of some plant genus.

The theory paper (MI-1T) of this course (MI-1) provides the student with-

CO1: Theory of introduction to microbial world and Whittaker's five-kingdom system.

CO2: Ideas of general characteristics of virus, Baltimore classification, economic importance.

CO3: Idea of general characteristics of bacteria, Bergey's classification, economic importance.

CO4: Theory of algae general characteristics, habitat, Van Den Hoek's (1995) classification, life cycle pattern of *Volvox* and *Batrachospermum*, concept of economic importance.

CO5:Concept of general characteristics of fungi, idea of Ainsworth' classification upto order, life cycle pattern of *Rhizopus* and *Agaricus,* economic importance, concept of lichen and mycorrhiza.

CO6: Idea of bryophytes general characteristics, Proskauer's (1957) classification, morphology with anatomy and reproduction of *Riccia, Anthoceros* and *Funaria,*economic importance.

CO7: Idea of pteridophytes general characteristics, Sporne's (1975) classification, morphology with anatomy and reproduction of *Lycopoduim, Adiantum* and *Marsilea*, economic importance.

CO8: Idea of general characteristics of Gymnosperms, Sporne's (1965) classification, morphology with anatomy and reproduction of *Cycas* and *Pinus*, economic importance

CO9: Understanding the palaeobotany, concept of geological time scale and important events, types of plant fossils.

Semester	I
Title of Course	Plant Science-I (MI-1)
Paper Code	MI-1P (Lab)
Credits	01
Hours	02 hours/week

The students with Botany Multidisciplinary studies of Semester-I will acquire the practical knowledge about the virus, gram staining of bacteria, algae, fungi, bryophytes, pteridophytes, gymnosperms and fossil types.

The lab paper (MI-1P) of this course (MI-1) provides the student with-

CO1: Study of electron micrographs/Models of viruses – T-Phage and Sars-CoV2.

CO2: Study of curd organisms through Gram staining.

CO3: Study of vegetative and reproductive structure of *Volvox*, and *Batrachospermum.*

CO4: Study of morphology and reproductive structure of *Rhizopus* and *Agaricus.*

CO5: Study ofmorphology of thallus and reproductive structure of *Riccia*, *Anthoceros* and *Funaria.*

CO6: Study of morphology vegetative and reproductive structure of *Lycopodium*, *Adiantum* and *Marsilea.*

CO7: Study of morphology and vegetative structure of *Cycas* and *Pinus.*

CO8: Study of fossil types (impressions, compressions, petrifaction).

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Website: *https://www.narajolerajcollege.ac.in*

Course Outcome

Botany (Hons.)

Semester	I
Title of Course	Plant Science-I(MI-1)
Paper Code	MI-1T (Theory)
Credits	03
Hours	03 hours/week

The students of Botany (H)of Semester-I will acquire the knowledge about general characteristics of virus, bacteria, algae, fungi, bryophytes, pteridophytes, gymnosperms withtheir classification system and economic importance.Idea aboutmorphology and life cycle pattern of some plant genus.

The theory paper (MI-1T) of this course (MI-1) provides the student with-

CO1: Theory of introduction to microbial world and Whittaker's five-kingdom system.

CO2: Ideas of general characteristics of virus, Baltimore classification, economic importance.

CO3: Idea of general characteristics of bacteria, Bergey's classification, economic importance.

CO4: Theory of algae general characteristics, habitat, Van Den Hoek's (1995) classification, life cycle pattern of *Volvox* and *Batrachospermum*, concept of economic importance.

CO5:Concept of general characteristics of fungi, idea of Ainsworth' classification upto order, life cycle pattern of *Rhizopus* and *Agaricus,* economic importance, concept of lichen and mycorrhiza.

CO6: Idea of bryophytes general characteristics, Proskauer's (1957) classification, morphology with anatomy and reproduction of *Riccia, Anthoceros* and *Funaria,*economic importance.

CO7: Idea of pteridophytes general characteristics, Sporne's (1975) classification, morphology with anatomy and reproduction of *Lycopoduim, Adiantum* and *Marsilea*, economic importance.

CO8: Idea of general characteristics of Gymnosperms, Sporne's (1965) classification, morphology with anatomy and reproduction of *Cycas* and *Pinus*, economic importance

CO9: Understanding the palaeobotany, concept of geological time scale and important events, types of plant fossils.

Semester	I
Title of Course	Plant Science-I (MI-1)
Paper Code	MI-1P (Lab)
Credits	01
Hours	02 hours/week

The students of Botany (H) of Semester-I will acquire the practical knowledge about the leaf types, inflorescence types, floral diversity, fruit types study of vegetative and floral characteristics of some families.

The lab paper (MI-1P) of this course (MI-1) provides the student with-

CO1: Study of leaf types (simple and compounds).

CO2: Study of inflorescence types (racemose and cymose).

CO3: Study of floral diversity with special reference to adhesion and cohesion.

CO4: Study of fruit types: Berry (*Cucumis sativus, Capsicum annuum, Solanum melongena*), Drupe (*Mangifera indica, Borasusflaballifer*), Hesperidium (*Citrus*), Nut (*Arachis hypogea*).

CO5: Study of vegetative and floral characteristics of the following families: Malvaceae (*Sidasp./Abutilon sp.*), Acanthaceae (*Ruellia sp./Barleria sp.*), Papilionaceae (*Tephrosia sp./Crotalaria sp.*), Verbenaceae (*Lantana sp./Duranta sp.*).

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Website: *thtps://www.narajolerajcollege.ac.in*

Course Outcome

Botany (Hons.)

Semester	II
Title of Course	Morphology, Anatomy and Plant Taxonomy (MJ-2)
Paper Code	MJ-2T (Theory)
Credits	03
Hours	03 hours/week

The students of Botany (H)of Semester-II will acquire the knowledge about general characteristics of plant morphology, flower, fruit and seeds types, structure and development of plant body, significance plant systematics, taxonomic hierarchy, systems of classification, general descriptions of the given families.

The theory paper (MJ-2T) of this course (MJ-2) provides the student with-

CO1: Theory of vegetative morphology of root, stem & leaves with different types of modifications; Different types of stipules and modifications along with phyllotaxy and diversity of leaves.

CO2: Ideas of different types of inflorescences; Floral morphology, aestivation with special reference to adhesion and cohesion of the floral parts, Placentaion - types; Floral formula, Floral diagram.

CO3: Concept of fruits, seed types and dispersal mechanism.

CO4: Concept of structure and Development of Plant Body.internal organization of plant body: The three tissue systems, types of cells and tissues. Root stem transition. Apical meristems, types of stomata, Types of vascular bundles; Stele and its evolution

CO5: Concept of vascular Cambium and Wood Structure, function and seasonal activity of cambium; Secondary growth in root and stem, Types of Anomalous secondary growth with special emphasis on *Boerhavia and Dracaena*. Sapwood and heartwood; Ring and diffuse porous wood; Early and late wood, tyloses; Annual ring; composition of periderm, rhytidome and lenticels.

CO6:Concept of significance of Plant systematics; Functions of Herbarium; Important herbaria and botanical gardens of the world and India; Virtual herbarium; E-flora; Documentation: Flora, Monographs, Journals; Keys:Single access and Multi-access.

CO7: Idea of taxonomic hierarchy, Concept of taxa (family, genus, species); Categories and taxonomic hierarchy; Species concept (taxonomic, biological, evolutionary).Botanical nomenclature, Principles and rules (ICN); Typification, author citation, valid publication, rejection of names, principle of priority and its limitations; Names of hybrids.

CO8: Idea of systems of classification, Overview of artificial, natural and phylogenetic classification; Classification system of Bentham and Hooker (up to series). Brief reference of Angiosperm Phylogeny Group (APG IV) classification.

CO9: Idea of Taximatrics: numerical taxonomy and cladistics Characters; OTUs, Cluster analysis; Phenograms, cladograms (definitions and differences).

CO10: Concept of phylogeny of Angiosperms: Terms and concepts (homology and analogy, parallelism and convergence, monophyly, Paraphyly, polyphyly and clades). Origin and evolution of angiosperms. Concept of Basal Angiosperms and Eudicots.

CO11: Concept of General descriptions of the given families:Magnoliaceae, Malvaceae, Acanthaceae, Verbenaceae, Scrophulariaceae, Fabaceae, Caesalpinioideae, Asteraceae, Euphorbiaceae, Lamiaceae, Poaceae, Orchidaceae.

Semester	II
Title of Course	Morphology, Anatomy and Plant Taxonomy (MJ-2)
Paper Code	MI-2P (Lab)
Credits	01
Hours	02 hours/week

The students of Botany (H) of Semester-II will acquire the practical knowledge about the phyllotaxy, stipules, inflorescence types, floral morphology, fruit types, study of vegetative and floral characteristics of some families, making of herbarium, anatomical study of root, stem, leaf, study of secondary growth, stomatal types and the study of local flora.

The lab paper (MI-2P) of this course (MI-2) provides the student with-

CO1: Study of phyllotaxy and stipules.

CO2: Study of Inflorescence types- Racemose, Cymose, Special types (Capitulum, Verticellaster, and Hypanthodium)

CO3: Study of floral morphology with special reference to adhesion and cohesion of the floral parts, placentation types.

CO4: Study of different fruit types.

CO5: Study of vegetative and floral characters of the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification): Malvaceae – *Sida*sp. / *Abutilon* sp.,Acanthaceae – *Ruellia*sp./*Barleria*sp.,Fabaceae – *Tephrosia*sp./*Crotalaria* sp.,Verbenaceae – *Lantana* sp./*Durantas*p.,Asteraceae - *Vernonia*sp./*Ageratum* sp., *Eclipta*sp./*Tridax*sp.,Lamiaceae – *Leucas*sp./*Ocimum*sp.,Euphorbiaceae – *Euphorbia* sp. / *Jatropha* sp.,Poaceae – *Triticum*sp./*Chrysopogon*sp. or any local common grass,Orchidaceae- *Vanda* sp.

CO6: Study of mounting of a properly dried and pressed specimen of any wild plant with herbarium label (to be submitted in the record book – At least 25 nos.).

CO7: Study of root: monocot, dicot, secondary growth.

CO8: Study of stem: monocot, dicot - primary and secondary growth.

CO9: Study of anatomy of Leaf: isobilateral, dorsiventral.

CO10: Study of anomalous secondary growth (Through permanent slides).

CO11: Study of Stomata and its types.

CO12: Study of Field visit (two) at least one to study the local flora.


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Estd.–1966

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Course Outcome

Botany (Hons.)

Semester	II
Title of Course	Floriculture (SEC-2)
Paper Code	SEC-2P (Lab)
Credits	03
Hours	03 hours/week

The students of Botany (H) of Semester-II will acquire the practical knowledge about the history of gardening, nursery management, ornamental plants, garden design, landscaping and commercial floriculture.

The lab paper (MI-1P) of this course (MI-1) provides the student with-

CO1: Study of introduction: History of gardening; Importance and scope of floriculture and landscape gardening.

CO2: Study of nursery management and routine garden operations: Sexual and vegetative methods of propagation; Soil sterilization; Seed sowing; Pricking; Planting and transplanting; Shading; Stopping or pinching; Defoliation; Wintering; Mulching; Topiary; Role of plant growth regulators.

CO3: Study ofornamental plants:Flowering annuals; Herbaceous perennials; Divine vines; Shade and ornamental trees; Ornamental bulbous and foliage plants; Cacti and succulents; Palms and Cycads; Ferns and Selaginellas; Cultivation of plants in pots; Indoor gardening; Bonsai.

CO4: Study of principles of garden designs:English, Italian, French, Persian, Mughal and Japanese gardens; Features of a garden (Garden wall, Fencing, Steps, Hedge, Edging, Lawn, Flower beds, Shrubbery, Borders, Water Garden. Some Famous gardens of India.

CO5: Study of landscaping places of public importance:Landscaping highways and educational institutions.

CO6: Study of commercial floriculture:Factors affecting flower production; Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life; Cultivation of Important cut flowers (Carnation, Aster, Chrysanthemum, Dahlia, Gerbera, Gladiolous, Marigold, Rose, Lilium, Orchids).

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Course Outcome

Botany (Hons.)

Semester	II
Title of Course	Plant Science-II(MI-2)
Paper Code	MI-2T (Theory)
Credits	03
Hours	03 hours/week

The students Botany (H) of Semester-II will acquire the knowledge about general characteristics of plant morphology, flower, fruit and seeds types, structure and development of plant body, significance plant systematics, taxonomic hierarchy, systems of classification, general descriptions of the given families.

The theory paper (MI-2T) of this course (MI-2) provides the student with-

CO1: Theory of general morphology of root, stem and leaves of monocot and dicot, concept of phyllotaxy.

CO2: Ideas of different types of inflorescences of flower, aestivation, placentation types, floral formula and floral diagram.

CO3: Concept of fruits and seed types.

CO4: Concept of Structure and Development of Plant Body. The three tissue systems, primary structure of root, stem, and leaf; types of stomata, Types of vascular bundles; Secondary growth in root and stem, Sapwood and heartwood; Ring and diffuse porous wood; Early and late wood; Annual ring; peridermand lenticels.

CO5: Concept of significance of plant systematics, functions of herbarium, idea of important herbaria and botanical gardens of the world and India, brief concept about flora, monographs, keys: single access and multi access.

CO6:Concept of taxonomic hierarchy, concept of taxa(family, genus, species), species concept (taxonomic, biological, evolutionary), botanical nomenclature, principles and rules of ICN, author citation and valid publication.

CO7: Idea of Systems of classification, Overview of artificial, natural and phylogenetic classification; Classification system of Bentham and Hooker (up to series). Brief account of Angiosperm Phylogeny Group classification. Concept of primitive and Advance angiosperms (basal angiosperm and eudicots).

CO8: Idea of General descriptions of the given families: Malvaceae, Papilionaceae, Acanthaceae, Verbenaceae, Asteraceae, Poaceae.

Semester	II
Title of Course	Plant Science-II(MI-2)
Paper Code	MI-2P (Lab)
Credits	01
Hours	02 hours/week

The students of Botany (H) of Semester-II will acquire the practical knowledge about the leaf types, inflorescence types, floral diversity, fruit types study of vegetative and floral characteristics of some families.

The lab paper (MI-2P) of this course (MI-2) provides the student with-

CO1: Study of leaf types (simple and compounds).

CO2: Study of inflorescence types (racemose and cymose).

CO3: Study of floral diversity with special reference to adhesion and cohesion.

CO4: Study of fruit types: Berry (*Cucumis sativus, Capsicum annuum, Solanum melongena*), Drupe (*Mangifera indica, Borasus flaballifer*), Hesperidium (*Citrus*), Nut (*Arachis hypogea*).

CO5: Study of vegetative and floral characteristics of the following families: Malvaceae (*Sidasp./Abutilon sp.*), Acanthaceae (*Ruellia sp./Barleria sp.*), Papilionaceae (*Tephrosia sp./Crotalaria sp.*), Verbenaceae (*Lantana sp./Duranta sp.*).

BACHELOR OF SCIENCE (HONOURS) MAJOR IN CHEMISTRY

SEMESTER-1

Course Outcome

Major in Chemistry (Hons.)

Semester	I
Title of Course	Organic Chemistry-I
Paper Code	CEMHMJ101
Credits	03
Hours	04 hours/week

The students of Chemistry (H) of Semester-I will acquire the knowledge about the Valence Bond Theory, Electronic displacements, MO theory, Mechanistic classification of ionic, radical and pericyclic, Bonding geometries of carbon compounds and representation of molecules, Concept of chirality and symmetry, Relative and absolute configuration and Optical activity of chiral compounds by studying this course.

The theory paper (CEMHMJ101T) of this course (CEMHMJ1011) provides the student with-

CO 1. Know the basic of structure, bonding, reactivity and reaction mechanisms of molecules.

CO 2. Identify the aromatic, anti-aromaticity and non-aromatic compounds.

CO 3. Identify electrophile, nucleophiles, free radicals and intermediates along the reaction pathways.

CO 4. Understand stability of organic molecules, structure & stereochemistry.

Semester	I
Title of Course	Organic Chemistry Lab- I
Paper Code	CEMHMJ101
Credits	01
Hours	04 hours/week

The students of Chemistry (H) of Semester-I will acquire the practical knowledge about the Separation & purification of the organic mixture, Determination of boiling point of common organic liquid compounds, Identification of a pure Organic Compounds by hands on practical experiment.

The lab paper (CEMHMJ101) of this course (CEMHMJ101) provides the student with-

CO 1. Judge the solubility of the mixture of compounds.

CO 2. Identify the pure organic compounds.

SEC (Hons)

Semester	I
Title of Course	Chemistry of Cosmetics & Perfumes
Paper Code	SEC1P
Credits	04
Hours	06 hours/week

The students of Chemistry (H) of Semester-I will acquire the knowledge about the talcum powder, shampoo, enamels, hair remover, face cream, nail polish and nail polish remover, Lipstick studying this course.

The theory paper (CEMSEC02T) of this course (CEMSEC02) provides the student with-

CO 1. Know the basic Preparation of talcum powder.

CO 2. Know the basic Preparation of talcum powder shampoo.

CO 3. Understand Industrial Preparation of Cosmetics & Perfumes.

Minor in Chemistry

Semester	I
Title of Course	Atomic Structure, Chemical Periodicity, Acids and Bases, Redox Reactions, & States of Matter

Paper Code	CEMMI01
Credits	03
Hours	04 hours/week

The students of other science subjects (H) of Semester-I will acquire the knowledge about the Atomic Structure, Chemical Periodicity, Acids and bases, Redox reaction, Redox reactions, Kinetic Theory of Gases and Real gases, Liquids and Solids by studying this course.

The theory paper (CEMMI01) of this course (CEMMI01) provides the student with-

CO 1. Understand the atomic theory and its development.

CO 2. Understand electronic configuration to explain periodic properties.

CO 3. Understand different acid-bases theory of organic compounds.

CO 4. Understand the different types of interactions present in

molecules.

CO 5. Know about the concepts of Gass, Solids and Liquids.

CO 6. Understand the qualitative treatment of Gas Solid and Liquid.

Semester	I
Title of Course	Atomic Structure, Chemical Periodicity, Acids and Bases, Redox Reactions, & States of Matter
Paper Code	MI-1P
Credits	01
Hours	04 hours/week

The students of other science subjects (H) of Major of Semester-I will acquire the practical knowledge about the Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture, sodium carbonate and sodium hydrogen carbonate present in a mixture, water of crystallization in Mohr's salt by titrating with $KMnO_4$ by hands on practical experiments.

The lab paper (MI-1P) of this course (MI-1P) provides the student with-

CO 1. Design Acid and Base Titrations of mixture of compounds.

CO 2. Produce the results of mixture of compounds by Oxidation-Reduction Titration.

BACHELOR OF SCIENCE (HONOURS) MAJOR IN CHEMISTRY

SEMESTER-II

Major in Chemistry (Hons.)

Semester	II
Title of Course	Inorganic Chemistry-I
Paper Code	CEMHMJ102
Credits	03
Hours	04 hours/week

The students of Chemistry (H) of Semester-II will acquire the knowledge about the Extra nuclear Structure of atom, Chemical periodicity, Acid-Base reactions and Redox Reactions reactions by studying this course.

The theory paper (CEMHMJ102T) of this course (CEMHMJ102) provides the student with-

CO 1. Understand the basics of Extra nuclear Structure of atoms.

CO 2. Understand the basics of the Chemical periodicity.

CO 3. Know the basics of Acid-Base reactions

CO 4. Know the basics of Redox Reactions and precipitation reactions.

Semester	II
Title of Course	Inorganic Chemistry Lab- I
Paper Code	CEMHMJ102
Credits	01
Hours	04 hours/week

The students of Chemistry (H) of Semester-II will acquire the practical knowledge about Acid and Base Titrations: Estimation of carbonate and hydroxide present together in mixture, carbonate and bicarbonate present together in a mixture and free alkali present in different soaps/detergents by hands on practical experiment.

The lab paper (CEMHMJ102) of this course (CEMHMJ102) provides the student with-

CO 1. Estimation of carbonate and hydroxide present together in mixture

CO 2. Estimation of carbonate and bicarbonate present together in a mixture.

CO 3. Estimation of free alkali present in different soaps/detergents.

SEC (Hons)

Semester	II
Title of Course	Medicinal & Pharmaceutical Chemistry
Paper Code	SEC2P
Credits	03
Hours	06 hours/week

The students of Chemistry (H) of Semester-2 will acquire the knowledge about the Extraction of eucalyptus leaf ingredient, eugenol from clove, nicotine from tobacco, Curumine from turmeric, caffeine from tea/coffee studying this course.

The theory paper (CEMSEC02T) of this course (CEMSEC02) provides the student with-

CO 1. Extraction of eucalyptus leaf ingredient.

CO 2. Extraction of eugenol from clove.

CO 3. Extraction of nicotine from tobacco.

CO 4. Curcumins from turmeric.

CO 5. Extraction of caffeine from tea/coffee.

Minor in Chemistry

Semester	II
Title of Course	General Organic Chemistry, Aliphatic Hydrocarbons & Chemical Kinetics
Paper Code	CEMMI02
Credits	04
Hours	04 hours/week

The students of other science subjects (H) of Semester-I will acquire the knowledge about the General Organic Chemistry, Aliphatic Hydrocarbons & Chemical Kinetics by studying this course.

The theory paper (CEMMI02) of this course (CEMMI01) provides the student with-

CO 1. Know about the concepts Fundamentals of Organic Chemistry

CO 2. Understand Stereochemistry.

CO 3. Understand the Nucleophilic Substitution and Elimination Reactions

CO 4. Understand the Aliphatic Hydrocarbons.

CO 5. Know about the concepts of Chemical Kinetics.

CO 6. Understand the qualitative treatment of Gas Solid and Liquid.

Semester	II
Title of Course	Qualitative Analysis of Single Solid Organic Compound(s)
Paper Code	MI-2P
Credits	02
Hours	04 hours/week

The students of other science subjects (H) of Minor of Semester-II will acquire the practical knowledge about the Qualitative Analysis of Single Solid Organic Compound(s) by hands on practical experiments.

The lab paper (MI-2P) of this course (MI-2P) provides the student with-

CO 1. Detection of special elements (N, Cl, and S) in organic compounds. Experiment B: Solubility and Classification (solvents: H_2O, dil. HCl, dil. NaOH)

CO 2. Detection of functional groups: Aromatic-NO_2, Aromatic -NH_2, - COOH, carbonyl (no distinction of –CHO and >C=O needed), -OH (phenolic) in solid organic compounds.

CO 3. The unknown (at least 6) solid samples containing not more than two of the above types of functional groups should be done.

CO 4. Study the kinetics of the following reactions, a) Initial rate method: Iodide-persulphate reaction, b) Integrated rate method:

CO 5. Acid hydrolysis of methyl acetate with hydrochloric acid.

CO 6. Compare the strengths of HCl and H_2SO_4 by studying kinetics of hydrolysis of methyl acetate.

CO 7. Decomposition of H_2O_2.

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Course Outcome

Education (Multidisciplinary)

Semester	I
Title of Course	Foundation of Education (MAJOR-1)
Paper Code	(MAJOR-1) Disc-A1
Credits	04
Hours	04 hours/week

After going through the paper students will know meaning, nature and scope of education. Students will know the meaning and types of curriculum and co – curricular activities. This paper will teach the students various play-way method and concept of free discipline and self-discipline

The paper (MAJOR-1, Disc-A1) of this course provides the student with-

CO1.Meaning and characteristics of Narrow concept of Education, Meaning and characteristics of Broad concept of Education, Difference between narrow & broad concept of education, Education as system, Concept Education as Process and Product

CO2.Education as science and arts, Meaning and definitions of education, Nature and scope of education

CO3.Aims of education, Individualistic aims of education, Socialistic aims of education Comparative discussion between individualistic and socialistic aims of education Vocational and democratic aims of education

CO4.Modern concept of education, Aims of modern education with special reference to Delor's Commission

CO5.Concept on factors that influences on learning and learner, influence of heredity and environment on the learner, Teacher: as impotent factor in learning, Qualities and duties of a good teacher.

CO6.Meaning and definitions of Curriculum, Types of curriculum, Concept of co-curricular activities, Different types of co-curricular activities, Significance of co-curricular actives on

the all-round development of learners, Concept of educational institutions, Meaning and characteristic of formal education, Meaning and characteristic of non-formal education, A comparative discussion on formal education and informal education

CO7.Meaning and concept of agencies of education, Concept and definitions of home, Role of home/family on child's development/ education, Limitation of family/home,

CO8.Concept and definitions of school, Role of school on child's development/ education, Concept and definitions of state, Role of school and state development/ education

CO9.Concept of mass media, Types of mass media, Contribution and limitations of television as mass media, Contribution and limitations of radio as mass media, Contribution and limitations of cinema as mass media, Contribution and limitations of newspaper as mass media

CO10.Concept and history of child-centralism in education, Characteristics of child centric education, Significance of child centric education, Concept and history of play and work/ activity centric education, Characteristics of play way in Education.

CO11.Concept and types of method of education, Key concept, procedure, advantage and limitations of Kindergarten method of education. (Gift & occupation), Key concept, procedure, advantage and limitations of Montessori Method of education. (Deductive operates), Key concept, procedure, advantage and limitations of project method of education

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Course Outcome

Education (Multidisciplinary)

Semester	II
Title of Course	Foundation of Education
Paper Code	MAJOR-2/ Disc-B1
Credits	04
Hours	04 hours/week

After going through the paper students will know meaning, nature and scope of education. Students will know the meaning and types of curriculum and co – curricular activities. This paper will teach the students various play-way method and concept of free discipline and self-discipline

The paper (MAJOR-2/ Disc-B1) of this course provides the student with-

CO1.Meaning and characteristics of Narrow concept of Education, Meaning and characteristics of Broad concept of Education, Difference between narrow & broad concept of education, Education as system, Concept Education as Process and Product

CO2.Education as science and arts, Meaning and definitions of education, Nature and scope of education

CO3.Aims of education, Individualistic aims of education, Socialistic aims of education Comparative discussion between individualistic and socialistic aims of education Vocational and democratic aims of education

CO4.Modern concept of education, Aims of modern education with special reference to Delor's Commission

CO5.Concept on factors that influences on learning and learner, influence of heredity and environment on the learner, Teacher: as impotent factor in learning, Qualities and duties of a good teacher.

CO6.Meaning and definitions of Curriculum, Types of curriculum, Concept of co-curricular activities, Different types of co-curricular activities, Significance of co-curricular actives on

the all-round development of learners, Concept of educational institutions, Meaning and characteristic of formal education, Meaning and characteristic of non-formal education, A comparative discussion on formal education and informal education

CO7.Meaning and concept of agencies of education, Concept and definitions of home, Role of home/family on child's development/ education, Limitation of family/home,

CO8.Concept and definitions of school, Role of school on child's development/ education, Concept and definitions of state, Role of school and state development/ education

CO9.Concept of mass media, Types of mass media, Contribution and limitations of television as mass media, Contribution and limitations of radio as mass media, Contribution and limitations of cinema as mass media, Contribution and limitations of newspaper as mass media

CO10.Concept and history of child-centralism in education, Characteristics of child centric education, Significance of child centric education, Concept and history of play and work/ activity centric education, Characteristics of play way in Education.

CO11.Concept and types of method of education, Key concept, procedure, advantage and limitations of Kindergarten method of education. (Gift & occupation), Key concept, procedure, advantage and limitations of Montessori Method of education. (Deductive operates), Key concept, procedure, advantage and limitations of project method of education

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E-mail: narajolerajcollege@rediffmail.com
Website: https://www.narajolerajcollege.ac.in

Course Outcome

Education (Multidisciplinary)

Semester	I
Title of Course	Principle of Education
Paper Code	Minor -1 (Disc.-I)
Credits	4
Hours	4 hours/week

After going through the paper students will know meaning, nature and scope of education. Students will know the meaning and types of curriculum and co – curricular activities. This paper will teach the students various play-way method and concept of free discipline and self-

The paper of this course (Minor-1/ Disc.I) provides the students with

CO: 1 Meaning and characteristics of Narrow concept of Education, Meaning and characteristics of Broad concept of Education, Difference between narrow & broad concept of education

CO: 2 Education as system, Concept Education as Process and Product, Education as science and arts, Meaning and definitions of education, Nature and scope of education, Aims of education

CO: 3 Individualistic aims of education, Socialistic aims of education, Comparative discussion between individualistic and socialistic aims of education, Vocational and democratic aims of education

CO: 4 Modern concept of education, Aims of modern education with special reference to Delor's Commission, Concept on factors that influences on learning and learner, influence of heredity and environment on the learner

CO: 5 Teacher : as impotent factor in learning, Qualities and duties of a good teacher, Meaning and definitions of Curriculum, Types of curriculum- Concept of co curricular activities

CO: 6 Different types of co-curricular activities, Significance of co-curricular actives on the all-round development of learners , Concept of educational institutions, Meaning and characteristic of formal education

CO: 7 Meaning and characteristic of non-formal education, A comparative discussion on formal education and informal education

CO: 8 Meaning and concept of agencies of education, Concept and definitions of home, Role of home/family on child's development/ education, Limitation of family/home

CO: 9 Concept and definitions of school, Role of school on child's development/ education, Concept and definitions of state, Role of school and state development/ education

CO: 10 Concept of mass media, Types of mass media, Contribution and limitations of television as mass media, Contribution and limitations of radio as mass media, Contribution and limitations of cinema as mass media

CO: 11 Contribution and limitations of news paper as mass media, Concept and history of child-centricism in education, Characteristics of child centric education , Significance of child centric education

CO: 12 Concept and history of play and work/ activity centric education , Characteristics of play way in Education, Concept and types of method of education, Key concept, procedure, advantage and limitations of Kindergarten method of education. (gift & occupation)

CO: 13 Key concept, procedure, advantage and limitations of Montessori method of education.(deductive operates), Key concept, procedure, advantage and limitations of project method of education.

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Course Outcome

Education (Multidisciplinary)

Semester	II
Title of Course	Educational Psychology
Paper Code	**MINOR-2**
Credits	4
Hours	4 hours/week

After going through the paper students will know concept and methods of educational psychology. Students will also know the concepts of growth and development. This paper will teach the students about development of personality and causes of individual differences. Students also know from the paper about concept and theories of intelligence and learning.

The paper of this course (Minor-2) provides the students with

CO:1 Concept, meaning and definitions of Education, Concept, meaning and definitions of Psychology, Relationship between education and psychology

CO:2 Meaning and definitions of educational psychology, Nature and Scope of Educational Psychology, Significance of psychology in education, Methods of educational psychology.

CO:3 Concept of human development, Different aspects of human development, Concept and nature of cognitive development, Key Concept of Piaget's cognitive development theory, Different stages of Piaget's theory of development, Educational implications of the theory

CO:4 Key concept of Erikson's psycho-social development theory, Educational implications of the theory, Meaning and characteristics of morality and moral development, Key concept of Kohlberg's moral development theory, Educational implications of the theory

CO:5 Meaning, definitions and characteristics of personality, Types of personality, Concept of Personality development by Freud.

CO:6 Intelligence: Concept and Nature, Basic concept on Theories of intelligence, Spearman two factor theory of intelligence, Educational implications of two factor theory

CO:7 Three dimensional theory of intelligence by Guilford, Educational implications of the theory, Measurement of Intelligence- verbal, non-verbal, and performance tests.

CO:8 Concept and nature Emotional Intelligence, Dimensions of emotional intelligence, Meaning nature of creativity, Factors that effects on creativity, How to nurture creativity to the students.

CO:9 Meaning and characteristics of learning, Factors influencing learning, Concept on different theories of learning, Concept of Classical Conditioning theory of Pavlov and it's educational implications, Concept of Operant conditioning theory by Skinner and it's educational implications, Concept of Vygotsky theory of learning and it's educational implications

CO:10 Concept and types Transfer of Learning, Educational implications of transfer of learning, Memorization: Definition, factors, Concept of STM, LTM, Difference between STM & LTM, Strategies for effective memorization, Forgetting- meaning and definitions , Causes of forgetting.

DEPARTMENT OF ENGLISH: COURSE OUTCOME/PROGRAMME SPECIFIC OUTCOME

- **ENGHMJ101 (SEMESTER I, HISTORY OF ENGLISH LITERATURE AND ENGLISH LANGUAGE- 4 CREDITS)**

Course Objectives:

The syllabus for Core Course 1 (CC1) under the Choice Based Credit System (CBCS) is structured to provide students with a comprehensive idea about the development of English literature and language over the ages. It traces the trajectory of the growth of English literature from the period of its inception, dating back to the seventh century, to the present era. The course is also designed to help students develop an understanding of the structural development of the English language and also to inform them about the various external linguistic influences that have contributed to the making of the language as we now know it to be.

Course Outcomes:

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 todevelop 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 ofthe language.

- **ENGSEC01 – SOFT SKILLS : 3 CREDITS**

Course Objectives:

Soft skills courses help professionals to gain personal skills, including active listening, empathy and effective communication, which they can deploy in a group setting as well.

Course Outcome:

By the end of the soft skills training program, the students should be able to:

1. Develop effective communication skills (spoken and written).
2. Develop effective presentation skills.
3. Conduct effective business correspondence and prepare business reports which produce results.
4. Become self-confident individuals by mastering interpersonal skills, team management skills, and leadership skills.
5. Develop all-round personalities with a mature outlook to function effectively in different circumstances.
6. Take part effectively in various selection procedures adopted by the recruiters

- **AEC01 – COMMUNICATIVE ENGLISH -1 : 2 CREDITS**

Course Objectives:

The purpose of this course is to introduce students to the theory, fundamentals and tools of communication and to develop in them vital communication skills which should be integral to personal, social and professional interactions.

Course Outcomes:

The completion of the course is supposed to benefit the students in thefollowing ways:

1. This course aims at addressing the importance of communication skills through an interactive mode of teaching-learning process and by focusing onvarious 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.

- **ENGHMJ102 SEMESTER II, BRITISH POETRY (RENAISSANCE - 18TH CENTURY) : 4 CREDITS**

Course objectives

The growth of English language and literature over the centuries from a totally different state- more in the condition of a dialect in the earliest periods- to what

it is in the present century should form the background knowledge of every student of English literature. The quaint systems and structures of the medieval English developed rather quickly during the 16th and 17th centuries. The objective of this course is to introduce the music and quaintness of the English sounds and vocabulary of the earliest period in English literary history to the students to enable them to have a historical perspective of the developments over the centuries. The course also introduces the great masters of the early period such as Spencer, Shakespeare, Marlowe and Donne, Marvell, Milton, Pope etc.

Course Outcomes :

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 whichshaped 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.

- **ENGSEC02 SEMESTER 2 BASIC PHONETICS: 3 CREDITS**

Course Objectives:

The specific aim of the course is to provide students with a solid foundation for the study of the sound patterns of English and to help them master the basic notions of phonetic transcription

Course Outcome: The following are the course outcome after its completion -

1. The study of phonetics enables students to understand and speak a language to a certain level of fluency.
2. While studying phonetics, you can examine the difference between the source of the sound and the language you are learning.
3. Teaching phonetics help students to decode sounds, pronounce them correctly, and combine these sounds to form words.
4. Once you have mastered phonetics as a student, you will be able to spell words correctly, especially the ones you are not familiar with.

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(NAAC Accredited 'B' Grade)
NARAJOLE:: PASCHIM MEDINIPUR :: WEST BENGAL :: Pin-721211
Phone and Fax: +91- 9933881131; E-mail: narajoleracollege@rediffmail.com
Website: h ttps://www.narajolerajcollege.ac.in
Affiliated By – Vidyasagar University

Course Outcome (NEP)

Geography (Honours)

Semester	I
Title of Course	Geotectonics and Geomorphology
Paper Code	MJ-1 (Theory and Practical)
Credits	04
Hours	04 hours/week

The theory paper (MJ-1) of this course will be able to learn-

Geotectonics and Geomorphology events on the earth surface with special emphasis on the following topics:

CO1: To understand the geotectonic processes and understand the association between geomorphological landforms, concepts and processes.

CO2: To critically evaluate and connect information about geomorphic processes.

CO3: To provide a theoretical and empirical framework for understanding landscape evolution and the characteristics of individual types of geomorphic landscapes by studying different theories.

CO4: The basic idea of characteristics of Rocks and minerals and their identification.

CO5: Draw and Identification of the characteristics and differentiation of the different Geological structure.

Semester	I
Title of Course	**Fundamentals of Earth System Science**
Paper Code	MI-1 (Theory)
Credits	04
Hours	04 hours/week

The theory paper (MI-1) of this course will be able to learn-

After the completion of course, the students will have ability to:

CO1: Understand the functioning of Earth systems in real time and analyse how the natural and anthropogenic operating factor affects the development of landforms

CO2: Distinguish between the mechanisms that control these processes.

CO3: Basic idea of vertical and horizontal distribution of temperature, and also explain the causes and consequences of inversion of temperature, Greenhouse effect and importance of ozone layer.

CO4: Understand different aspects of physical geography like hydrology, oceanography, climatology and soil science.

CO5: Describe the effecting factors and process of soil formation, like the origin, development and characteristics of soils -Lateritic, Podzol and Chernozem soil.

CO6: Description of classify soil according to genetic and USDA classification methods.

Semester	I
Title of Course	**Computer Basics and Applications**
Paper Code	SEC-1**(Practical)**
Credits	03
Hours	03 hours/week

The theory paper (SEC-1) of this course will be able to learn-

Upon completion of this course, students will be able to -

CO1: Get a working knowledge of computer hardware and software.

CO2: Get an idea of managing folders and files.

CO3: Concept of internet surfing, cloud computing and drive sharing.

CO4: Run an application, preferably, MS Word, MS Excel, MS PowerPoint.

Semester	II
Title of Course	**Cartographic Techniques**
Paper Code	MJ-2 (Practical)
Credits	04
Hours	04 hours/week

The theory paper (Mj-2) of this course will be able to learn-

After the completion of course, the students will have ability to:

CO1: Read and prepare maps.

CO2: Comprehend locational and spatial aspects of the earth surface.

CO3: Use and importance of maps for regional development and decision making.

CO4: Classification and description of the principles or properties of different types of maps and projections with their components.

CO5: Familiarity with different surveying instruments i.e. prismatic compass, dumpy level, theodolite, Abney level, and clinometer.

CO6: Drawing and using of different types of scales and projections.

Semester	II
Title of Course	**Human Geography**
Paper Code	MI-2 (Theory)
Credits	04
Hours	04 hours/week

The theory paper (MI-2) of this course will be able to learn-

After the completion of course, the students will have ability to:

CO1: Know the changing human and cultural landscape at different levels.

CO2: Understand patterns and processes of population growth and its implications.

CO3: Appreciate the nature and quality of human landscapes.

CO4: Basic idea of World Population Distribution and Composition.

CO5: Understanding the different types and patterns of rural-urban settlements.

Semester	II
Title of Course	**Coastal Management**
Paper Code	SEC-2**(Practical)**
Credits	03
Hours	03 hours/week

The theory paper (SEC-2) of this course will be able to learn-

Upon completion of this course, students will be able to -

CO1: Understand Coastal morphodynamic variables and their role in evolution of coastal forms.

CO2: Understanding the Environmental impacts and management of different coastal activity. Such as mining, oil exploration, salt manufacturing, land reclamation and tourism.

CO3: Basic concept for the coastal hazards and their management using different structural and non-structural measures. Such as Erosion, flood, sand encroachment, dune degeneration, estuarine sedimentation and pollution.

CO4: The basic concept of dynamics of a principle of Coastal Zone Management and Exclusive Economic Zone and ICZM.

CO5: Moreover, in this SEC paper gives knowledge about Coastal Regulation Zones with reference to India.

CO6: In this particular portion of the core paper each of the students will prepare a field report to explore the coastal problems of the nearest coastal area.

CO7: This work gives a field base knowledge how the local people are living such coastal areas. The objectives of this work should follow to locating such areas and suggest some useful recommendations to minimize the risk of this field report.

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NARAJOLE: PASCHIM MEDINIPUR: WEST BENGAL: Pin-721211
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Website: https://www.narajolerajcollege.ac.in

Course Outcome

History (Hons.)

Semester	I
Title of Course	Ancient India from the earliest times to 600 BCE
Paper Code	MJIT- (Theory)
Credits	04
Hours	04 hours / week

The students of other arts subjects of Semester-I will acquire the knowledge about Indian civilisation, ancient administration, political structure, culture and Indian Art of this course.

The theory paper (Paper Code-MJIT, Ancient India) of this course provides the student with-

After going through the paper students' will know about historical theories and interpretations about the Indian past. Student's will get the idea of Bharatvarsha with all its diversity and cultural tradition. Student's will know the following from this paper:

CO1: Description of an overview of literary and archaeological sources.
CO2: Discussion about the first urbanization in the Indian subcontinent i.e. Indus Civilisation.
C03: Technology, architecture, religion and maritime trade of the early Harappan, Harappan and
late Harappan phases and its classification.
CO4: Description of the spread of Aryan settlements in India in the period of the Vedas, Brahmans and Upanishads.

CO5: Explanation about the establishment of kingdoms, oligarchies and chiefdoms and the history of the autonomous clan. Discussion about the history of Mahajanpadas.
CO6: Discussion about the issue of upward mobility among the Shudras and ancient forms and modern debates about slavery.

CO7: Discussion about the religion of the Vedas, Buddhisim, Jainism and the doctrine of the Ajivikas.

CO8: Discussion about the ancient history of education, language, literature, science and technology.

Paper Code: MI-1T(Paper: Ancient India), Credit- 04

After going through the paper students' will know about historical theories and interpretations about the Indian past. Student's will get the idea of After going through the paper students' will know about the idea of Harappan civilization and Vedic age. And also the elaborate history of Mauryan and Gupta Empire, and students will understand the early mediaeval phase in the Indian history and different perception of Early medieval situation. Student's will know the following aspects from this paper:

CO9: Explanation about empire building in India i.e. Mahajanapadas to Kingdom.

CO10: Description of polity, economy, socio-cultural aspects and downfall of Mauryanempire.

CO11: Discussion about past- Mauryanempire.

CO12: Age of imperial Guptas and its classification.

CO13: Description of an overview of the development of regional States.

Paper Code: SEC1P(Art Appreciation: An introduction to Indian Art) Credit-03

After going through the paper students will know about

Art appreciation . They will know about Indian art from the infant to the modern period. They will also know about contemporary Indian art and architecture. This paper will teach the student about Art and Architecture.

CO1: Discussion about Indian Prehistic and Proto historic Art.

CO2: Description about stupa, cave and temple art and architecture in early ancient India.

CO2: Analysis about temple forms and their architecture features .

CO3: Manuscripts and painting traditions in early medieval India.
CO4: Discussion about Sultanate and Mughal Architecture miniature painting traditions.
CO5: Modern and contemporary Indian art and Architecture.

Semester	II
Title of Course	Social Formation and the Cultural Pattern of the Ancient World
Paper Code	MI-2
Credits	04

The students of other Arts subjects (H) of Semester-II will acquire the knowledge about the social and cultural pattern of the Ancient World. Microscope, evolution of humankind and Mesolithic culture to ancient civilization of Greece.

Hours	04 hours / week

Paper Code **MJ2(Social formation and Cultural Pattern of Ancient World)**

After going through the paper student's will know about the oldest history of the world. Student's will know about Social formation and the cultural patterns of the ancient world.

CO1: Paleolithic and Mesolithic cultures of the ancient world.
CO2: Food production of the ancient world.
CO3: discussion about Mesopotamian civilization up to Akkadian Empire: during the bronze age civilization.
CO4: Debate on the advent of iron and its implications in Central and West Asia.
CO5: Agrarian economy, Urbanization, Trade in ancient Greece.
CO5: Athens and Sparta; Greek cultural in ancient Greece.

Paper Code : SEC2P(Archives and Museums in India), Credit - 03
After going through the paper students will know about the institutions that house and maintain documentary, visual and material remains of the past. Museums and archives are among the most important such repositories and this paper explains their significance and how they work. Students will be encouraged to undertake collection, documentation and exhibition of such materials in their localities and colleges. Visit to National Archives and National Museum are and integral part of the paper.

CO1: Definition and history of development in India.
CO2: Understanding the preservation in India.
CO3: Discussion about documentation.
CO4: Description about digital documentation and the accessioning Preservation.
CO5: Description about the process of chemical preservation and restoration.
CO6: Discussion museum presentation and exhibition.
CO7: Analysis education and communication outreach activites about museum archives and society.

Paper Code: MI, (Paper: Medieval India), Credit - 4

After going to the paper students will know about Medieval India.From Arab conquest and establishment of Delhi Sultana and Mughal Imperialism and their economy, polity, culture, and administration. Student will also know about socio cultural system of mediaeval India.

Student's will know the following from this paper:

CO1: Discussion about Arab Conquest of sindh.
CO2: Analysis about Arab Conquest nature and impact.
CO3: Discussion about causes and consequence of early Turkish invention.
CO4: establishment of the sultanate Qutub -ud-din Aibak to firoj Shah.
CO5: Discussion about sultani period polity,economy, and cultural condition.
CO6: discussion about emergence of religion power like Vijayanagar bahamani Hussain Sahi Shahi and Illiyas Shahi dynasties.
CO7: Description of establishment of Mughal Empire and greater Mughal and its polity economy and cultural condition.
CO8: Discussing about socio cultural syncretism.

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Course Outcome

Mathematics (Hons.)

Semester	I
Title of Course	Calculus, Geometry & Ordinary Differential Equation
Paper Code	MJ-1T (Theory)
Credits	04
Hours	04 hours/week

The students of Mathematics (H) of Semester-I will acquire the knowledge about the Leibnitz rule, L' Hospital'a rule, reduction formula, conics, solution of differentiation equation, Bernoulli differential Equation by studying this course.

The theory paper (MJ-1T) of this course (MJ-1) provides the student with-

CO1. Describe Leibnitz rule and its application to various problems.

CO2. Write Down L'Hospital's rule with applications in business, economics and life sciences.

CO3. Illustrate reduction formula for different types of functions.

CO4. Classification of conics.

CO5. Write down general, particular, explicit, implicit and singular solutions of a differential equation.

CO6. Illustration of exact differential equation and integrating factors.

CO7. Reduction to separable differential equation.

CO8. Describe linear equation and Bernoulli differential equations.

CO2: Solution of second order linear differential equations (LDEs) with constant coefficients, concept of particular integral.

Semester	I
Title of Course	MATLAB-1
Paper Code	SEC1P
Credits	03
Hours	03 hours/week

The students of Mathematics (H) of Semester-I utilizes the MATLAB environment to acquire with a working knowledge of computer-based problem-solving methods relevant to science and engineering, including programming and numerical analysis techniques. Students outline, write, test, and debug computer programs to solve problems and display results, with emphasis on proper documentation of computer code and reports. Common examples and applications of physics and engineering are used throughout the course.

The paper (SEC 1) of this course provides the student with-

CO1: Students learned features of MATLAB as a programming tool. They are fully familiar to all the features of MATLAB software and easily handle the software.

CO2: To Impart the Knowledge to the students with MATLAB software. This enhances programming knowledge in Research and Development.

CO3: To provide a working introduction to the Matlab technical computing environment. Themes of data analysis, visualization, and programming.

CO4: To introduce students the use of a high-level programming language, Matlab. Scientific problem solving with applications and examples from Engineering.

CO5: New teaching model which include theory & practical running simultaneously is introduced to our students. This method is very effective and helped to develop programming skills and technique to solve mathematical problems.

CO6: Students learned graphic features of MATLAB and they are able to use this feature effectively in the various applications.

Semester	I
Title of Course	Calculus, Geometry & Ordinary Differential Equation
Paper Code	MI-1T (Theory)
Credits	04
Hours	04 hours/week

The students of other science subjects (H) of Semester-I will acquire the knowledge about the Leibnitz rule, L'Hospital'a rule, reduction formula, conics, solution of differentiation equation, Bernoulli differential Equation bystudying this course.

The theory paper (MI-1T) of this course (MI-1) provides the student with-

CO1. Describe Leibnitz rule and its application to various problems.

CO2. Write Down L'Hospital's rule with applications in business, economics and life sciences.

CO3. Illustrate reduction formula for different types of functions.

CO4. Classification of conics.

CO5. Write down general, particular, explicit, implicit and singular solutions of a differential equation.

CO6. Illustration of exact differential equation and integrating factors.

CO7. Reduction to separable differential equation.

CO8. Describe linear equation and Bernoulli differential equations.

CO2: Solution of second order linear differential equations (LDEs) with constant coefficients, concept of particular integral.

Semester	II
Title of Course	Algebra
Paper Code	MJ-2T (Theory)
Credits	04
Hours	04 hours/week

The students of Mathematics (H) of Semester-II will acquire the knowledge about the Complex numbers, De Moivre's Theorem, Equivalence relation, well-ordering property, Division algorithms, Principles of Mathematical induction, linear Transformation, Eigen values and Eigen vectors, Rank of matrix, Cayley Hamilton theorem by studying this course.

The theory paper (MJ-2T) of this course (MJ-2) provides the student with-

CO1.Representation of complex numbers in polar forms.

CO2. Write Down De Moivre's theorem with rational indices with applications.

CO3. Identify relation between roots and coefficients.

CO4. Describe different types of inequalities.

CO5. Describe equivalence relation, well-ordering property of positive integers.

CO6. Write down division algorithm, congruence relation, principles of mathematical induction.

CO7. Representation of linear system of equations in matrix form and derivation of solutions.

CO8. Describe linear transformation.

CO9. Identify rank of a matrix, eigen values, eigen vectors, characteristics equation of a matrix.

CO10. Describe Cayley-Hamilton theorem and its use in finding the inverse of a matrix.

Semester	II
Title of Course	MATLAB-2
Paper Code	SEC2P
Credits	03
Hours	03 hours/week

The students of Mathematics (H) of Semester-II will acquire with multi paradigm numerical computing environment and was developed by Math Works. It is used for integrating computation, visualization, and programming so that the programming environment becomes easy to use. The applications of MATLAB are immense. It is a powerful linear algebra tool with a very good collection of toolboxes; therefore it finds applications in research and teaching on domains of robotics and automation.

The paper (SEC2) of this course provides the student with-

CO1: Students learned graphic features of MATLAB and they are able to use this feature effectively in the various applications

CO2: Students are able to use MATLAB as a simulation tool.

CO3: Major outcome is students are able to work as a 'MATLAB programmer' in the industry because of the hands on practical sessions. This job oriented course will helps students to get the jobs in future.

CO4: Apply a top-down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives.

CO5: Design and document computer programs and analyses in a careful and complete manner so as to effectively communicate results, to facilitate evaluation and debugging by another programmer, and to anticipate and resolve user errors.

CO6: Introduce common approaches, structures, and conventions for creating and evaluating computer programs, primarily in a procedural paradigm, but with a brief introduction to object-oriented concepts and terminology.

Semester	II
Title of Course	Algebra
Paper Code	MI-2T (Theory)
Credits	04
Hours	04 hours/week

The students of other science subjects (H) of Semester-I will acquire the knowledge about the Complex numbers, De Moivre's Theorem, Equivalence relation, well-ordering property, Division algorithms, Principles of Mathematical induction, linear Transformation, Eigen values and Eigen vectors, Rank of matrix , Cayley Hamilton theoremby studying this course.

The theory paper (MI-2T) of this course (MI-2) provides the student with-

CO1.Representation of complex numbers in polar forms.

CO2. Write Down De Moivre's theorem with rational indices with applications.

CO3. Identify relation between roots and coefficients.

CO4. Describe different types of inequalities.

CO5. Describe equivalence relation, well-ordering property of positive integers.

CO6. Write down division algorithm, congruence relation, principles of mathematical induction.

CO7. Representation of linear system of equations in matrix form and derivation of solutions.

CO8. Describe linear transformation.

CO9. Identify rank of a matrix, eigen values, eigen vectors, characteristics equation of a matrix.

CO10. Describe Cayley-Hamilton theorem and its use in finding the inverse of a matrix.

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Course Outcome

Philosophy (Hons)

Semester	II
Title of Course	History of Western Philosophy – 1
Paper Code	MJ-2T
Credits	04
Hours	04 hours / week

The theory paper (MJ-2T) of this course (MJ-2) provides the students with

CO-1 : Knowledge about classical western philosophy, idea of pre socratic period which includes the ionics, Pythagorean, Heraclitus and others.

CO-2 : Description about the Socratic method of philosophizing.

CO-3 : Idea about Plato's theory of Knowledge, theory of Forms.

CO-4 : Understanding the Aristotle's criticism of Plato's theory of forms, idea about doctrine of four causes

CO-5 : Knowledge about Aquinas theory of faith and reason, idea of essence and existence.

CO-6 : Idea about the Modern Western Philosophers, Descartes's method of doubt, the concept of Cogito ergo sum (I think therefore I am), the Criterion of truth, various ideas as well as the proofs for the existence of God.

CO-7 : Able to know the Spinoza's method, theory of knowledge, orders of knowing, idea about the doctrine of substance, Attributes and Modes, freedom of will and the concept of Pantheism.

CO-8 : Knowledge about Leibnitz's theory of substance and Monadology, truths of reason, truths of facts, idea about various metaphysical principles, the doctrine of pre-established harmony.

Semester	II
Title of Course	**Western Logic**
Paper Code	MI-2T
Credits	04
Hours	04 hours / week

The theory paper (MI-2T) of this course (M1-2) provides the students with

CO-1 : Knowledge about the concept of Western Logic, arguments, difference between deductive and inductive arguments, idea of truths and validity as well as laws of thought

CO-2 : Aristotelian classification of categorical proposition, distribution of terms.

CO-3 : Idea about immediate inference opposition of proposition, conversion, obversion and contraposition.

CO-4 : Knowledge about existential import, Boolean interpretation of categorical proposition.

CO-5 : Idea about categorical syllogism i.e. mood, figure etc. venn – Diagram method, technique of testing validity and fallacies.

CO-6 : Knowledge about symbolic Logic, Value of symbols, Truth-functions i.e. Negation, Conjunction, disjunction, implication and equivalence.

CO-7 : Idea about various statement forms – tautologous, contradiction, contingent statements forms, construction of truth-table using truth table for testing the validity of arguments and statements form.

Semester	II
Title of Course	Environmental Issues in India
Paper Code	SEC-2P
Credits	03
Hours	03 hours/week

The practical paper (SEC-2P) of this course (SEC-2) provides the students

CO-1 : Knowledge about the concept of Nature and Individual, critically examine all environmental issues such as history o relation between Man and Nature and also knowledge about how to interact with the environment on both personal and a social level.

CO-2 : Knowledge about various contemporary environmental movements such as Narmada Banchao Andolan, Chipko movement, Tehari Dam movement, silent valley movement as well as Apico movement.

CO-3 : Idea about different Contemporary Philosopher's idea about environment, Able to know the idea of Rabindranath Tagore, Mahatma Gandhi, Vandana Shiva and Meera Baidur.

CO-4 : Able to know Swachh Bharat Abhiyan which is a campaign in roads and infrastructure of India's cities, smaller town and rural areas.

CO-5 : Knowledge about observance of Aranya Saptaho by promoting the planting of trees as a healthy lifestyle and to monitor and support eco-friendly relationship.

CO-6 : Knowledge about Nomani Ganga project, which is a efforts made for the conservation of the Ganges river and the restoration of ecology recognized by UNESCO, the national mission for clean Ganga by the Govt. of India.

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Course Outcome

Multidisciplinary Studies (Gen)

Semester	I
Title of Course	Ethics and Morality : Indian and Western Approach
Paper Code	Major – A1/B1T
Credits	04
Hours	04 hours / week

The theory paper (Major – A1/Bit) of this course (Major A1/B1) provides the students with

C01 : The concepts of purusartha, i.e. four purusartha in Indian Philosophy i.e. dharma, Artha, Kama and moksha, also the relation amoungust the four purusarthas, the concept of karma and the division of karma.

C02 : Idea of the concepts of dharma in Indian Philosophy, the basic of Rna, Rta etc.

C03 : Understanding the Carvaka Ethics which is known as Asonjata Atmasukhvada; the views of the carvaka Ethics is the only goal of human life is the individual's own pleasure – eat, drink and be merry is the objects of Carvaka ethics.

C04 : Basic features of Buddhist's ethics – i.e. the four noble truths and the eight fold path of fourth noble truths.

C05 : The concept of knowledge about definition of moral and non-moral action and objects of moral judgements.

C06 : Description of the Telcological Ethics, Utilitarianism of Mill and Bentham the concept of Decontological Ethics, Moral theory of Kant and also virtue Ethics.

C07 : Understanding the theory of punishment and the concept of Capital Punishment.

Semester	I
Title of Course	Ethics : Indian and Western
Paper Code	MI – 1/C1
Credits	04
Hours	04 hours / week

The theory paper (MI-1/C1) of this course (MI-1) provides the students with :

C01 : The concepts of four purusarthas – i.e. dharma, artha, kama and moksa, their interrelation as well as the idea of Karma and division of karma.

C02 : Idea about the dharma – division of Dharma, Svadharma, Visesa dharma, Varnadharma, Asrama, Dharma, Varnadharma, Asrama Dharma, Rna, Rta.

C03 – Description of the Carvaka ethics according to which the only goal of life of an individual is his own pleasure, i.e. eat, drink and be merry is the main objective of human life.

C04 – Idea about the Buddhist ethics which includes – four noble truths and the eight-fold path of fourth noble truth.

C05 - Knowledge about the Buddhist ethics which provide definition, scope and types of Ethics, idea of Ethics and Morality, Moral and non-moral Actions as well as the objects of Moral judgement.

C06 – Description of the Teleological ethics, Mull and Bentham's utilitarianism, the concept of Deontological ethics : which includes kant's Moral Theory, virtue Ethics.

C07 – Idea of the concept of punishment, narious theoris of punishment and the concept of Capital Punishment.

Semester	I
Title of Course	Yoga for Stress Management.(SEC-1)
Paper Code	PHISEC01(Lecture-Tutorial-Practical)
Credits	03
Hours	03 hours/week

Students can experiences different types of Yoga and Meditation. They learn Stress Hazards in details. They can learn some Yoga in this regard. To culture a habit of regular Yoga and Meditation practice. They can learn ″OM Meditation ″. Right way to think for something or someone.

The Lecture-Tutorial-Practical (SEC-1) ***of this course*** (SEC-1) ***provides the student with-***

CO 1: Here students can learn how to manage stress in their daily lives. And also they are to be very helpful to release stress of others too.

CO 2: Students can learn actual nature of Stress in Western Perspective and they are able to apply that knowledge their daily lives.

CO 3: They learn Stress Hazards in details. They can learn some Yoga in this regard.

CO 4: Students acquire some experiences about challenges of Stress.

CO 5 : How to remove the pessimistic aspects of life. To culture a habit of regular Yoga and Meditation practice. To make the students aware towards the benefits of Yoga and Meditation.

CO 6: They can learn ″OM Meditation ″. Right way to think for something or someone. How to be motivated by one's own self.

CO 7 : To increase the body flexibility as well as mental peace. How to utilize the present moment.

Semester	I
Title of Course	Social Value and Ethics
Paper Code	MDC 01
Credits	03
Hours	03 hours / week

The theory paper (MDS 01) of this course (MDC) provides the students with

C01 – Basic concepts of life and Individual qualities, human life on earth, purpose, meaning of life, the laws of nature, protection of nature basic culture, thought analysis, regulating desire, guarding against anger to get rid of anxiety, the rewards of blessing, benevolence of friendship, love and charity, self-tranquillity / peace.

C02 – Knowledge about Social values (individual and social welfare), family, peace in family, society, the law of life, Brotherhood, the pride of womanhood – five responsibilities of Man – i.e. to himself, to his family to his environment, society, to the universe in his lives, thriftiness Economics, health education, Governance, peoples responsibility, duties of the community as well as idea about the world peace.

C03 – Ideas about Mind culture and tending personal health, life and mind, Bio-magnetism, universal Magnetism Genetic Centre, Thought action – short term memory, expansiveness, though waves, channelizing the Mind, Meditation, Spiritual value, structure of the body, three forces of the body, natural and unnatural causes of diseases, Method of curing diseases.

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Course Outcome

Philosophy (Hons)

Semester	I
Title of Course	Indian Philosophy
Paper Code	MJ-1T
Credits	04
Hours	04 (four) hours / week

The theory paper (MJ-1T) of this course (MJ-1) provides the student with :

C01 : The basic philosophy of Vedas, the divisions of Vedas and Upanisads. They can able to know the division of Orthodox (Astika) school and Heterodox schools (Nastika) of Indian Philosophy.

C02 : Description of Carvaka Philosophy and gain knowledge about the Epistemology Metaphysic and Ethics.

C03 : Description of the basic concepts of Jaina Philosophy as well as the theory of reality, i.e. Anekantavada, Syadvada and Saptabhanginaya.

C04 : Knowledge about the life, the four noble truths and the various theories, like the theory of Dependent origination, definition of reality, doctrine of momentarinus, theory of no soul as well as the basic tenets.

05 : Description, analysis of various concepts of Nyaya School, know the instuments, methodology and classification of Anumana, pramana, sannikarsa, pratyaksa, types of Laukika, Alaukita pratyaksa.

06 : Amumana (Definition), Vyapti, Paramark, Classification of Anumana, concept of upamana, sabda.

C07 : Gain knowledge about vaisesika view of seven padarthas, i.e. dravya, guna, karma, samanya, visesa, samavaya, abhava and theory of Atomism.

Semester	I
Title of Course	Ethics : Indian and Western
Paper Code	MI-1T
Credits	04
Hours	04 hours / week

The theory paper (MI-1T) of this course (MI-1) provides the students with the Indianand Western ethics.

C01 : The concepts of four purusarthas – dharma, artha, kama, Moksa also their interrelation as well as the concept of Karma (Sakama and Niskama)

C02 : Concepts of Dharma, various divisions of dharma i.e. visesa dharma, varnadharm Asrama dharma and the concepts of Rta.

C03 : The carvaka Ethics which is known as Gross egoistic hedonism. The only goal of life in the individuals own pleasure. Eat, drink and be merry is the main objectives of Carvaka Ethics.

C04 : Knowledge about the Buddhist's ethics. The four Noble Truths and the eight fold path of fourth noble truth.

C05 : In the Western ethics, here students can gain knowledge about definition, scope, types of ethics, Ethics and morality, the concepts of various actions as well as moral judgement.

C06 : Description of the Telcological Ethics, Mill and Bentham's

Utilitarianism. Dcontological ethics, kant's moral theory and also virtue ethics.

C07 : Knowledge about the theories of punishment, capital punishment.

Semester	I
Title of Course	Yoga for Stress Management.(SEC-1)
Paper Code	SEC01P(Practical)
Credits	03
Hours	03 hours/week

Students can experiences different types of Yoga and Meditation. They learn Stress Hazards in details. They can learn some Yoga in this regard. To culture a habit of regular Yoga and Meditation practice. They can learn "OM Meditation ". Right way to think for something or someone.

The Lecture-Tutorial-Practical ***(SEC-1) of this course (SEC-1) provides the student with-***

CO 1: Here students can learn how to manage stress in their daily lives. And also they are to be very helpful to release stress of others too.

CO 2: Students can learn actual nature of Stress in Western Perspective and they are able to apply that knowledge their daily lives.

CO 3: They learn Stress Hazards in details. They can learn some Yoga in this regard.

CO 4: Students acquire some experiences about challenges of Stress.

CO 5 : How to remove the pessimistic aspects of life. To culture a habit of regular Yoga and Meditation practice. To make the students aware towards the benefits of Yoga and Meditation.

CO 6: They can learn "OM Meditation ". Right way to think for something or someone. How to be motivated by one's own self.

CO 7 : To increase the body flexibility as well as mental peace. How to utilize the present moment.

Semester	I
Title of Course	Social Value and Ethics
Paper Code	MDC 01
Credits	03
Hours	03 hours / week

The theory paper (MDS 01) of this course (MDC) provides the students with

C01 – Basic concepts of life and Individual qualities, human life on earth, purpose, meaning of life, the laws of nature, protection of nature basic culture, thought analysis, regulating desire, guarding against anger to get rid of anxiety, the rewards of blessing, benevolence of friendship, love and charity, self-tranquillity / peace.

C02 – Knowledge about Social values (individual and social welfare), family, peace in family, society, the law of life, Brotherhood, the pride of womanhood – five responsibilities of Man – i.e. to himself, to his family to his environment, society, to the universe in his lives, thriftiness Economics, health education, Governance, peoples responsibility, duties of the community as well as idea about the world peace.

C03 – Ideas about Mind culture and tending personal health, life and mind, Bio-magnetism, universal Magnetism Genetic Centre, Thought action – short term memory, expansiveness, though waves, channelizing the Mind, Meditation, Spiritual value, structure of the body, three forces of the body, natural and unnatural causes of diseases, Method of curing diseases.

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Course Outcome

Multidisciplinary

Semester	II
Title of Course	Ethics and Morality : Indian and Western Approach
Paper Code	Major – A1/B1T
Credits	04
Hours	04 hours / week

The theory paper (Major – A1/Bit) of this course (Major A1/B1) provides the students with

C01 : The concepts of purusartha, i.e. four purusartha in Indian Philosophy i.e. dharma, Artha, Kama and moksha, also the relation amoungust the four purusarthas, the concept of karma and the division of karma.

C02 : Idea of the concepts of dharma in Indian Philosophy, the basic of Rna, Rta etc.

C03 : Understanding the Carvaka Ethics which is known as Asonjata Atmasukhvada; the views of the carvaka Ethics is the only goal of human life is the individual's own pleasure – eat, drink and be merry is the objects of Carvaka ethics.

C04 : Basic features of Buddhist's ethics – i.e. the four noble truths and the eight fold path of fourth noble truths.

C05 : The concept of knowledge about definition of moral and non-moral action and objects of moral judgements.

C06 : Description of the Telcological Ethics, Utilitarianism of Mill and Bentham the concept of Decontological Ethics, Moral theory of Kant and also virtue Ethics.

C07 : Understanding the theory of punishment and the concept of Capital Punishment.

Semester	II
Title of Course	Ethics and Morality : Indian and Western Approach
Paper Code	Major – 2 (DISc-B1)
Credits	04
Hours	04 hours / week

The Theory paper (Major-2) of this course (DISc-B1) provides the students with

C01 : The concepts of purusartha, i.e. four purusartha in Indian Philosophy i.e. dharma, Artha, Kama and moksha, also the relation amoungust the four purusarthas, the concept of karma and the division of karma.

C02 : Idea of the concepts of dharma in Indian Philosophy, the basic of Rna, Rta etc.

C03 : Understanding the Carvaka Ethics which is known as Asonjata Atmasukhvada; the views of the carvaka Ethics is the only goal of human life is the individual's own pleasure – eat, drink and be merry is the objects of Carvaka ethics.

C04 : Basic features of Buddhist's ethics – i.e. the four noble truths and the eight fold path of fourth noble truths.

C05 : The concept of knowledge about definition of moral and non-moral action and objects of moral judgements.

C06 : Description of the Telcological Ethics, Utilitarianism of Mill and Bentham the concept of Decontological Ethics, Moral theory of Kant and also virtue Ethics.

C07 : Understanding the theory of punishment and the concept of Capital Punishment.

Semester	II
Title of Course	Western Logic
Paper Code	Minor – 2
Credits	04
Hours	04 hours / week

The theory paper (Minor-2) of this course (DISc-C2) provides the students with

CO-1 : Knowledge about the concept of Western Logic, arguments, difference between deductive and inductive arguments, idea of truths and validity as well as laws of thought

CO-2 : Aristotelian classification of categorical proposition, distribution of terms.

CO-3 : Idea about immediate inference opposition of proposition, conversion, obversion and contraposition.

CO-4 : Knowledge about existential import, Boolean interpretation of categorical proposition.

CO-5 : Idea about categorical syllogism i.e. mood, figure etc. venn – Diagram method, technique of testing validity and fallacies.

CO-6 : Knowledge about symbolic Logic, Value of symbols, Truth-functions i.e. Negation, Conjunction, disjunction, implication and equivalence.

CO-7 : Idea about various statement forms – tautologous, contradiction, contingent statements forms, construction of truth-table using truth table for testing the validity of arguments and statements form.

Semester	II
Title of Course	Environmental Issues in India
Paper Code	SEC-02
Credits	03
Hours	03 hours / week

The practical paper (SEC-02) of this course (SEC) provides the students.

CO-1 : Knowledge about the concept of Nature and Individual, critically examine all environmental issues such as history o relation between Man and Nature and also knowledge about how to interact with the environment on both personal and a social level.

CO-2 : Knowledge about various contemporary environmental movements such as Narmada Banchao Andolan, Chipko movement, Tehari Dam movement, silent valley movement as well as Apico movement.

CO-3 : Idea about different Contemporary Philosopher's idea about environment, Able to know the idea of Rabindranath Tagore, Mahatma Gandhi, Vandana Shiva and Meera Baidur.

CO-4 : Able to know Swachh Bharat Abhiyan which is a campaign in roads and infrastructure of India's cities, smaller town and rural areas.

CO-5 : Knowledge about observance of Aranya Saptaho by promoting the planting of trees as a healthy lifestyle and to monitor and support eco-friendly relationship.

CO-6 : Knowledge about Nomani Ganga project, which is a efforts made for the conservation of the Ganges river and the restoration of ecology recognized by UNESCO, the national mission for clean Ganga by the Govt. of India.

Semester	II
Title of Course	**Western Logic**
Paper Code	MI-2T
Credits	04
Hours	04 hours / week

The theory paper (MI-2T) of this course (M1-2) provides the students with

CO-1 : Knowledge about the concept of Western Logic, arguments, difference between deductive and inductive arguments, idea of truths and validity as well as laws of thought

CO-2 : Aristotelian classification of categorical proposition, distribution of terms.

CO-3 : Idea about immediate inference opposition of proposition, conversion, obversion and contraposition.

CO-4 : Knowledge about existential import, Boolean interpretation of categorical proposition.

CO-5 : Idea about categorical syllogism i.e. mood, figure etc. venn – Diagram method, technique of testing validity and fallacies.

CO-6 : Knowledge about symbolic Logic, Value of symbols, Truth-functions i.e. Negation, Conjunction, disjunction, implication and equivalence.

CO-7 : Idea about various statement forms – tautologous, contradiction, contingent statements forms, construction of truth-table using truth table for testing the validity of arguments and statements form.

Semester	II
Title of Course	Environmental Issues in India
Paper Code	SEC-2P
Credits	03
Hours	03 hours/week

The practical paper (SEC-2P) of this course (SEC-2) provides the students

CO-1 : Knowledge about the concept of Nature and Individual, critically examine all environmental issues such as history o relation between Man and Nature and also knowledge about how to interact with the environment on both personal and a social level.

CO-2 : Knowledge about various contemporary environmental movements such as Narmada Banchao Andolan, Chipko movement, Tehari Dam movement, silent valley movement as well as Apico movement.

CO-3 : Idea about different Contemporary Philosopher's idea about environment, Able to know the idea of Rabindranath Tagore, Mahatma Gandhi, Vandana Shiva and Meera Baidur.

CO-4 : Able to know Swachh Bharat Abhiyan which is a campaign in roads and infrastructure of India's cities, smaller town and rural areas.

CO-5 : Knowledge about observance of Aranya Saptaho by promoting the planting of trees as a healthy lifestyle and to monitor and support eco-friendly relationship.

CO-6 : Knowledge about Nomani Ganga project, which is a efforts made for the conservation of the Ganges river and the restoration of ecology recognized by UNESCO, the national mission for clean Ganga by the Govt. of India.

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COURSE OUTCOME

DEPARTMENT OF PHYSICAL EDUCATION

Semester	I
Title of Course	Foundation and history of physical educatuon
Paper Code	PEDPMJ101
Credits	04
Hours	04 hours/week

Foundation and history of physical educatuon

CO-01. Discuss the definitions of Physical Education

CO-02. : Explain the Aim and objectives of Physical Education

CO-3. Discuss the scope of Physical Education

CO-04.Describe theTraditional concept and Modern concept,

CO-05. Explain the Education and Physical Education

CO-06. History of Physical Education in Sparta and Athen

CO-07.Development of Physical Education and Sports in India: a) Pre-Independence (1856 -1947), b) Post-Independence.

Co-08.explain the Olympic movement

CO-09.Movement of Sports Schemes in India

CO-10.Describe the Modern Olympic Games

CO-11.Personality and its development through Physical Education and Sports.

CO-12.Describe theSocial values of Sports.

CO-13.Explain the Instinct, Emotion, Attention, Interest and Motivation - Role in

Physical Education and Sports

CO-14. Discussthe Skeletal System and Skeletal Deformities

CO-15. Types of Bones, Names of various bones of the body

CO-16. Describe the Types of Joints

CO-17.explani the Posture and Postural

Defects.

CO-18..explanithe Circulatory System

CO-19..explanitheRespiratory System

CO-20.explani the Digestive System

CO-21.Endocrine System-Endocrine glands

Semester	I
Title of Course	ATHLETICS
Paper Code	PEDSSE01
Credits	03
Hours	03 hours/week

CO-01.Meaning of Track and Field and Explain about 100 M run,400 M run, 1500 M run

CO-02.Putting the Shot, Discus throw, Javelin throw- Explain it

CO-03.Meaning of Gymnastics: Elaborate the Forward Roll & Backward Roll

CO-04.Brifely Discuss about Indian Games and Explain about Kabaddi &Kho-Kho.

CO-05.Explani the volleyball game in Physical Education

CO-06.Explani the Football game in Physical Education

CO-07 Explain the Badminton game in Physical Education

CO-08 Explain the Basketball game in Physical Education

CO-09. Meaning and Explain about Yoga

CO-10 Practice and explain in the various types of Yoga posture: sabasan ,Padmasana, Dhanurasana, Halasana,Ardhamatseyendrasana, Chakrasana, Sabbangasana, Shirsana, Mayurasana, Bakasana, Paschimatyasana, Kapakbhati, Anulomvilom.

CO-11 Elaborate the First Aid Practical class and Discuss about management of sports injury in Physical Education

CO-12. Meaning and Describe about Sprain,
Dislocation, Fracture, Wounds, Muscle cramps, Bandage,

CO-13. Maintain about the Practical Exercise Book and Viva Voce and describe the Skills of practical activities to be recorded according to regular practical classes

CO-14.Describe of the Dive roll, T. Balance and Hand Stan in Physical Education

CO-15.Describe about High jump, Long jump and Triple jump.

CO-14.Discuss about Muscular System in Physical Education

CO-15. Meaning of Blood pressure in our body. Effect of exercises on Circulatory system -Explain it.

CO-16.Elaborate the Oxygen debt .Effect of exercises on Respiratory system-Explain it.

CO-17. Discuss about measurement of cardiovascular endurance and muscular endurance in Physical Education

CO-18. Meaning and Discuss the Types Fatigue

CO-19. Explain the various types of muscles in our body

CO-20.Effects of exercises on muscle in our body, Meaning of Muscular contraction Muscular Contraction- Explain it

CO-21.Brifely discuss about Healthful Environment in education institutions, offices, playground, auditorium in Physical Education.

Semester	I
Title of Course	**Management of Physical Education and Sports**
Paper Code	PEDMI02
Credits	04
Hours	04 hours/week

Management of Physical Education and Sports

CO-01.Discuss the Management of Sports and Games in School

CO-02.Explain the various types Tournaments in physical Education

CO-03Brifely Explain the Care and maintenance of Sports equipments

CO-04. Explain the various types Sports Training in Physical Education

CO-05.Elaborate the Physical Fitness

CO-06.Discuss the meaning of Load in Physical Education

CO-07Explain the various types of Training methods in Physical Education

CO-08.Mechanical Principles Applied to Sports: Motion

CO-09.Meaning of health-Explain it

CO-10.Discuss about major areas of Health Education

CO-11.Discuss the various types of Environment Hygiene

CO-11.Elaborate the Mental Health in Physical Education

CO-12.Meaning and Explain the Safety Education in Physical Education

CO-13.Meaning of First Aid in Physical Education- Explain it

CO-14.Discuss about Muscular System in Physical Education

CO-15. Meaning of Blood pressure in our body. Effect of exercises on Circulatory system -Explain it.

CO-16.Elaborate the Oxygen debt .Effect of exercises on Respiratory system-Explain it.

CO-17. Discuss about measurement of cardiovascular endurance and muscular endurance in Physical Education

CO-18. Meaning and Discuss the Types Fatigue

CO-19.Explain the various types of muscles in our body

CO-20.Effects of exercises on muscle in our body, Meaning of Muscular contraction Muscular Contraction- Explain it

CO-21.Brifely discuss about Healthful Environment in education institutions, offices, playground, auditorium in Physical Education.

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Course Outcome

Physics (Hons.)

Semester	I
Title of Course	Foundation of Physics – 1 (MJ-1)
Paper Code	MJ-1T (Theory)
Credits	04
Hours	04 hours/week

The students of Physics (H) of Semester-I will acquire the knowledge about Unit – I: Preliminary Math. Methods and Unit – II: Introduction to Thermodynamics by studying this course. Unit – I: Preliminary Math. Methods contains Vector Analysis, Vector Integration, Orthogonal Curvilinear Coordinates, Analytic Functions, Differential Equation, Partial Differential Equation as course modules and Unit – II: Introduction to Thermodynamics contains Basics of Kinetic Theory, Thermodynamic Description of System, First Law of Thermodynamics, Second Law of Thermodynamics, Entropy, Third Law of Thermodynamics, Theory of Radiation as course modules.

The theory paper (MJ-1T) of this course (MJ-1) provides the student with-

Unit – I: Preliminary Math. Methods

CO1: Fundamentals of vector algebra, gradient of scalars, divergence and curl of vector fields and their physical significance.

CO2: Physical concept of solenoidal and irrational vector, conservative vector field and scalar field, concept of vector potential and identities involving gradient, divergence and curl.

CO3: Concept and theory of ordinary integrals of vectors, multiple integrals, Jacobian.

CO4: Concept of line, surface and volume integrals of vector field along with solution of different mathematical problems on these topics.

CO5: Statements of Gauss' divergence theorem, Green's and Stokes Theorems and their applications in terms of different mathematical problems.

CO6: Concept of orthogonal curvilinear coordinates as well as mathematical derivation of gradient, divergence, curl and Laplacian

CO7: Description of Cartesian, spherical polar and cylindrical polar coordinate systems.

CO8: Definition of Analytic Function and illustration of Taylor's series and Maclaurin's series for functions of single variables.

CO9: Classification of differential equations with illustrations, solution of problems on first order differential equations with integrating factor.

CO10: Illustration of second order ODEs with constant coefficients and solution with the concept of integrating factor.

CO11: Solution of partial differential equations by the method of separation of variables and Laplace's equation in 2D and 3D.

Unit-II: Introduction to Thermodynamics

CO12: Description of matter macroscopically and microscopically, relation between microscopic and macroscopic state variables and ideal gas and van der Wall's equations.

CO13: Thermodynamic description of a system, extensive and intensive thermodynamic variables, thermodynamic equilibrium, zeroth law of thermodynamics and the concept of temperature.

CO14: Concept of work and heat, state functions, first law of thermodynamics and its differential form.

CO15: Idea of internal energy and examples of various thermodynamic processes involving the first law.

CO16: Applications of first law of thermodynamics, general relation between C_P and C_V, calculations of work done during isothermal and adiabatic processes, compressibility and expansion coefficient.

CO17: Concept of reversible and irreversible processes with examples, conversion of work into heat and heat into work, heat engines, Carnot's cycle, Carnot's engine and its efficiency, idea of refrigerator and coefficient of performance.

CO18: Statement of second law of thermodynamics, Kelvin-Planck and Clausius statements and their equivalence,

CO19: Concept of Carnot's theorem, and the study of applications of second law of thermodynamics, thermodynamic scale of temperature and its equivalence to perfect gas scale.

CO20: Concept of entropy, Clausius theorem, Clausius inequality, second law of thermodynamics in terms of entropy, entropy of a perfect gas and principle of increase of entropy.

CO21: Study of entropy change in reversible and irreversible processes, entropy-temperature diagrams, third law of thermodynamics and the unattainability of absolute zero.

CO22: Theory of blackbody radiation and its spectral distribution and the concept of energy density.

CO23: Derivation of Planck's law of blackbody radiation and the deduction of Wein's distribution law, Rayleigh Jeans law, Stefan-Boltzmann law and Wein's distribution law from Planck's law.

Semester	I
Title of Course	Introduction to Python Programming and Graph Plotting (SEC-1)
Paper Code	SEC-1P (Lab)
Credits	03
Hours	06 hours/week

The students of Physics (H) of Semester-I will acquire the practical knowledge about Introduction to Programming in Python (Version-3), Problems and Applications, Introduction of Graph Plotting by hands on computer programming.

The lab paper (SEC-1P) of this course (SEC-1) provides the student with-

CO1: Basics of scientific computing such as types of variables and data, mathematical operations, and the use of Python interpreter as a calculator.

CO2: Use of compound statements such as logical conditions, loops and user defined functions (def:) in Python.

CO3: Importance and method of importing different modules or libraries like math, cmath, numpy etc. and the use of "help" and "dir" command to know the inbuilt manuals.

CO4: Basic concepts of name spaces – local and global, Python sciprts and I/O operations like opening and writing to files.

CO5: Concepts and uses of different data types, e.g. List, Tuples, Sets, Strings and the built in functions involving these data types.

CO6: Computation of basic mathematical problems such as finding odd, even numbers, factors of an integer, roots of a quadratic equation, area of triangle by Heron's formula using Python programming.

CO7: Computation of mean, variance, and standard deviation of list of various random numbers using Python.

CO8: Computation of all prime numbers within a given range, sorting of lists using Bubble, Insertion and Selection sort, sum of series correct up to a given decimal place using Python.

CO9: Studying the motion of a particles under a given force F(x,t,v) with given initial condition using Euler's method and plotting (t,x), (x,v) and (t,v) using Matplotlib library.

CO10: Computation of matrix addition, multiplication and transpose directly and using List comprehension.

CO11: Concept of curve fitting, least square fit, goodness of fit and standard deviation using Python.

CO12: Introduction to graph plotting using Matplotlib as a plotting module, basics of XY-plotting of functions such as power laws and exponential functions, trigonometric functions, hyperbolic functions, and user defined functions.

CO13: Use of Matplotlib to plot Bar charts, histograms, polar plots, pie plots and data from a file, subplots and multiple plots.

Semester	I
Title of Course	Mathematical Physics and Mechanics (MI-1)
Paper Code	MI-1T (Theory)
Credits	03
Hours	03 hours/week

The students of other science subjects (H) of Semester-I will acquire the knowledge about Differential Equations, Vector Calculus, Fundamentals of Dynamics, Gravitation and Central Force Motion, Rotational Dynamics, Motion under Central Forces, General Properties of Matter by studying this course.

The theory paper (MI-1T) of this course (MI-1) provides the student with-

CO1: Solution of problems on partial derivatives, exact and inexact differentials, first order linear differential equations (LDEs) with integrating factor.

CO2: Solution of second order linear differential equations (LDEs) with constant coefficients, concept of particular integral.

CO3: Theory of the properties of vector under rotation, scalar product, the invariance of scalar product under rotation, scalar triple product and their interpretation in terms of area and volume respectively, scalar and vector fields as well as solution of different mathematical problems on these topics.

CO4: Theory of directional derivatives and normal derivative of a vector, gradient of a scalar field and its geometrical interpretation, divergence and curl of a vector field along with solution of different mathematical problems on these topics.

CO5: Statements of Gauss' divergence theorem, Green's and Stokes Theorems and their applications in terms of different mathematical problems.

CO6: Idea of reference frames and inertial frames, concept of Galilean transformations and Galilean invariance.

CO7: Understanding the basics of Newton's laws of motion and their application to various dynamical situations.

CO8: Basic concept of dynamics of a system of particles and centre of mass, procedure to evaluate centre of mass in different bodies, concept of centre of mass frame.

CO9: Description of non-inertial frames and fictitious forces arising in a non-inertial frame.

CO10: Understanding the basics of laws of gravitation, inertial and gravitational mass, potential and field due to spherical shell and solid sphere.

CO11: Ideas of central force field, basic features of the motion under a central force, e.g. planar motion, conservation of angular momentum and constant areal velocity.

CO12: Understanding perpendicular and parallel axes theorems, ideas of radius of gyration.

CO13: Basic concept for the moment of inertia about the given axis of symmetry for different uniform mass distributions, particularly rectangular, cylindrical and spherical bodies, idea of pure rolling of a body on an inclined plane.

CO14: Illustration of central force field as a two-body problem and reduction of it into one-body problem, concept of reduced mass, its definition and nature.

CO15: Basic features of motion under central force field, setting up differential equations of orbit and the corresponding energy expression, simple derivations of nature of force from the equations of orbit.

CO16: Understanding the principles of elasticity through the study of a few elastic constants and the relation between those e.g. Young's modulus and modulus of rigidity, twisting torque on a cylinder or wire.

CO17: Concept of surface tension and surface energy, angle of contact, capillarity and Jurin's law and its applications, concept of molecular theory of surface tension, ripple method.

CO18: Basic idea of viscosity and Reynold's number, ideas on simple principles of fluid flow and the equations governing fluid dynamics.

CO19: Understanding Poiseuille's equation for flow of a liquid through a capillary tube, Stokes las and its application to highly viscous liquid.

Semester	I
Title of Course	Mathematical Physics and Mechanics (MI-1)
Paper Code	MI-1P (Lab)
Credits	01
Hours	02 hours/week

The students of other science subjects (H) of Semester-I will acquire the practical knowledge about the Slide Callipers, Screw Gauge and Travelling Microscope, Motion of a Spring and Calculation of Spring Constant and g, Digital Timing Technique, Bar Pendulum, Kater's Pendulum, Moment of Inertia of a Flywheel, Elastic Constants by Searle's Method, Maxwell's Needle Method by hands on practical experiments.

The lab paper (MI-1P) of this course (MI-1) provides the student with-

CO1: Study of necessary theory, working formula and experimental measurement of length (or diameter) using slide callipers, screw gauge and travelling microscope.

CO2: Study of necessary theory, working formula and experimental determination of acceleration due to gravity (g) and velocity for a freely falling body using digital timing technique.

CO3: Study of necessary theory, working formula and experimental observation for the motion of a spring and calculation of its spring constant, and acceleration due to gravity (g).

CO4: Study of necessary theory, working formula and experimental determination the value of acceleration due to gravity (g) using Bar Pendulum.

CO5: Study of necessary theory, working formula and experimental determination the value of acceleration due to gravity (g) using Kater's Pendulum.

CO6: Study of necessary theory, working formula and experimental determination the moment of inertia of a flywheel.

CO7: Study of necessary theory, working formula and experimental determination of the modulus of rigidity of a wire by Maxwell's needle.

CO8: Study of necessary theory, working formula and experimental determination of the elastic constants of a wire by Searle's method.

Semester	II
Title of Course	Foundation of Physics – 2 (MJ-2)
Paper Code	MJ-2T (Theory)
Credits	04
Hours	04 hours/week

The students of Physics (H) of Semester-II will acquire the knowledge about Unit – I: Preliminary Classical Mechanics and Unit – II: Basic Electricity & Magnetism by studying this course. Unit – I: Preliminary Classical Mechanics contains Introduction, Dynamics of a System of Particles, Rotating Frame of Reference, Motion under Central Forces, Scattering, Mechanics of Continuum as course modules and Unit – II: Basic Electricity & Magnetism contains Electric Field and Electric Potential, Electrostatic Energy & Capacitor, Method of Images, Dielectric Properties of Matter, Lorentz Force, Magnetic Field, Magnetic Properties of Matter as course modules.

The theory paper (MJ-2T) of this course (MJ-2) provides the student with-

Unit – I: Preliminary Classical Mechanics

CO1: Understanding the historical growth of Newtonian classical mechanics.

CO2: Idea of reference frames and inertial frames, concept of Galilean transformations and Galilean invariance.

CO3: Understanding the basics of Newton's laws of motion and their application to various dynamical situations.

CO4: Differentiation between conservative and non-conservative forces, kinetic energy and potential energy, Familiarization with elastic potential energy, conceptual

background of force as gradient of potential energy, methods to calculate the work done by and against a force field.

CO5: Learning the concept of conservation of energy, linear momentum, angular momentum and their applications to basic problems.

CO6: Basic concept of dynamics of a system of particles and centre of mass, procedure to evaluate centre of mass in different bodies, concept of centre of mass frame.

CO7: Understanding the motion of centre of mass under external force, calculation of kinetic energy and angular momentum about centre of mass and laboratory frames, idea of conservation of mechanical energy.

CO8: Description of non-inertial frames and fictitious forces arising in a non-inertial frame.

CO9: Concept of centrifugal force, Coriolis force and their applications, ideas on the effect of Coriolis force on nature.

CO10: Ideas of central force field, basic features of the motion under a central force, e.g. planar motion, conservation of angular momentum and constant areal velocity.

CO11: Illustration of central force field as a two-body problem and reduction of it into one-body problem, concept of reduced mass, its definition and nature.

CO12: Basic features of motion under central force field, setting up differential equations of orbit and the corresponding energy expression, simple derivations of nature of force from the equations of orbit.

CO13: Understanding polar equation of conics, basics of Kepler's laws and derivation, concept of Laplace-Runge-Lenz vector and nature of orbit under inverse square repulsive force and along with the stability.

CO14: Understanding two-body collision, concept of scattering.

CO15: Basic idea of kinematics for moving fluids, idea of viscosity, streamline flow, turbulent flow and Reynold's number, ideas on simple principles of fluid flow and the equations governing fluid dynamics, concept of equation of continuity.

CO16: Understanding Poiseuille's equation for flow of a liquid through a capillary tube, Stokes law and its application to highly viscous liquid.

CO17: Idea of fluid dynamics, understanding Euler equation and simple examples of fluid statics e.g. Archimedes Principles, idea of Bernoulli's theorem.

Unit – II: Basic Electricity & Magnetism

CO18: Concept of electric field and electric potential from Coulomb's law, calculation of electric field, basic idea of electric dipole and its calculation related to force and torque.

CO19: Demonstration of Gauss' law for the electric field and application to systems of point charges as well as line, surface and volume distributions of charges.

CO20: Explanation and differentiation of the vector (electric fields from Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics, ideas of Poisson and Laplace equations.

CO21: Application of Gauss' Law of electrostatics to solve a variety of problems.

CO22: Ideas about electrostatic energy and calculation of electrostatic energy for charged spheres, conductors and dielectric materials, concept of surface charge.

CO23: Demonstration of working and understanding of capacitors of various shapes filled with dielectrics.

CO24: Concept of Method of Images and its application for a few examples.

CO25: Concept of electric fields in matter, polarization and polarization charges, dielectric materials.

CO26: Ideas of electric susceptibility and dielectric constant, concept of displacement vector, applications of Gauss' law in dielectric materials.

CO27: Concept of Lorentz force, ideas of force on a current carrying conductor inside a magnetic field.

CO28: Basic idea of the trajectory of charged particles in uniform electric field and crossed uniform electric and magnetic fields, ideas and basic principles of a Cyclotron.

CO29: Ideas of magnetic force in current carrying elements, demonstration of Biot Savart Law for current carrying elements and its application to systems of straight wire and circular current loops.

CO30: Concept of Ampere's Circuital Law and its application to infinite straight wire, infinite planar surface current and solenoids, ideas of axial vector e.g. magnetic field and its properties.

CO31: Concept of current loop as magnetic dipoles, magnetic dipole moment and its analogy with electric dipole moment, concept of magnetic vector potential and magnetic forces, application of magnetic forces on point charges and current carrying elements.

CO32: Understanding the magnetic properties of materials and magnetic susceptibility, magnetic permeability, qualitative ideas of paramagnetism, diamagnetism and ferromagnetism, B-H loop, magnetic hysteresis.

Semester	II
Title of Course	Basic Instrumentation (SEC-2)
Paper Code	SEC-2P (Lab)
Credits	03
Hours	06 hours/week

The students of Physics (H) of Semester-II will acquire the practical knowledge about the Basic Ideas of Measurements, Resistances, Analog and Digital Voltmeter and Ammeter, Digital Multimeter, Introduction to Electrical Household Wiring by hands on practical experiments.

The lab paper (SEC-2P) of this course (SEC-2) provides the student with-

CO1: Basic concept of accuracy and precision of data sensitivity and range of resolution of instruments.

CO2: Calculate the uncertainties or errors in measurements and loading effect of some basic instruments.

CO3: Study of necessary theory, working formula and experimental measurement of unknown Resistance using Carbon resistance, electronic rheostats.

CO4: Study of necessary theory, working formula and experimental measurement of unknown Resistance using electronic potentiometer.

CO5: Study and experimental demonstration of basic block diagram of analog and digital voltmeter and ammeter.

CO6: Study the principles of voltage and current measurements and ideas of resistance of voltmeters and ammeters in different ranges.

CO7: Study the working principles of digital meters (voltmeters and ammeters), and understand the various specification of an electronic meter.

CO8: Computation on advantages of digital meter over an analog meter and study the basic ideas on range change of meter.

CO9: Study of block diagram and working principle of a digital multimeter to measurement of resistance, current (dc & ac), voltage (dc & ac), inductance, diode and transistor checking.

CO10: Study the concept of basic electricity as like power rating, idea on transformer action, measurement of electrical quantities like Voltage, Currents, Resistance, Impedance, power factor and energy.

CO11: Computation of familiarisation with PVC wires with SWG, PVC conduit pipes, sockets and plugs, clips, switches, fuse, holder, ceiling rose, Miniature Circuit Breaker (MCB), Residual Current Circuit Breaker (RCCB).

CO12: Study the Earth Leakage Circuit Breaker (ELCB), Double Pole (DP) or Single Pole and Neutral Miniature Circuit Board (SPN MCB), DP Isolator, live line, neutral and earth connections, consequences of faulty earth connection.

CO13: Study the Two-way switching in stairs, bed switch connection, fluorescent / LED tube circuit, connection from lamp post on road to main distribution board (home).

CO14: Study the assessment of total load with circuit, sub-circuits, and components with specifications, connections for refrigerator / microwave oven, concept of Single phase and three phase circuits.

CO15: Observations of the Fires in electrical Circuits & Precautions, safely handling Tools & Equipment /Fire Fighting and use of fire extinguishers.

CO16: Submission of a plan and estimation of power, points with circuit connection in real case as a short project.

Semester	II
Title of Course	Thermal Physics and Statistical Mechanics (MI-2)
Paper Code	MI-2T (Theory)
Credits	03
Hours	03 hours/week

The students of other science subjects (H) of Semester-II will acquire the knowledge about the Laws of Thermodynamics and their Applications, Various Thermodynamic Processes, Thermodynamic Potentials, Kinetic Theory of Gases, Blackbody Radiations, Different Distribution Laws for Blackbody Radiations, Classical and Quantum Statistical Mechanics and their Applications by studying this course.

The theory paper (MI-2T) of this course (MI-2) provides the student with-

CO1:General thermodynamic description of a system, zeroth law of thermodynamics and the concept of temperature.

CO2: Statement and understanding of first law of thermodynamics, idea of internal energy and the conversion of heat into work, examples of various thermodynamic processes.

CO3: Study of the applications of first law of thermodynamics, general relation between C_P and C_V, calculations of work done during isothermal and adiabatic processes, compressibility and expansion coefficient.

CO4: Concept of reversible and irreversible processes, statement of second law of thermodynamics and the idea of entropy.

CO5: Study of Carnot's cycle and Carnot's theorem, entropy changes in reversible and irreversible processes, Entropy-temperature diagrams, third law of thermodynamics and the unattainability of absolute zero.

CO6: Theoretical and mathematical understanding of the thermodynamic potentials e.g. enthalpy, Gibbs free energy, Helmholtz free energy and internal energy functions.

CO7: Study of Maxwell's relations and applications in Joule-Thompson effect, Clausius- Clapeyron equation, expression for $(C_P - C_V)$, C_P/C_V and TdS equations.

CO8: Derivation of Maxwell's law of distribution of velocities and its experimental verification, mean free path (zeroth order).

CO9: Study of transport phenomena, viscosity, conduction and diffusion (for vertical case), law of equipartition of energy and its applications to specific heat of gases, mono-atomic and diatomic gases.

CO10: Theoretical concept of blackbody radiation, its spectral distribution, concept of energy density of radiations.

CO11: Fundamental postulates and mathematical derivation of Planck's law of blackbody radiation.

CO12: Deduction of Wien's distribution law, Rayleigh-Jeans law, Stefan Boltzmann law and Wien's displacement law from Planck's law of blackbody radiations.

CO13: Theoretical concept of phase space, macrostate and microstate, entropy and thermodynamic probability.

CO14: Study of Maxwell-Boltzmann distribution law and its applications to the distribution of velocity of the atoms/molecules of an ideal gas.

CO15: Fundamental postulates of quantum statistics - Fermi-Dirac distribution law and its application to a system of electron gas, Bose-Einstein distribution law and its application to a photon gas, comparison of three statistics.

Semester	II
Title of Course	Thermal Physics and Statistical Mechanics (MI-2)
Paper Code	MI-2P (Lab)
Credits	01
Hours	02 hours/week

The students of other science subjects (H) of Semester-II will acquire the practical knowledge about the Mechanical Equivalent of Heat, Measurement of Planck's Constant using Blackbody Radiation, Determination of Stefan's Constant, Coefficient of Thermal Conductivity, Temperature Coefficient of Resistance, Variations of Thermo EMF across Junctions of a Thermocouple and Calibration Resistance Temperature Device (RTD) by hands on practical experiments.

The lab paper (MI-2P) of this course (MI-2) provides the student with-

CO1: Study of necessary theory, working formula and experimental method to measure Planck's constant using black body radiation.

CO2: Study of necessary theory, working formula and experimental method to determine Stefan's constant.

CO3: Study of necessary theory, working formula and experimental method to study the variation of thermo EMF across two junctions of a thermocouple with temperature.

CO4: Study of necessary theory, working formula and experimental method to determine the coefficient of thermal conductivity of Cu by Searle's apparatus.

CO5: Study of necessary theory, working formula and experimental method to determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.

CO6: Study of necessary theory, working formula and experimental method to determine mechanical equivalent of heat J, by Callender and Barne's constant flow method.

NARAJOLE RAJ COLLEGE

(NAAC Accredited 'B' Grade Govt. Aided College)
NARAJOLE: PASCHIM MEDINIPUR: WEST BENGAL: Pin-721211
E-mail: narajolerajcollege@rediffmail.com
Website: https://www.narajolerajcollege.ac.in

Course Outcome

Physics (Gen.)

Semester	I
Title of Course	Mathematical Methods and Mechanics (including STR) (MJ-A1)
Paper Code	MJ-A1T (Theory)
Credits	03
Hours	03 hours/week

The students of Physics (Gen or MDC) of Semester-I will acquire the knowledge about Differential Equations, Vector Calculus, Fundamentals of Dynamics, Gravitation and Central Force Motion, Rotational Dynamics, Motion under Central Forces, General Properties of Matter, Special Theory of Relativity by studying this course.

The theory paper (MJ-A1T) of this course (MJ-A1) provides the student with-

CO1: Solution of problems on partial derivatives, exact and inexact differentials, first order linear differential equations (LDEs) with integrating factor.

CO2: Solution of second order linear differential equations (LDEs) with constant coefficients, concept of particular integral.

CO3: Theory of the properties of vector under rotation, scalar product, the invariance of scalar product under rotation, scalar triple product and their interpretation in terms of area and volume respectively, scalar and vector fields as well as solution of different mathematical problems on these topics.

CO4: Theory of directional derivatives and normal derivative of a vector, gradient of a scalar field and its geometrical interpretation, divergence and curl of a vector field along with solution of different mathematical problems on these topics.

CO5: Statements of Gauss' divergence theorem, Green's and Stokes Theorems and their applications in terms of different mathematical problems.

CO6: Idea of reference frames and inertial frames, concept of Galilean transformations and Galilean invariance.

CO7: Understanding the basics of Newton's laws of motion and their application to various dynamical situations.

CO8: Basic concept of dynamics of a system of particles and centre of mass, procedure to evaluate centre of mass in different bodies, concept of centre of mass frame.

CO9: Description of non-inertial frames and fictitious forces arising in a non-inertial frame.

CO10: Understanding the basics of laws of gravitation, inertial and gravitational mass, potential and field due to spherical shell and solid sphere.

CO11: Ideas of central force field, basic features of the motion under a central force, e.g. planar motion, conservation of angular momentum and constant areal velocity.

CO12: Understanding perpendicular and parallel axes theorems, ideas of radius of gyration.

CO13: Basic concept for the moment of inertia about the given axis of symmetry for different uniform mass distributions, particularly rectangular, cylindrical and spherical bodies, idea of pure rolling of a body on an inclined plane.

CO14: Illustration of central force field as a two-body problem and reduction of it into one-body problem, concept of reduced mass, its definition and nature.

CO15: Basic features of motion under central force field, setting up differential equations of orbit and the corresponding energy expression, simple derivations of nature of force from the equations of orbit.

CO16: Understanding the principles of elasticity through the study of a few elastic constants and the relation between those e.g. Young's modulus and modulus of rigidity, twisting torque on a cylinder or wire.

CO17: Concept of surface tension and surface energy, angle of contact, capillarity and Jurin's law and its applications, concept of molecular theory of surface tension, ripple method.

CO18: Basic idea of viscosity and Reynold's number, ideas on simple principles of fluid flow and the equations governing fluid dynamics.

CO19: Understanding Poiseuille's equation for flow of a liquid through a capillary tube, Stokes las and its application to highly viscous liquid.

CO20: Demonstration of special theory of relativity (STR) through Michelson-Morley experiment and postulates of STR, constancy of speed of light.

CO21: Understanding Lorentz Transformation, ideas of length contraction, time dilation, relativistic addition of velocities.

Semester	I
Title of Course	Mathematical Methods and Mechanics (including STR) (MJ-A1)
Paper Code	MJ-A1P (Lab)
Credits	01
Hours	02 hours/week

The students of Physics (Gen or MDC) of Semester-I will acquire the practical knowledge about the Slide Callipers, Screw Gauge and Travelling Microscope, Motion of a Spring and Calculation of Spring Constant and g, Digital Timing Technique, Bar Pendulum, Kater's Pendulum, Moment of Inertia of a Flywheel, Elastic Constants by Searle's Method, Maxwell's Needle Method by hands on practical experiments.

The lab paper (MJ-A1P) of this course (MJ-A1) provides the student with-

CO1: Study of necessary theory, working formula and experimental measurement of length (or diameter) using slide callipers, screw gauge and travelling microscope.

CO2: Study of necessary theory, working formula and experimental determination of acceleration due to gravity (g) and velocity for a freely falling body using digital timing technique.

CO3: Study of necessary theory, working formula and experimental observation for the motion of a spring and calculation of its spring constant, and acceleration due to gravity (g).

CO4: Study of necessary theory, working formula and experimental determination the value of acceleration due to gravity (g) using Bar Pendulum.

CO5: Study of necessary theory, working formula and experimental determination the value of acceleration due to gravity (g) using Kater's Pendulum.

CO6: Study of necessary theory, working formula and experimental determination the moment of inertia of a flywheel.

CO7: Study of necessary theory, working formula and experimental determination of the modulus of rigidity of a wire by Maxwell's needle.

CO8: Study of necessary theory, working formula and experimental determination of the elastic constants of a wire by Searle's method.

Semester	I
Title of Course	Introduction to Python Programming and Graph Plotting (SEC-1)
Paper Code	SEC-1P (Lab)
Credits	03
Hours	06 hours/week

The students of Physics (Gen or MDC) of Semester-I will acquire the practical knowledge about Introduction to Programming in Python (Version-3), Problems and Applications, Introduction of Graph Plotting by hands on computer programming.

The lab paper (SEC-1P) of this course (SEC-1) provides the student with-

CO1: Basics of scientific computing such as types of variables and data, mathematical operations, and the use of Python interpreter as a calculator.

CO2: Use of compound statements such as logical conditions, loops and user defined functions (def:) in Python.

CO3: Importance and method of importing different modules or libraries like math, cmath, numpy etc. and the use of "help" and "dir" command to know the inbuilt manuals.

CO4: Basic concepts of name spaces – local and global, Python sciprts and I/O operations like opening and writing to files.

CO5: Concepts and uses of different data types, e.g. List, Tuples, Sets, Strings and the built in functions involving these data types.

CO6: Computation of basic mathematical problems such as finding odd, even numbers, factors of an integer, roots of a quadratic equation, area of triangle by Heron's formula using Python programming.

CO7: Computation of mean, variance, and standard deviation of list of various random numbers using Python.

CO8: Computation of all prime numbers within a given range, sorting of lists using Bubble, Insertion and Selection sort, sum of series correct up to a given decimal place using Python.

CO9: Studying the motion of a particles under a given force F(x,t,v) with given initial condition using Euler's method and plotting (t,x), (x,v) and (t,v) using Matplotlib library.

CO10: Computation of matrix addition, multiplication and transpose directly and using List comprehension.

CO11: Concept of curve fitting, least square fit, goodness of fit and standard deviation using Python.

CO12: Introduction to graph plotting using Matplotlib as a plotting module, basics of XY-plotting of functions such as power laws and exponential functions, trigonometric functions, hyperbolic functions, and user defined functions.

CO13: Use of Matplotlib to plot Bar charts, histograms, polar plots, pie plots and data from a file, subplots and multiple plots.

Semester	I
Title of Course	Mathematical Physics and Mechanics (MI-C1)
Paper Code	MI-C1T (Theory)
Credits	03
Hours	03 hours/week

The students of other science subjects (Gen or MDC) of Semester-I will acquire the knowledge about Differential Equations, Vector Calculus, Fundamentals of Dynamics, Gravitation and Central Force Motion, Rotational Dynamics, Motion under Central Forces, General Properties of Matter by studying this course.

The theory paper (MI-C1T) of this course (MI-C1) provides the student with-

CO1: Solution of problems on partial derivatives, exact and inexact differentials, first order linear differential equations (LDEs) with integrating factor.

CO2: Solution of second order linear differential equations (LDEs) with constant coefficients, concept of particular integral.

CO3: Theory of the properties of vector under rotation, scalar product, the invariance of scalar product under rotation, scalar triple product and their interpretation in terms of area and volume respectively, scalar and vector fields as well as solution of different mathematical problems on these topics.

CO4: Theory of directional derivatives and normal derivative of a vector, gradient of a scalar field and its geometrical interpretation, divergence and curl of a vector field along with solution of different mathematical problems on these topics.

CO5: Statements of Gauss' divergence theorem, Green's and Stokes Theorems and their applications in terms of different mathematical problems.

CO6: Idea of reference frames and inertial frames, concept of Galilean transformations and Galilean invariance.

CO7: Understanding the basics of Newton's laws of motion and their application to various dynamical situations.

CO8: Basic concept of dynamics of a system of particles and centre of mass, procedure to evaluate centre of mass in different bodies, concept of centre of mass frame.

CO9: Description of non-inertial frames and fictitious forces arising in a non-inertial frame.

CO10: Understanding the basics of laws of gravitation, inertial and gravitational mass, potential and field due to spherical shell and solid sphere.

CO11: Ideas of central force field, basic features of the motion under a central force, e.g. planar motion, conservation of angular momentum and constant areal velocity.

CO12: Understanding perpendicular and parallel axes theorems, ideas of radius of gyration.

CO13: Basic concept for the moment of inertia about the given axis of symmetry for different uniform mass distributions, particularly rectangular, cylindrical and spherical bodies, idea of pure rolling of a body on an inclined plane.

CO14: Illustration of central force field as a two-body problem and reduction of it into one-body problem, concept of reduced mass, its definition and nature.

CO15: Basic features of motion under central force field, setting up differential equations of orbit and the corresponding energy expression, simple derivations of nature of force from the equations of orbit.

CO16: Understanding the principles of elasticity through the study of a few elastic constants and the relation between those e.g. Young's modulus and modulus of rigidity, twisting torque on a cylinder or wire.

CO17: Concept of surface tension and surface energy, angle of contact, capillarity and Jurin's law and its applications, concept of molecular theory of surface tension, ripple method.

CO18: Basic idea of viscosity and Reynold's number, ideas on simple principles of fluid flow and the equations governing fluid dynamics.

CO19: Understanding Poiseuille's equation for flow of a liquid through a capillary tube, Stokes las and its application to highly viscous liquid.

Semester	I
Title of Course	Mathematical Physics and Mechanics (MI-C1)
Paper Code	MI-C1P (Lab)
Credits	01
Hours	02 hours/week

The students of other science subjects (Gen or MDC) of Semester-I will acquire the practical knowledge about the Slide Callipers, Screw Gauge and Travelling Microscope, Motion of a Spring and Calculation of Spring Constant and g, Digital Timing Technique, Bar Pendulum, Kater's Pendulum, Moment of Inertia of a Flywheel, Elastic Constants by Searle's Method, Maxwell's Needle Method by hands on practical experiments.

The lab paper (MI-C1P) of this course (MI-C1) provides the student with-

CO1: Study of necessary theory, working formula and experimental measurement of length (or diameter) using slide callipers, screw gauge and travelling microscope.

CO2: Study of necessary theory, working formula and experimental determination of acceleration due to gravity (g) and velocity for a freely falling body using digital timing technique.

CO3: Study of necessary theory, working formula and experimental observation for the motion of a spring and calculation of its spring constant, and acceleration due to gravity (g).

CO4: Study of necessary theory, working formula and experimental determination the value of acceleration due to gravity (g) using Bar Pendulum.

CO5: Study of necessary theory, working formula and experimental determination the value of acceleration due to gravity (g) using Kater's Pendulum.

CO6: Study of necessary theory, working formula and experimental determination the moment of inertia of a flywheel.

CO7: Study of necessary theory, working formula and experimental determination of the modulus of rigidity of a wire by Maxwell's needle.

CO8: Study of necessary theory, working formula and experimental determination of the elastic constants of a wire by Searle's method.

Semester	II
Title of Course	Mathematical Methods and Mechanics (including STR) (MJ-B1)
Paper Code	MJ-B1T (Theory)
Credits	03
Hours	03 hours/week

The students of Physics (Gen or MDC) of Semester-II will acquire the knowledge about Differential Equations, Vector Calculus, Fundamentals of Dynamics, Gravitation and Central Force Motion, Rotational Dynamics, Motion under Central Forces, General Properties of Matter, Special Theory of Relativity by studying this course.

The theory paper (MJ-B1T) of this course (MJ-B1) provides the student with-

CO1: Solution of problems on partial derivatives, exact and inexact differentials, first order linear differential equations (LDEs) with integrating factor.

CO2: Solution of second order linear differential equations (LDEs) with constant coefficients, concept of particular integral.

CO3: Theory of the properties of vector under rotation, scalar product, the invariance of scalar product under rotation, scalar triple product and their interpretation in terms of area and volume respectively, scalar and vector fields as well as solution of different mathematical problems on these topics.

CO4: Theory of directional derivatives and normal derivative of a vector, gradient of a scalar field and its geometrical interpretation, divergence and curl of a vector field along with solution of different mathematical problems on these topics.

CO5: Statements of Gauss' divergence theorem, Green's and Stokes Theorems and their applications in terms of different mathematical problems.

CO6: Idea of reference frames and inertial frames, concept of Galilean transformations and Galilean invariance.

CO7: Understanding the basics of Newton's laws of motion and their application to various dynamical situations.

CO8: Basic concept of dynamics of a system of particles and centre of mass, procedure to evaluate centre of mass in different bodies, concept of centre of mass frame.

CO9: Description of non-inertial frames and fictitious forces arising in a non-inertial frame.

CO10: Understanding the basics of laws of gravitation, inertial and gravitational mass, potential and field due to spherical shell and solid sphere.

CO11: Ideas of central force field, basic features of the motion under a central force, e.g. planar motion, conservation of angular momentum and constant areal velocity.

CO12: Understanding perpendicular and parallel axes theorems, ideas of radius of gyration.

CO13: Basic concept for the moment of inertia about the given axis of symmetry for different uniform mass distributions, particularly rectangular, cylindrical and spherical bodies, idea of pure rolling of a body on an inclined plane.

CO14: Illustration of central force field as a two-body problem and reduction of it into one-body problem, concept of reduced mass, its definition and nature.

CO15: Basic features of motion under central force field, setting up differential equations of orbit and the corresponding energy expression, simple derivations of nature of force from the equations of orbit.

CO16: Understanding the principles of elasticity through the study of a few elastic constants and the relation between those e.g. Young's modulus and modulus of rigidity, twisting torque on a cylinder or wire.

CO17: Concept of surface tension and surface energy, angle of contact, capillarity and Jurin's law and its applications, concept of molecular theory of surface tension, ripple method.

CO18: Basic idea of viscosity and Reynold's number, ideas on simple principles of fluid flow and the equations governing fluid dynamics.

CO19: Understanding Poiseuille's equation for flow of a liquid through a capillary tube, Stokes las and its application to highly viscous liquid.

CO20: Demonstration of special theory of relativity (STR) through Michelson-Morley experiment and postulates of STR, constancy of speed of light.

CO21: Understanding Lorentz Transformation, ideas of length contraction, time dilation, relativistic addition of velocities.

Semester	II
Title of Course	Mathematical Methods and Mechanics (including STR) (MJ-B1)
Paper Code	MJ-B1P (Lab)
Credits	01

Hours	02 hours/week

The students of Physics (Gen or MDC) of Semester-II will acquire the practical knowledge about the Slide Callipers, Screw Gauge and Travelling Microscope, Motion of a Spring and Calculation of Spring Constant and g, Digital Timing Technique, Bar Pendulum, Kater's Pendulum, Moment of Inertia of a Flywheel, Elastic Constants by Searle's Method, Maxwell's Needle Method by hands on practical experiments.

The lab paper (MJ-B1P) of this course (MJ-B1) provides the student with-

CO1: Study of necessary theory, working formula and experimental measurement of length (or diameter) using slide callipers, screw gauge and travelling microscope.

CO2: Study of necessary theory, working formula and experimental determination of acceleration due to gravity (g) and velocity for a freely falling body using digital timing technique.

CO3: Study of necessary theory, working formula and experimental observation for the motion of a spring and calculation of its spring constant, and acceleration due to gravity (g).

CO4: Study of necessary theory, working formula and experimental determination the value of acceleration due to gravity (g) using Bar Pendulum.

CO5: Study of necessary theory, working formula and experimental determination the value of acceleration due to gravity (g) using Kater's Pendulum.

CO6: Study of necessary theory, working formula and experimental determination the moment of inertia of a flywheel.

CO7: Study of necessary theory, working formula and experimental determination of the modulus of rigidity of a wire by Maxwell's needle.

CO8: Study of necessary theory, working formula and experimental determination of the elastic constants of a wire by Searle's method.

Semester	II
Title of Course	Basic Instrumentation (SEC-2)
Paper Code	SEC-2P (Lab)
Credits	03
Hours	06 hours/week

The students of Physics (Gen or MDC) of Semester-II will acquire the practical knowledge about the Basic Ideas of Measurements, Resistances, Analog and Digital Voltmeter and Ammeter, Digital Multimeter, Introduction to Electrical Household Wiring by hands on practical experiments.

The lab paper (SEC-2P) of this course (SEC-2) provides the student with-

CO1: Basic concept of accuracy and precision of data sensitivity and range of resolution of instruments.

CO2: Calculate the uncertainties or errors in measurements and loading effect of some basic instruments.

CO3: Study of necessary theory, working formula and experimental measurement of unknown Resistance using Carbon resistance, electronic rheostats.

CO4: Study of necessary theory, working formula and experimental measurement of unknown Resistance using electronic potentiometer.

CO5: Study and experimental demonstration of basic block diagram of analog and digital voltmeter and ammeter.

CO6: Study the principles of voltage and current measurements and ideas of resistance of voltmeters and ammeters in different ranges.

CO7: Study the working principles of digital meters (voltmeters and ammeters), and understand the various specification of an electronic meter.

CO8: Computation on advantages of digital meter over an analog meter and study the basic ideas on range change of meter.

CO9: Study of block diagram and working principle of a digital multimeter to measurement of resistance, current (dc & ac), voltage (dc & ac), inductance, diode and transistor checking.

CO10: Study the concept of basic electricity as like power rating, idea on transformer action, measurement of electrical quantities like Voltage, Currents, Resistance, Impedance, power factor and energy.

CO11: Computation of familiarisation with PVC wires with SWG, PVC conduit pipes, sockets and plugs, clips, switches, fuse, holder, ceiling rose, Miniature Circuit Breaker (MCB), Residual Current Circuit Breaker (RCCB).

CO12: Study the Earth Leakage Circuit Breaker (ELCB), Double Pole (DP) or Single Pole and Neutral Miniature Circuit Board (SPN MCB), DP Isolator, live line, neutral and earth connections, consequences of faulty earth connection.

CO13: Study the Two-way switching in stairs, bed switch connection, fluorescent / LED tube circuit, connection from lamp post on road to main distribution board (home).

CO14: Study the assessment of total load with circuit, sub-circuits, and components with specifications, connections for refrigerator / microwave oven, concept of Single phase and three phase circuits.

CO15: Observations of the Fires in electrical Circuits & Precautions, safely handling Tools & Equipment /Fire Fighting and use of fire extinguishers.

CO16: Submission of a plan and estimation of power, points with circuit connection in real case as a short project.

Semester	II
Title of Course	Thermal Physics and Statistical Mechanics (MI-C2)
Paper Code	MI-C2T (Theory)
Credits	03
Hours	03 hours/week

The students of other science subjects (Gen or MDC) of Semester-II will acquire the knowledge about the Laws of Thermodynamics and their Applications, Various Thermodynamic Processes, Thermodynamic Potentials, Kinetic Theory of Gases, Blackbody Radiations, Different Distribution Laws for Blackbody Radiations, Classical and Quantum Statistical Mechanics and their Applications by studying this course.

The theory paper (MI-C2T) of this course (MI-C2) provides the student with-

CO1:General thermodynamic description of a system, zeroth law of thermodynamics and the concept of temperature.

CO2: Statement and understanding of first law of thermodynamics, idea of internal energy and the conversion of heat into work, examples of various thermodynamic processes.

CO3: Study of the applications of first law of thermodynamics, general relation between C_P and C_V, calculations of work done during isothermal and adiabatic processes, compressibility and expansion coefficient.

CO4: Concept of reversible and irreversible processes, statement of second law of thermodynamics and the idea of entropy.

CO5: Study of Carnot's cycle and Carnot's theorem, entropy changes in reversible and irreversible processes, Entropy-temperature diagrams, third law of thermodynamics and the unattainability of absolute zero.

CO6: Theoretical and mathematical understanding of the thermodynamic potentials e.g. enthalpy, Gibbs free energy, Helmholtz free energy and internal energy functions.

CO7: Study of Maxwell's relations and applications in Joule-Thompson effect, Clausius- Clapeyron equation, expression for ($C_P - C_V$), C_P/C_V and TdS equations.

CO8: Derivation of Maxwell's law of distribution of velocities and its experimental verification, mean free path (zeroth order).

CO9: Study of transport phenomena, viscosity, conduction and diffusion (for vertical case), law of equipartition of energy and its applications to specific heat of gases, mono-atomic and diatomic gases.

CO10: Theoretical concept of blackbody radiation, its spectral distribution, concept of energy density of radiations.

CO11: Fundamental postulates and mathematical derivation of Planck's law of blackbody radiation.

CO12: Deduction of Wien's distribution law, Rayleigh-Jeans law, Stefan Boltzmann law and Wien's displacement law from Planck's law of blackbody radiations.

CO13: Theoretical concept of phase space, macrostate and microstate, entropy and thermodynamic probability.

CO14: Study of Maxwell-Boltzmann distribution law and its applications to the distribution of velocity of the atoms/molecules of an ideal gas.

CO15: Fundamental postulates of quantum statistics - Fermi-Dirac distribution law and its application to a system of electron gas, Bose-Einstein distribution law and its application to a photon gas, comparison of three statistics.

Semester	II
Title of Course	Thermal Physics and Statistical Mechanics (MI-C2)
Paper Code	MI-C2P (Lab)
Credits	01
Hours	02 hours/week

The students of other science subjects (Gen or MDC) of Semester-II will acquire the practical knowledge about the Mechanical Equivalent of Heat, Measurement of Planck's Constant using Blackbody Radiation, Determination of Stefan's Constant, Coefficient of Thermal Conductivity, Temperature Coefficient of Resistance, Variations of Thermo EMF across Junctions of a Thermocouple and Calibration Resistance Temperature Device (RTD) by hands on practical experiments.

The lab paper (MI-C2P) of this course (MI-C2) provides the student with-

CO1: Study of necessary theory, working formula and experimental method to measure Planck's constant using black body radiation.

CO2: Study of necessary theory, working formula and experimental method to determine Stefan's constant.

CO3: Study of necessary theory, working formula and experimental method to study the variation of thermo EMF across two junctions of a thermocouple with temperature.

CO4: Study of necessary theory, working formula and experimental method to determine the coefficient of thermal conductivity of Cu by Searle's apparatus.

CO5: Study of necessary theory, working formula and experimental method to determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.

CO6: Study of necessary theory, working formula and experimental method to determine mechanical equivalent of heat J, by Callender and Barne's constant flow method.

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(NAAC Accredited 'B' Grade Govt.-Aided College)
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Phone: +91- 9475429270; E-mail: narajoleracollege@rediffmail.com
Website: http://www.narajolerajcollege.ac.in

Name of the Department: Physiology
Name and Distinctive number of the paper: MAJOR (MJ)
Topics: Fundamental concept of immune System, Physiology of Respiratory System
Session: 2023-24
Semester: I

Name of faculty who teaches the topics	Broad topic in university syllabus	Course Outcome
Dr. Parimal Dua	**Fundamental concept of Immune System**	Through the study of the fundamental concepts of the immune system, students acquire: 1. **Basic Immunology Concepts:** Understanding immune system components, including innate and adaptive immunity. 2. **Immune Response Mechanisms:** Knowledge of innate defences (e.g., barriers, phagocytosis) and adaptive responses (e.g., antigen presentation, memory formation). 3. **Cellular and Molecular Interactions:** Insights into antigen-antibody interactions and signal transduction pathways. 4. **Immune Disorders:** Awareness of autoimmunity, immunodeficiencies, and hypersensitivities. 5. **Clinical Applications:** Understanding of vaccination, immunotherapy, and diagnostic techniques. 6. **Evolution and Adaptation:** Knowledge of immune system evolution and pathogen evasion strategies. 7. **Research Skills:** Proficiency in immunology research techniques, data analysis, and critical evaluation. 8. **Ethical and Societal Implications:** Awareness of bioethics and the role of the immune system in public health.

Dr. Parimal Dua	**Physiology of Respiratory system**	Through the study of the physiology of the respiratory system, students acquire: 1. **Anatomy and Structure:** Understanding the components of the respiratory system, including the lungs, airways, diaphragm, and related structures. 2. **Respiratory Mechanics:** Knowledge of the mechanics of breathing, including inspiration and expiration, and the role of the diaphragm and intercostal muscles. 3. **Gas Exchange:** Insights into the processes of oxygen and carbon dioxide exchange in the alveoli and the transport of these gases in the blood. 4. **Control of Respiration:** Understanding how breathing is regulated by neural and chemical mechanisms. 5. **Lung Volumes and Capacities:** Familiarity with different lung volumes and capacities (e.g., tidal volume, vital capacity) and their measurement. 6. **Pathophysiology:** Awareness of common respiratory disorders and diseases (e.g., asthma, COPD, pneumonia) and their physiological basis. 7. **Respiratory Physiology in Exercise:** Knowledge of how exercise affects respiratory function and gas exchange. 8. **Research and Diagnostic Skills:** Proficiency in techniques to assess respiratory function, such as spirometry and blood gas analysis. By studying these topics, students gain a comprehensive understanding of how the respiratory system functions, its importance in overall health, and the basis for various respiratory conditions and their treatments.

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(NAAC Accredited 'B' Grade Govt.-Aided College)
NARAJOLE:: PASCHIM MEDINIPUR :: WEST BENGAL :: Pin-721211
Phone: +91- 9475429270; E-mail: narajoleracollege@rediffmail.com
Website: http://www.narajolerajcollege.ac.in

Name of faculty who teaches the topics	Broad topic in university syllabus	Course Outcome
Suman Kalyan Khanra	**Blood & Body fluid**	Through the study of blood and body fluids, students acquire: 1. **Components of Blood:** Understanding the different components of blood, including red blood cells, white blood cells, platelets, and plasma. 2. **Functions of Blood:** Knowledge of the roles of blood, such as oxygen and nutrient transport, waste removal, immune response, and clotting. 3. **Haematopoiesis:** Insights into the process of blood cell formation in the bone marrow. 4. **Blood Typing and Transfusion:** Understanding blood types, the Rh factor, and principles of blood transfusion compatibility. 5. **Body Fluids:** Knowledge of the various body fluids (e.g., lymph, interstitial fluid, cerebrospinal fluid) and their roles. 6. **Fluid Balance and Homeostasis:** Awareness of mechanisms regulating fluid balance and electrolyte homeostasis in the body. 7. **Blood Disorders:** Familiarity with common blood disorders and diseases, such as anaemia, leukaemia, and clotting disorders. 8. **Diagnostic Techniques:** Proficiency in techniques for analyzing blood and body fluids, such as complete blood count (CBC), blood smears, and biochemical tests. By studying these topics, students gain a comprehensive understanding of the composition and functions of blood and body fluids, the physiological processes involved, and the basis for various haematological and fluid balance-related conditions.

Suman Kalyan Khanra	**Cardiovascular System**	Through the study of the cardiovascular system, students acquire: 1. **Anatomy of the Heart:** Understanding the structure of the heart, including chambers, valves, and major blood vessels. 2. **Cardiac Cycle:** Knowledge of the phases of the cardiac cycle, including systole and diastole, and how the heart pumps blood. 3. **Electrical Conduction:** Insights into the heart's electrical conduction system, including the sinoatrial (SA) node, atrioventricular (AV) node, and the conduction pathways. 4. **Blood Vessels:** Understanding the types and functions of blood vessels (arteries, veins, capillaries) and the principles of blood flow and pressure. 5. **Blood Circulation:** Knowledge of systemic and pulmonary circulation and how oxygenated and deoxygenated blood are transported throughout the body. 6. **Cardiac Output:** Understanding factors that influence cardiac output, such as heart rate and stroke volume. 7. **Regulation of Blood Pressure:** Awareness of mechanisms that regulate blood pressure, including neural and hormonal controls. 8. **Cardiovascular Diseases:** Familiarity with common cardiovascular diseases, such as hypertension, atherosclerosis, myocardial infarction, and heart failure. 9. **Diagnostic Techniques:** Proficiency in techniques used to assess cardiovascular function, such as electrocardiography (ECG), echocardiography, and blood pressure measurement. 10. **Preventive and Therapeutic Measures:** Knowledge of lifestyle factors and medical treatments that can prevent or manage cardiovascular diseases. By studying these topics, students gain a comprehensive understanding of how the cardiovascular system functions, its role in maintaining health, and the basis for various cardiovascular conditions and their treatments.

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(NAAC Accredited 'B' Grade Govt.-Aided College)
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Phone: +91- 9475429270; E-mail: narajoleracollege@rediffmail.com
Website: http://www.narajolerajcollege.ac.in

Name of the Department: Physiology
Name and Distinctive number of the paper: MAJOR (MJ)
Topics: Fundamental concept of immune System, Physiology of Respiratory System
Session: 2023-24
Semester: I

Name of faculty who teaches the topics	Broad topic in university syllabus	Course Outcome
Dr. Parimal Dua	**Fundamental concept of Immune System**	Through the study of the fundamental concepts of the immune system, students acquire: 1. **Basic Immunology Concepts:** Understanding immune system components, including innate and adaptive immunity. 2. **Immune Response Mechanisms:** Knowledge of innate defences (e.g., barriers, phagocytosis) and adaptive responses (e.g., antigen presentation, memory formation). 3. **Cellular and Molecular Interactions:** Insights into antigen-antibody interactions and signal transduction pathways. 4. **Immune Disorders:** Awareness of autoimmunity, immunodeficiencies, and hypersensitivities. 5. **Clinical Applications:** Understanding of vaccination, immunotherapy, and diagnostic techniques. 6. **Evolution and Adaptation:** Knowledge of immune system evolution and pathogen evasion strategies. 7. **Research Skills:** Proficiency in immunology research techniques, data analysis, and critical evaluation. 8. **Ethical and Societal Implications:** Awareness of bioethics and the role of the immune system in public health.

Dr. Parimal Dua	**Physiology of Respiratory system**	Through the study of the physiology of the respiratory system, students acquire: 1. **Anatomy and Structure:** Understanding the components of the respiratory system, including the lungs, airways, diaphragm, and related structures. 2. **Respiratory Mechanics:** Knowledge of the mechanics of breathing, including inspiration and expiration, and the role of the diaphragm and intercostal muscles. 3. **Gas Exchange:** Insights into the processes of oxygen and carbon dioxide exchange in the alveoli and the transport of these gases in the blood. 4. **Control of Respiration:** Understanding how breathing is regulated by neural and chemical mechanisms. 5. **Lung Volumes and Capacities:** Familiarity with different lung volumes and capacities (e.g., tidal volume, vital capacity) and their measurement. 6. **Pathophysiology:** Awareness of common respiratory disorders and diseases (e.g., asthma, COPD, pneumonia) and their physiological basis. 7. **Respiratory Physiology in Exercise:** Knowledge of how exercise affects respiratory function and gas exchange. 8. **Research and Diagnostic Skills:** Proficiency in techniques to assess respiratory function, such as spirometry and blood gas analysis. By studying these topics, students gain a comprehensive understanding of how the respiratory system functions, its importance in overall health, and the basis for various respiratory conditions and their treatments.

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Website: http://www.narajolerajcollege.ac.in

Name of faculty who teaches the topics	Broad topic in university syllabus	Course Outcome
Suman Kalyan Khanra	**Blood & Body fluid**	Through the study of blood and body fluids, students acquire: 1. **Components of Blood:** Understanding the different components of blood, including red blood cells, white blood cells, platelets, and plasma. 2. **Functions of Blood:** Knowledge of the roles of blood, such as oxygen and nutrient transport, waste removal, immune response, and clotting. 3. **Haematopoiesis:** Insights into the process of blood cell formation in the bone marrow. 4. **Blood Typing and Transfusion:** Understanding blood types, the Rh factor, and principles of blood transfusion compatibility. 5. **Body Fluids:** Knowledge of the various body fluids (e.g., lymph, interstitial fluid, cerebrospinal fluid) and their roles. 6. **Fluid Balance and Homeostasis:** Awareness of mechanisms regulating fluid balance and electrolyte homeostasis in the body. 7. **Blood Disorders:** Familiarity with common blood disorders and diseases, such as anaemia, leukaemia, and clotting disorders. 8. **Diagnostic Techniques:** Proficiency in techniques for analyzing blood and body fluids, such as complete blood count (CBC), blood smears, and biochemical tests. By studying these topics, students gain a comprehensive understanding of the composition and functions of blood and body fluids, the physiological processes involved, and the basis for various haematological and fluid balance-related conditions.

Suman Kalyan Khanra	**Cardiovascular System**	Through the study of the cardiovascular system, students acquire: 1. **Anatomy of the Heart:** Understanding the structure of the heart, including chambers, valves, and major blood vessels. 2. **Cardiac Cycle:** Knowledge of the phases of the cardiac cycle, including systole and diastole, and how the heart pumps blood. 3. **Electrical Conduction:** Insights into the heart's electrical conduction system, including the sinoatrial (SA) node, atrioventricular (AV) node, and the conduction pathways. 4. **Blood Vessels:** Understanding the types and functions of blood vessels (arteries, veins, capillaries) and the principles of blood flow and pressure. 5. **Blood Circulation:** Knowledge of systemic and pulmonary circulation and how oxygenated and deoxygenated blood are transported throughout the body. 6. **Cardiac Output:** Understanding factors that influence cardiac output, such as heart rate and stroke volume. 7. **Regulation of Blood Pressure:** Awareness of mechanisms that regulate blood pressure, including neural and hormonal controls. 8. **Cardiovascular Diseases:** Familiarity with common cardiovascular diseases, such as hypertension, atherosclerosis, myocardial infarction, and heart failure. 9. **Diagnostic Techniques:** Proficiency in techniques used to assess cardiovascular function, such as electrocardiography (ECG), echocardiography, and blood pressure measurement. 10. **Preventive and Therapeutic Measures:** Knowledge of lifestyle factors and medical treatments that can prevent or manage cardiovascular diseases. By studying these topics, students gain a comprehensive understanding of how the cardiovascular system functions, its role in maintaining health, and the basis for various cardiovascular conditions and their treatments.

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Website: http://www.narajolerajcollege.ac.in

Name of the Department: Physiology
Name and Distinctive number of the paper: MAJOR (MJ)
Topics: Fundamentals of body fluids, Immunity, Circulation and Respiration
Session: 2023-24
Semester: I

Name of faculty who teaches the topics	Broad topic in university syllabus	Course Outcome
Dr. Parimal Dua	**Fundamental concept of Immune System**	Through the study of the fundamental concepts of the immune system, students acquire: 1. **Basic Immunology Concepts:** Understanding immune system components, including innate and adaptive immunity. 2. **Immune Response Mechanisms:** Knowledge of innate defences (e.g., barriers, phagocytosis) and adaptive responses (e.g., antigen presentation, memory formation). 3. **Cellular and Molecular Interactions:** Insights into antigen-antibody interactions and signal transduction pathways. 4. **Immune Disorders:** Awareness of autoimmunity, immunodeficiencies, and hypersensitivities. 5. **Clinical Applications:** Understanding of vaccination, immunotherapy, and diagnostic techniques. 6. **Evolution and Adaptation:** Knowledge of immune system evolution and pathogen evasion strategies. 7. **Research Skills:** Proficiency in immunology research techniques, data analysis, and critical evaluation. 8. **Ethical and Societal Implications:** Awareness of bioethics and the role of the immune system in public health. 9.
Dr. Parimal Dua	**Physiology of Respiratory system**	Through the study of the physiology of the respiratory system, students acquire: 1. **Anatomy and Structure:** Understanding the components of the respiratory system, including the lungs, airways, diaphragm, and related structures.

		2. **Respiratory Mechanics:** Knowledge of the mechanics of breathing, including inspiration and expiration, and the role of the diaphragm and intercostal muscles. 3. **Gas Exchange:** Insights into the processes of oxygen and carbon dioxide exchange in the alveoli and the transport of these gases in the blood. 4. **Control of Respiration:** Understanding how breathing is regulated by neural and chemical mechanisms. 5. **Lung Volumes and Capacities:** Familiarity with different lung volumes and capacities (e.g., tidal volume, vital capacity) and their measurement. 6. **Pathophysiology:** Awareness of common respiratory disorders and diseases (e.g., asthma, COPD, pneumonia) and their physiological basis. 7. **Respiratory Physiology in Exercise:** Knowledge of how exercise affects respiratory function and gas exchange. 8. **Research and Diagnostic Skills:** Proficiency in techniques to assess respiratory function, such as spirometry and blood gas analysis. By studying these topics, students gain a comprehensive understanding of how the respiratory system functions, its importance in overall health, and the basis for various respiratory conditions and their treatments.

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Name of faculty who teaches the topics	Broad topic in university syllabus	Course Outcome
Suman Kalyan Khanra	**Blood & Body fluid**	Through the study of blood and body fluids, students acquire: 1. **Components of Blood:** Understanding the different components of blood, including red blood cells, white blood cells, platelets, and plasma. 2. **Functions of Blood:** Knowledge of the roles of blood, such as oxygen and nutrient transport, waste removal, immune response, and clotting. 3. **Haematopoiesis:** Insights into the process of blood cell formation in the bone marrow. 4. **Blood Typing and Transfusion:** Understanding blood types, the Rh factor, and principles of blood transfusion compatibility. 5. **Body Fluids:** Knowledge of the various body fluids (e.g., lymph, interstitial fluid, cerebrospinal fluid) and their roles. 6. **Fluid Balance and Homeostasis:** Awareness of mechanisms regulating fluid balance and electrolyte homeostasis in the body. 7. **Blood Disorders:** Familiarity with common blood disorders and diseases, such as anaemia, leukaemia, and clotting disorders. 8. **Diagnostic Techniques:** Proficiency in techniques for analyzing blood and body fluids, such as complete blood count (CBC), blood smears, and biochemical tests. By studying these topics, students gain a comprehensive understanding of the composition and functions of blood and body fluids, the physiological processes involved, and the basis for various haematological and fluid balance-related conditions.

Suman Kalyan Khanra	**Cardiovascular System**	Through the study of the cardiovascular system, students acquire: 1. **Anatomy of the Heart:** Understanding the structure of the heart, including chambers, valves, and major blood vessels. 2. **Cardiac Cycle:** Knowledge of the phases of the cardiac cycle, including systole and diastole, and how the heart pumps blood. 3. **Electrical Conduction:** Insights into the heart's electrical conduction system, including the sinoatrial (SA) node, atrioventricular (AV) node, and the conduction pathways. 4. **Blood Vessels:** Understanding the types and functions of blood vessels (arteries, veins, capillaries) and the principles of blood flow and pressure. 5. **Blood Circulation:** Knowledge of systemic and pulmonary circulation and how oxygenated and deoxygenated blood are transported throughout the body. 6. **Cardiac Output:** Understanding factors that influence cardiac output, such as heart rate and stroke volume. 7. **Regulation of Blood Pressure:** Awareness of mechanisms that regulate blood pressure, including neural and hormonal controls. 8. **Cardiovascular Diseases:** Familiarity with common cardiovascular diseases, such as hypertension, atherosclerosis, myocardial infarction, and heart failure. 9. **Diagnostic Techniques:** Proficiency in techniques used to assess cardiovascular function, such as electrocardiography (ECG), echocardiography, and blood pressure measurement. 10. **Preventive and Therapeutic Measures:** Knowledge of lifestyle factors and medical treatments that can prevent or manage cardiovascular diseases. By studying these topics, students gain a comprehensive understanding of how the cardiovascular system functions, its role in maintaining health, and the basis for various cardiovascular conditions and their treatments.

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Website: http://www.narajolerajcollege.ac.in

Name of the Department: Physiology
Name and Distinctive number of the paper: MINOR (MI)
Topics: Fundamental concept of immune System, Physiology of Respiratory System
Session: 2023-24
Semester: II

Name of faculty who teaches the topics	Broad topic in university syllabus	Course Outcome
Dr. Parimal Dua	**Cellular Physiology**	The course outcome of studying cellular physiology typically includes: 1. **Understanding Cellular Structure and Function**: Grasping the fundamental components of cells, such as membranes, organelles, and cytoskeleton, and their specific functions. 2. **Cellular Metabolism**: Learning about metabolic pathways, including glycolysis, the citric acid cycle, oxidative phosphorylation, and how these processes are regulated. 3. **Cell Differentiation and Apoptosis**: Understanding how cells differentiate into specific types and the processes regulating programmed cell death (apoptosis). 4. **Application to Disease**: Applying knowledge of cellular physiology to understand various diseases, including cancer, metabolic disorders, and neurodegenerative diseases, and exploring potential therapeutic interventions.

Dr. Parimal Dua	**Biophysical Principles**	The course outcome of studying biophysical principles typically includes: 1. **Fundamental Biophysics Knowledge**: Understanding the basic principles of physics as they apply to biological systems, including mechanics, thermodynamics, and electromagnetism. 2. **Molecular and Cellular Biophysics**: Learning how physical principles govern the behaviour of molecules and cells, including protein folding, molecular motors, and membrane dynamics. 3. **Structure-Function Relationships**: Understanding how the structure of biological molecules, such as proteins and nucleic acids, relates to their function and dynamics. 4. **Research and Experimental Design**: Developing skills in designing and conducting biophysical experiments, as well as analyzing and interpreting data. 5. **Application to Health and Disease**: Applying biophysical principles to understand physiological processes and pathologies, and exploring their implications for medical research and biotechnology.

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(NAAC Accredited 'B' Grade Govt.-Aided College)
NARAJOLE:: PASCHIM MEDINIPUR :: WEST BENGAL :: Pin-721211
Phone: +91- 9475429270; E-mail: *narajoleracollege@rediffmail.com*
Website: http://www.narajolerajcollege.ac.in

Name of faculty who teaches the topics	Broad topic in university syllabus	Course Outcome
Suman Kalyan Khanra	**Chemistry of Biomolecules** (Carbohydrate)	The course outcome of studying carbohydrates typically includes: 1. **Carbohydrate Structure and Classification**: Understanding the basic structures of carbohydrates, including monosaccharides, disaccharides, oligosaccharides, and polysaccharides, and their classification based on these structures. 2. **Chemical Properties and Reactions**: Learning about the chemical properties of carbohydrates and their reactions, including glycosidic bond formation, isomerization, oxidation, and reduction. 3. **Carbohydrate Metabolism**: Gaining a thorough understanding of carbohydrate metabolism, including glycolysis, gluconeogenesis, the citric acid cycle, and the pentose phosphate pathway, as well as the regulation of these metabolic pathways. 4. **Function and Role in Biological Systems**: Understanding the roles of carbohydrates in biological systems, such as energy storage, structural components, signaling molecules, and recognition sites on cell surfaces. 5. **Glycobiology**: Exploring the field of glycobiology, which studies the structure, biosynthesis, and function of glycans (carbohydrate chains) and glycoconjugates (molecules with carbohydrate components). 6. **Application in Biotechnology and Industry**: Exploring the applications of carbohydrates in biotechnology and industry, including the production of biofuels, biopolymers, and pharmaceuticals.

Suman Kalyan Khanra	**Chemistry of Biomolecules**	**Proteins** 1. **Protein Structure and Function**: o Understanding the primary, secondary, tertiary, and quaternary structures of proteins. o Learning about protein folding, stability, and the forces that determine protein conformation. 2. **Protein Synthesis and Degradation**: o Exploring the mechanisms of protein biosynthesis, including transcription, translation, and post-translational modifications. o Studying protein degradation pathways, such as the ubiquitin-proteasome system and autophagy. 3. **Protein Function and Interaction**: o Examining the diverse functions of proteins, including enzymatic catalysis, signal transduction, transport, and structural roles. o Studying protein-protein interactions and their role in cellular processes. **Nucleic Acids** 1. **Structure and Properties of Nucleic Acids**: o Understanding the chemical and physical properties of DNA and RNA. o Learning about the double-helix structure of DNA and the various structural forms of RNA. 2. **Gene Regulation and Expression**: o Examining the regulation of gene expression at the transcriptional, post-transcriptional, translational, and post-translational levels. o Understanding the role of non-coding RNAs in gene regulation. **Lipids** 1. **Lipid Structure and Classification**: o Understanding the basic structures of lipids, including fatty acids, triglycerides, phospholipids, sphingolipids, and sterols.

		○ Learning about the classification of lipids based on their chemical structure and function. 2. **Lipid Metabolism**: ○ Studying the pathways of lipid metabolism, including fatty acid synthesis, beta-oxidation, and lipid transport. ○ Understanding the regulation of lipid metabolism and its role in energy homeostasis.

Name of faculty who teaches the topics	**Broad topic in university syllabus**	**Course Outcome**
Suman Kalyan Khanra	**Digestive System & Metabolism**	**Digestive System** 1. **Anatomy and Physiology of the Digestive System**: ○ Understanding the structure and function of the digestive organs, including the mouth, esophagus, stomach, intestines, liver, pancreas, and gallbladder. ○ Learning about the histology of the digestive tract and the role of different cell types in digestion. 2. **Digestive Processes and Enzymes**: ○ Studying the mechanical and chemical processes of digestion, including the role of digestive enzymes and bile in breaking down food into absorbable nutrients. ○ Understanding the process of nutrient absorption in the small intestine and the role of the large intestine in water and electrolyte balance. 3. **Regulation of Digestion**: ○ Exploring the neural and hormonal regulation of digestive processes, including the enteric nervous system and the role of hormones such as gastrin, cholecystokinin, and secretin. ○ Understanding the feedback mechanisms that control digestive enzyme secretion and gastrointestinal motility. 4. **Nutrient Assimilation and Transport**: ○ Learning how carbohydrates, proteins, fats, vitamins, and minerals are

		digested, absorbed, and transported in the body. ○ Studying the impact of different diets and dietary components on digestion and nutrient absorption. 5. **Disorders of the Digestive System**: ○ Understanding common digestive disorders and diseases, such as gastroesophageal reflux disease (GERD), peptic ulcers, inflammatory bowel disease (IBD), and irritable bowel syndrome (IBS). ○ Learning about the causes, symptoms, diagnosis, and treatment of these disorders. 6. **Clinical and Diagnostic Techniques**: ○ Gaining knowledge of clinical techniques used to diagnose and treat digestive system disorders, such as endoscopy, colonoscopy, imaging studies, and laboratory tests.

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ESTD.- 1966
Narajole ⊕ Paschim Medinipur

P.O.- NARAJOLE
DIST.- PASCHIM MEDINIPUR
PIN CODE- 721211
WEST BENGAL
Email:
nrcprincipal@narajolerajcollege.ac.in

Memo No. ..... Date .....

Dept. of Political Science

Course Outcome : NEP (CCFUP)

The subject of Political Science intends to equip students with an understanding of Power relations in society through the study of the following :

- Politics , meaning (s) and concept
- Political theory and its relevance
- Indian Government and Politics, as well as comparative Government and Politics
- Various socio-political issues like Gender, Environment, Human rights
- Research Methodology and hands - on experiences from the field

Major – 1: Understanding Political Theory

After successful completion of this course the students will attain thorough knowledge about Political Theory, different approaches to the study of politics

This course Major 1 provides the students with

CO1. Meanings and concepts of Politics, narrow and wider concept of politics

CO2. Relevance of Political Theory and different political theories – traditional and contemporary theories

CO3. Concepts of Democracy, Liberty and Equality and their interrelationship

CO4. Definition of citizenship, rights and duties of citizens

CO5. The State, especially the theories on state and Core issues

CO6. Civil Society and the State : Concepts and debates on Censorship and surveillance , Privacy and Family

CO7. Issues of Development and Growth, Major Themes

CO8. Issues of Justice : Gender, discourses on fairness and Protective Discrimination / Affirmative Action

Major - 2: Constitutional Government in India

After successful completion of this course the students will learn about the philosophy of the Indian Constitution , basic features of the Indian Constitution; Fundamental Rights and Duties and Directive Principles. They will also acquire knowledge of the structure and functions of the three basic organs of the Indian Government - the Executive, President and Prime Minister, the Legislature, the Parliament and the Judiciary, the Supreme Court. They will know about federalism and the decentralization of power, from centre to state and Centre - State Relationship and the Recommendations of the Sarkaria Commission.

This course Major 2 provides the students with

CO1. Evolution of the Indian Constitution : The Role of the Constituent Assembly ; Amendments and Reviews of the Constitution

CO2. The Philosophical basis of the Indian Constitution

CO3. Basic features of the Indian Constitution

CO4 The Rights and Duties of the Indian Citizens, Directive Principles of State Policy

CO5. The Executive, : President, Prime Minister, Governors and chief Ministers of the State

CO6. Union and State Legislatures

CO7. The Judiciary : Supreme Court and the High Courts

CO8. Nature of Indian Federalism, Centre - State Relationship - The Recommendations of the Sarkaria Commission

NARAJOLE RAJ COLLEGE

Dept. of Sanskrit

PROGRAMME OUTCOME OF SANSKRIT MAJOR & MINOR UNDER

NEP

SANSKRIT MAJOR (HONOURS WITH OR WITHOUT RESEARCH)

PROGRAMME OUTCOME

Sanskrit is a very rich language of IE language group. Sanskrit is a medium to know about ancient Indian history, culture, religion, social life through its text. The academic programme of both Honours and General degree courses are designed not only professional skill but also develop a deep understanding of rich heritage and dynamic prevalent scenario of India through various Sanskrit texts.

➢ Develop a strong concept of ancient Indian history, philosophy and literature.

➢ Enhance communication skills-Listening, Speaking, Reading, Writing.

➢ Students will be able to write Devnagari scripts which provide them paleographical knowledge to read out the script of modern languages like Hindi and Marathi.

➢ Increase in depth knowledge of the Core Areas of the subject.

➢ Students will demonstrate the skill needed to participate in conversation that builds knowledge with collaboration.

➢ Reasonable understanding of multi-disciplinary relevance of literature of Sanskrit like Veda, Philosophy, Grammar, Kavya, Smriti Śastra etc.

➢ To make them eligible for higher education.

➢ Develop research aptitude and independent thinking.

➢ After becoming graduate students can apply in the field of UPSE, WBCS etc. And also, after post-graduation they can apply against teaching posts in schools, colleges and other educational institutions.

➢ Appreciate scientific bent of mind of the scholars in ancient India.

➢ Get an exposure the analytical thinking of the ancient scholars.

➢ Explore the findings of those scholars and study their modern relevance.

SANSKRIT MINOR (MULTI-DISCIPLINARY)

PROGRAMME OUTCOME

➢ Develop a strong concept of ancient Indian history, philosophy and literature.

➢ Enhance communication skills-Listening, Speaking, Reading, Writing.

➢ Students will be able to write Devnagari scripts which provide them the paleographical knowledge to read out the script of modern languages like Hindi and Marathi.

➢ Students will demonstrate the skill needed to participate in conversation that builds knowledge with collaboration.

➢ Students will gain knowledge of the major traditions of literatures written in Sanskrit.

➢ To make them eligible for higher education.

➢ Prepare students for the profession of teacher, WBCS, UPSC etc.

➢ Appreciate scientific bent of mind of the scholars in ancient India.

➢ Get an exposure the analytical thinking of the ancient scholars.

➢ Explore the findings of those scholars and study their modern relevance.

NARAJOLE RAJ COLLEGE

Dept. of Sanskrit

PROGRAMME OUTCOME OF SANSKRIT HONOURS & GENERAL UNDER- CBCS

SANSKRIT HONOURS (B.A.)

PROGRAMME OUTCOME

➢ After completing of Sanskrit honours of six semesters in three years, students will be graduates having Sanskrit honours degree.

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

➢ This Programme will help students acquire a general understanding of classical Sanskrit literature and Philosophy and religion, history and culture through Sanskrit texts.

➢ They will develop an insight into one and more fields of specialization within the broader area of ancient Indian philosophy like Upanishads and Gita.

➢ They will demonstrate an enhanced knowledge and understanding of all structures of the Sanskrit language and develop a basic understanding of Panini's grammar and a basic familiarity of the history of Sanskrit literature.

➢ 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.

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

➢ After completing 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 So, students of Sanskrit have huge opportunities to get chance in these before said fields.

➢ 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 Ph. D. degree for higher studies.

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

➢ Knowledge and language always interrelated with each other. A huge amount of ancient Indigenous texts were 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. ➢ 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.

➢ Students will acquire the ability to apply relevant theoretical perspectives to topics with in the field of ancient Indian religion, literature, history even ancient Indian technical and scientific literature through Sanskrit text.

SANSKRIT GENERAL (B.A.)

PROGRAMME OUTCOME

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

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

➢ 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.

➢ 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.

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

➢ 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.

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Zoology (Hons.) NEP

Course Outcome

Semester	I
Title of Course	Systematics and Diversity of Life- Protists to Chordates (MJ-1)
Paper Code	MJ-1T (Theory)
Credits	03
Hours	06 hours/week

The students of Zoology (Honours & Major) of Semester-I will acquire an in-depth knowledge on the taxonomic position of Chordate diploblastic acoelomate animals and Chordate animals on the environment and on the Animal Diversity of Non-Chordate as well as Chordate phyla, their biology and role in the environment by studying this

The theory paper (MJ-1T) of this course (MJ-1) provides the students with-

CO1: To understand the details of products of evolutionary process and origin of life on Earth from primordial chemicals.

CO2: To understand the details of origin of metazoans and its body symmetry.

CO3: To understand the concept of mesozoa, parazoa & eumetazoa, evolution of germinal layer, body cavity and types of coelom.

CO4: To understand the details of classification of life cycles of animal kingdom, the adaptations & relationship between ontogeny & phylogeny.

CO5: To understand the basics of animal classification.

CO6: To understand the definitions relationship & utility of systematics, taxonomy, evolution, classification & nomenclature.

CO7: To understand the different phyletic lineages, the kinds & components of classification and Linnaean hierarchy.

CO8: To understand the concept of species & clade, the codes of zoological nomenclature, principle of priority, synonymy and homonymy, the six-kingdom concept of classification by Carl Woese and concept of major & minor phyla.

CO9: To understand the taxonomic position of Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO10: To understand the general and identifying characteristics of animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO11: To understand the body organization of animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO12: To understand the life cycle, pathogenicity and control measures of certain important animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO13: To understand the physiological mechanisms of animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO14: To describe understand the taxonomic position and unique characters animals belonging to Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO15: To understand the evolution of coelom and metamerism.

CO16: To recognize the general and identifying characteristic features of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO17: To understand the classification of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO18: To recognize life functions body organization of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO19: To study the ecological role of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO20: To recognize the diversity of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO21: To understand the physiological mechanisms of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO22: To understand the evolutionary significance of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO23: To understand the relationships between Chordates and Non-Chordates.

CO24: To recognize the affinities of Non-Chordates with Chordates.

CO25: To understand the different categories of vertebrates and the general characters of vertebrates.

CO26: To study the outline classification of vertebrates.

CO27: To understand the ecological role of different groups of vertebrates.

CO28: To understand the diversity and the level of organization of vertebrates.

CO29: To understand the origin and evolutionary relationship in different subphylum of chordates.

CO30: To understand the different physiological mechanisms of different groups of vertebrates.

CO31: To study the advanced features of vertebrates over Protochordata.

CO32: To study the identifying characters of animals belonging to Pisces, Amphibia, Reptilia, Aves and Mammals.

CO33: To study the classification of animals belonging to Pisces, Amphibia, Reptilia, Aves and Mammals.

CO34: To study the basic organization and diversity of fishes with reference to aquatic adaptation & evolutionary transitions in fishes.

CO35: To understand the concept of Amphibian diversity and adaptability to dual mode of life in Amphibia.

CO36: To recognise the adaptive radiations in Reptilia, Aves and Mammals.

CO37: To understand the concept of volant, arboreal, cursorial, fossorial & secondary aquatics adaptations.

CO38: To understand the origin of Aves and Mammals.

CO39: To understand the features of venomous & non venomous snake, distribution & type of snake venom with antidote in India.

CO40: To understand the features of flying birds & running birds.

CO41: To understand the special features of Monotremes & Marsupials with evolutionary significance.

CO42: To understand the features of Features of living primates – Prosimi & Anthropoidea.

Semester	I
Title of Course	Systematics and Diversity of Life- Protists to Chordates (MJ-1)
Paper Code	MJ-1P (Practical)
Credits	01
Hours	02 hours/week

The students of Zoology (Honours & Major) of Semester-I will acquire an in-depth concept on the parts of microscope, basic idea of fixatives, preservatives & stains and identification & ecological importance of Non-Chordate and Chordate animals by

The practical paper (MJ-1P) of this course (MJ-1) provides the students with-

CO1: To gain knowledge about the parts of microscope with their function & setting of microscopes, its calibration, magnification & drawing with the help of camera lucida.

CO2: To understand the basic idea of fixatives, preservatives & stains with preparation method and significance for study of museum specimen.

CO3: To study the different Non-Chordate and Chordate animals through identification of models, photographs, slides and museum specimens in the laboratory with details on their classification along with biogeography, adaptive features, ecological importance and diagnostic features.

CO4: To understand the study of animals in nature by the use of photographic device, sound recorder, GPS & binocular through demonstration or handling.

CO5: To observe & record different animals from college campus and nearby any terrestrial field (forest, grassland, hill or mountain area etc.) or water body (pond, river, lake, sea etc.) or zoological park or museum.

CO6: To study the comparison & weighting of characters of any two species of animal belonging to same genera or different genera but same family.

CO7: To understand the method of collection of species from arthropoda, mollusca, fish, reptile, bird and mammals.

CO8: To understand the assessment of relationship by constructing a cladogram using any five animals belonging to a clade.

CO9: To understand the preparation of key for identification of venomous and non-venomous snakes, insects, fishes & birds of different feeding habit (planktonivorus, detritivorous, frugivorus, carnivorous, omnivorus, insectivorous, piscivorous, graminivorous etc.).

CO10: To prepare a project work and seminar on any topic of practical courses.

Semester	I
Title of Course	Diversity of Life-Protists to Chordates (MI-1)
Paper Code	MI-1T (Theory)
Credits	03
Hours	06 hours/week

The students of Zoology (Minor) of Semester-I will acquire an in-depth knowledge on the taxonomic position of Chordate diploblastic acoelomate animals and Chordate animals on the environment and on the Animal Diversity of Non-Chordate as well as Chordate phyla, their biology and role in the environment by studying this course.

The theory paper (MI-1T) of this course (MI-1) provides the students with-

CO1: To understand the products of evolutionary process and origin of life on Earth.

CO2: To understand the details of symmetry and cellularity.

CO3: To understand the concept of types & evolution of germinal layer, body cavity and types of coelom.

CO4: To understand the details of classification of life cycles of animal kingdom, the adaptations & relationship between ontogeny & phylogeny.

CO5: To understand the basics of animal classification.

CO6: To understand the definitions relationship & utility of systematics, taxonomy, evolution, classification & nomenclature.

CO7: To understand the different phyletic lineages, the kinds & components of classification and Linnaean hierarchy.

CO8: To understand the concept of species & clade, the codes of zoological nomenclature, principle of priority, synonymy and homonymy, the six-kingdom concept of classification by Carl Woese and concept of major & minor phyla.

CO9: To understand the taxonomic position of Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO10: To understand the general and identifying characteristics of animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO11: To understand the body organization of animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO12: To understand the life cycle, pathogenicity and control measures of certain important animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO13: To understand the physiological mechanisms of animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO14: To describe understand the taxonomic position and unique characters animals belonging to Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO15: To understand the evolution of coelom and metamerism.

CO16: To recognize the general and identifying characteristic features of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO17: To understand the classification of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO18: To recognize life functions body organization of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO19: To study the ecological role of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO20: To recognize the diversity of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO21: To understand the physiological mechanisms of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO22: To understand the evolutionary significance of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO23: To understand the relationships between Chordates and Non-Chordates.

CO24: To recognize the affinities of Non-Chordates with Chordates.

CO25: To understand the different categories of vertebrates and the general characters of vertebrates.

CO26: To study the outline classification of vertebrates.

CO27: To understand the ecological role of different groups of vertebrates.

CO28: To understand the diversity and the level of organization of vertebrates.

CO29: To understand the origin and evolutionary relationship in different subphylum of chordates.

CO30: To understand the different physiological mechanisms of different groups of vertebrates.

CO31: To study the advanced features of vertebrates over Protochordata.

CO32: To study the identifying characters of animals belonging to Pisces, Amphibia, Reptilia, Aves and Mammals.

CO33: To study the classification of animals belonging to Pisces, Amphibia, Reptilia, Aves and Mammals.

CO34: To study the basic organization and diversity of fishes with reference to aquatic adaptation in fishes.

CO35: To understand the concept of emergence of land vertebrates in Amphibia.

CO36: To understand the concept of volant, arboreal, cursorial, fossorial & secondary aquatics adaptations.

CO37: To understand the features of venomous & non venomous snake, distribution & type of snake venom with antidote in India.

CO38: To understand the features of flying birds & running birds.

Semester	I
Title of Course	Diversity of Life-Protists to Chordates (MI-1)
Paper Code	MI-1P (Practical)
Credits	01
Hours	02 hours/week

The students of Zoology (Minor) of Semester-I will acquire an in-depth concept on the parts of microscope and identification & ecological importance of Non-Chordate and Chordate animals by studying this course.

The practical paper (MI-1P) of this course (MI-1) provides the students with-

CO1: To gain knowledge about the parts of microscope with their function & setting of microscopes, its calibration, magnification & drawing with the help of camera lucida.

CO2: To study the different Non-Chordate and Chordate animals through identification of models, photographs, slides and museum specimens in the laboratory with details on their classification along with biogeography, adaptive features, ecological importance and diagnostic features.

CO3: To observe & record different animals from college campus and nearby any terrestrial field (forest, grassland, hill or mountain area etc.) or water body (pond, river, lake, sea etc.) or zoological park or museum.

CO4: To study the comparison & weighting of characters of any two species of animal belonging to same genera or different genera but same family.

CO5: To understand the preparation of key for identification of venomous and non-venomous snakes.

Semester	I
Title of Course	Apiculture SKILL ENHANCEMENT COURSES (SEC 1)
Paper Code	SEC1
Credits	04
Hours	04 hours/week

The students of Zoology (Honours & Major) of Semester-I will acquire an enhanced knowledge on the biology and rearing of honeybees to establish a sustainable beekeeping cottage industry and development of entrepreneurship in this sector and also to make them understand about the prospects and entrepreneurship in Apiculture by studying this course.

The practical paper (SEC1) of this course (SEC-1) provides the students with-

CO1: To study the identification of different species of honeybees and different working groups of honey bees.

CO2: To study the morphology and sexual dimorphism of honey bees.

CO3: To study the pollen basket, mouth parts, sting apparatus, wax gland of worker honey bees.

CO4: To understand the different bee keeping methods and equipment for the extraction of honey.

CO5: To understand the basic concept regarding artificial bee rearing and construction of beehives – Newton and Langstroth.

CO6: To study the bee diseases and enemies, their control and preventive measures.

CO7: To gain knowledge on the products of Apiculture Industry and its uses.

CO8: To study the physical and chemical nature of honey.

CO9: To gain knowledge on the preparation of honey based products.

CO10: To understand the Bee Keeping Industry and the recent modern methods in employing artificial beehives for cross pollination in horticultural gardens.

CO11: To visit an apiculture farm and preparation a project report on apiculture to understand and gain knowledge regarding perquisite of beekeeping industry.

Semester	I
Title of Course	Diversity of Living World (MI-A1)
Paper Code	MJ-A1T (Theory)
Credits	02
Hours	04 hours/week

The students of Zoology (Pass) of Semester-I will acquire an in-depth knowledge on the taxonomic position of Chordate diploblastic acoelomate animals and Chordate animals on the environment and on the Animal Diversity of Non-Chordate as well as Chordate phyla, their biology and role in the environment by studying this course.

The theory paper (MJ-A1T) of this course (MJ-A1) provides the students with-

CO1: To understand the products of evolutionary process and origin of life on Earth.

CO2: To understand the details of symmetry and cellularity.

CO3: To understand the concept of Types & evolution of Germinal layer, body cavity and types of coelom.

CO4: To understand the details of classification of life cycles of animal kingdom, the adaptations & relationship between ontogeny & phylogeny.

CO5: To understand the basics of animal classification.

CO6: To understand the definitions relationship & utility of systematics, taxonomy, evolution, classification & nomenclature.

CO7: To understand the different phyletic lineages, the kinds & components of classification and hierarchical categories recognized by ICZN.

CO8: To understand the concept of species & clade, the codes of zoological nomenclature and the six-kingdom concept of classification by Carl Woese.

CO9: To understand the taxonomic position of Protozoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO10: To understand the general and identifying characteristics of animals belonging to Protozoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO11: To understand the body organization of animals belonging to Protozoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO12: To understand the life cycle, pathogenicity and control measures of certain important animals belonging to Protozoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO13: To understand the physiological mechanisms of animals belonging to Protozoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO14: To describe understand the taxonomic position and unique characters animals belonging to Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO15: To understand the evolution of coelom and metamerism.

CO16: To recognize the general and identifying characteristic features of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO17: To understand the classification of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO18: To recognize life functions body organization of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO19: To study the ecological role of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO20: To recognize the diversity of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO21: To understand the physiological mechanisms of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO22: To understand the evolutionary significance of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO23: To understand the relationships between Chordates and Non-Chordates.

CO24: To recognize the affinities of Non-Chordates with Chordates.

CO25: To understand the different categories of vertebrates and the general characters of vertebrates.

CO26: To study the outline classification of vertebrates.

CO27: To understand the ecological role of different groups of vertebrates.

CO28: To understand the diversity and the level of organization of vertebrates.

CO29: To understand the origin and evolutionary relationship in different subphylum of chordates.

CO30: To understand the different physiological mechanisms of different groups of vertebrates.

CO31: To study the advanced features of vertebrates over Protochordata.

CO32: To study the identifying characters of animals belonging to Pisces, Amphibia, Reptilia, Aves and Mammals.

CO33: To study the classification of animals belonging to Pisces, Amphibia, Reptilia, Aves and Mammals.

CO34: To study the basic organization and diversity of fishes with reference to aquatic adaptation in fishes.

CO35: To understand the concept of emergence of land vertebrates in Amphibia.

CO36: To understand the features of venomous & non venomous snake, distribution & type of snake venom with antidote in India.

CO37: To understand the features of flying birds & running birds.

CO38: To understand the special features of Monotremes & Marsupials with evolutionary significance.

CO39: To understand the concept of volant, arboreal, cursorial, fossorial & secondary aquatics adaptations.

Semester	I
Title of Course	Diversity of Living World (MJ-A1)
Paper Code	MJ-A1P (Practical)
Credits	01
Hours	02 hours/week

The students of Zoology (Pass) of Semester-I will acquire an in-depth concept on the parts of microscope and identification & ecological importance of Non-Chordate and Chordate animals by studying this course.

The practical paper (MJ-A1P) of this course (MJ-A1) provides the students with-

CO1: To gain knowledge about the parts of microscope with their function & setting of microscopes, its calibration, magnification & drawing with the help of camera lucida.

CO2: To study the different Non-Chordate and Chordate animals through identification of models, photographs, slides and museum specimens in the laboratory with details on their classification along with biogeography, adaptive features, ecological importance and diagnostic features.

CO3: To understand the study of animals in nature by the use of photographic device, sound recorder, GPS & binocular through demonstration or handling and

observe & record different animals from college campus and nearby any terrestrial field (forest, grassland, hill or mountain area etc.) or water body (pond, river, lake, sea etc.) or zoological park or museum.

CO4: To understand the preparation of key for identification of venomous and non-venomous snakes, insects, fishes & birds of different feeding habit.

CO5: To study the comparison & weighting of characters of any two species of animal belonging to same genera or different genera but same family.

Semester	I
Title of Course	Animal Diversity (MI-01/C1-01)
Paper Code	MI-01T/C1-01 (Theory)
Credits	03
Hours	06 hours/week

The students of Zoology (Pass) of Semester-I will acquire an in-depth knowledge on the taxonomic position of Chordate diploblastic acoelomate animals and Chordate animals on the environment and on the Animal Diversity of Non-Chordate as well as Chordate phyla, their biology and role in the environment by studying this course.

The theory paper (MI-01T) of this course (MI-01) provides the students with-

CO1: To understand the products of evolutionary process and origin of life on Earth.

CO2: To understand the details of symmetry and cellularity.

CO3: To understand the concept of Types & evolution of Germinal layer, body cavity and types of coelom.

CO4: To understand the details of classification of life cycles of animal kingdom, the adaptations & relationship between ontogeny & phylogeny.

CO5: To understand the basics of animal classification.

CO6: To understand the definitions relationship & utility of systematics, taxonomy, evolution, classification & nomenclature.

CO7: To understand the different phyletic lineages, the kinds & components of classification and Linnaean hierarchy.

CO8: To understand the concept of species & clade, the codes of zoological nomenclature, principle of priority, synonymy and homonymy, the six-kingdom concept of classification by Carl Woese and concept of major & minor phyla.

CO9: To understand the taxonomic position of Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO10: To understand the general and identifying characteristics of animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO11: To understand the body organization of animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO12: To understand the life cycle, pathogenicity and control measures of certain important animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO13: To understand the physiological mechanisms of animals belonging to Protozoa, Metazoa, Porifera, Cnidaria, Ctenophora, Platyheminthes and Nematoda.

CO14: To describe understand the taxonomic position and unique characters animals belonging to Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO15: To understand the evolution of coelom and metamerism.

CO16: To recognize the general and identifying characteristic features of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO17: To understand the classification of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO18: To recognize life functions body organization of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO19: To study the ecological role of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO20: To recognize the diversity of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO21: To understand the physiological mechanisms of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

CO22: To understand the evolutionary significance of animals belonging to Phylum Annelida, Arthropoda, Onycophora, Mollusca, Echinodermata and Hemichordata.

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CO33: To study the classification of animals belonging to Pisces, Amphibia, Reptilia, Aves and Mammals.

CO34: To study the basic organization and diversity of fishes with reference to aquatic adaptation in fishes.

CO35: To understand the concept of emergence of land vertebrates in Amphibia.

CO36: To understand the concept of volant, arboreal, cursorial, fossorial & secondary aquatics adaptations.

CO37: To understand the features of venomous & non venomous snake, distribution & type of snake venom with antidote in India.

CO38: To understand the features of flying birds & running birds.

Semester	I
Title of Course	Animal Diversity (MI-01/C1-01)
Paper Code	MI-01P/C1-01P (Practical)
Credits	01
Hours	02 hours/week

The students of Zoology (Pass) of Semester-I will acquire an in-depth concept on the parts of microscope and identification & ecological importance of Non-Chordate and Chordate animals by studying this course.

The practical paper (MI-01P) of this course (MI-01) provides the students with-

CO1: To gain knowledge about the parts of microscope with their function & setting of microscopes, its calibration, magnification & drawing with the help of camera lucida.

CO2: To study the different Non-Chordate and Chordate animals through identification of models, photographs, slides and museum specimens in the laboratory with details on their classification along with biogeography, adaptive features, ecological importance and diagnostic features.

CO3: To observe & record different animals from college campus and nearby any terrestrial field (forest, grassland, hill or mountain area etc.) or water body (pond, river, lake, sea etc.) or zoological park or museum.

CO4: To study the comparison & weighting of characters of any two species of animal belonging to same genera or different genera but same family.

CO5: To understand the preparation of key for identification of venomous and non-venomous snakes.

Semester	II
Title of Course	Cell Biology (MJ-2)
Paper Code	MJ-2T (Theory)
Credits	03
Hours	06 hours/week

The students of Zoology (Honours & Major) of Semester-II will develop students' knowledge on the basic concepts of cellular structure and function of prokaryotic and eukaryotic cell organelles, the complex regulatory mechanisms that control cell function and also acquire an in-depth concept on the membrane macromolecules and cell organelles and principles of the cell theory by studying this course.

The theory paper (MJ-2T) of this course (MJ-2) provides the students with-

CO1: To understand the details of cell theory and its modern version and interpretation.

CO2: To study the basic general structure of prokaryotes, bacteria, archaea and eukaryotes.

CO3: To understand responses to environmental or physiological changes, or alterations of cell function brought about by mutation.

CO4: To study the ultra structure and composition of Plasma membrane, Lipid Bilayer Fluid mosaic model, Peripheral and Integral Membrane proteins, Glycolipids and Glycoproteins; Membrane receptor modifications: microvilli, desmosomes and plasmodesmata; Mobility of membrane lipids and membrane proteins, Lipid rafts; Cell-cell junctions.

CO5: To study the active and passive transport across membrane, endocytosis and exocytosis.
CO6: To understand the structure and functions of Endoplasmic Reticulum, overview of protein sorting, protein folding and processing in ER, export of proteins and lipids from ER.

CO7: To understand the structure, morphology and functions of Golgi apparatus, protein glycosylation within Golgi, protein sorting and export from Golgi apparatus.

CO8: To understand the structure and functions of Lysosomes, polymorphism and lysosome formation.

CO9: To study the structure of mitochondria, its semi-autonomous nature, the endosymbiotic hypothesis of Mitochondrial Respiratory Chain and mitochondrial DNA.

CO10: To understand the structure and functions of peroxisomes and centrosome.

CO11: To study the type, structure and functions of cytoskeleton, microtubules, actin filaments, and intermediate filaments, basic composition and function of ECM and have a brief idea about cell-matrix interactions molecular motors.

CO12: To understand the structure and functions of interphase nucleus, ultra structure of nuclear membrane and basic concept of pore complex, nuclear envelope, nuclear pore complex, general organization, chemical composition and functions of nucleolus, nuclear matrix, chromatin: Euchromatin and Hetrochromatin and packaging (nucleosome) and nucleo-cytoplasmic interactions.

CO13: To understand the functioning of nucleus and extra nuclear organelles and understand the intricate cellular mechanisms involved.

CO14: To understand the cellular components underlying mitotic and meiotic cell division.

CO15: To develop a clear concept on cell cycle, cell division check points and their regulations.

CO16: To understand the role of growth factors, mutations in the genes that regulate cell cycle and division and their role in causing cancer and the concept of Programmed cell death (Apoptosis).

CO17: To develop a clear concept on cancer, protooncogene & tumor suppressor genes with special reference to p53 and activation of a protooncogene to oncogene.

CO18: To understand the detailed knowledge of different pathways related to cell signalling and apoptosis thus enabling them to understand the anomalies in cancer.

CO19: To study the different cell signalling transduction pathways, modes of cell-cell communication, and types of signalling molecules and receptors GPCR and G-protein mediated signalling (Adenyl cyclase-cAMP), Enzyme linked Receptors: RTK (ras-raf).

CO20: To develop an understanding how cells work in healthy and diseased states and to give a 'health forecast' by analyzing the genetic database and cell information.

CO21: To get new avenues of joining research in areas such as genetic engineering of cells, cloning, vaccines development, human fertility programme, organ transplant, etc.

CO22: To study the tools and techniques used to study cell, the principle of Light Microscope, Phase contrast microscope, Fluorescence Microscope and Principle of SEM & TEM.

CO23: To study the animal cell culture and different types of cell culture- monolayer and suspension culture.

CO24: To study the types of culture media, the sterilization methods for culture wares and culture media and maintenance of a cell line and storage of cells, the basic concept of subcellular fractionation and ultracentrifugation.

Title of Course	Cell Biology (MJ-2)
Paper Code	MJ-2P (Practical)
Credits	01
Hours	02 hours/week

The students of Zoology (Honours & Major) of Semester-II will acquire the practical knowledge on how to study the various stages of mitosis and meiosis, methods of cell viability study and learn to prepare temporary and permanent stained slides of human cells by studying this course.

The practical paper (MJ-2P) of this course (MJ-2) provides the students with-

CO1: To study the cell viability by Trypan Blue Exclusion method.

CO2: To study the preparation of chromosome squashes from grasshopper testes for the observation of stages of meiosis.

CO3: To study the preparation of temporary stained squash of onion root tip to study various stages of mitosis.

CO4: To study the preparation of permanent slide to show the presence of Barr body in human female blood cells/cheek cells.

Semester	II
Title of Course	Insect vector & disease (MI-2)
Paper Code	MI-2T (Theory)
Credits	03
Hours	06 hours/week

The students of Zoology (Minor) of Semester-II will acquire knowledge about an insight into the common vector-borne diseases, their etiology and develop an awareness about the causative agents and control measures of many commonly occurring diseases, role of vectors in their spread, host- parasite relationship and finally the strategies to manage these vectors by studying this course.

The theory paper (MI-2T) of this course (MI-2) provides the students with-

CO1: To study the general and morphological features from head to eyes, types of antennae, mouth parts of insects.

CO2: To study the types of vectors, vector bionomics and morphological peculiarities of different vectors.

CO3: To understand the host-vector relationship, their adaptations as vectors, host specificity and vectorial capacity.

CO4: To study the role of Insects as Vectors and detailed features of orders with insects as vectors – Diptera, Siphonaptera, Siphunculata, Hemiptera.

CO5: To study the dipterans as important insect vectors – Mosquitoes, Sand fly, Houseflies.

CO6: To study the different mosquito-borne diseases and their control – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis.
CO7: To study the different sand fly-borne diseases and their control measures – Leishmaniasis.

CO8: To study the role of house fly as important mechanical vector, Myiasis.

CO9: To study the role of fleas (Siphonaptera) as important insect vectors and their host-specificity.

CO10: To study the different flea-borne diseases and their control measures – Plague, Typhus fever.

CO11: To study the role of different human louse (head, body and pubic louse) - Siphunculata as important insect vectors and their control measures.

CO12: To study the role of bugs (Hempitera) as insect mechanical vectors and their control and prevention measures – Bed bugs as vectors, Blood-sucking bugs, Chagas disease.

CO13: To develop an understanding about the favourable breeding conditions for the vectors.

CO14: To understand the different control methods of vectors – biological control, chemical control and sterile insect technique.

CO15: To acquire knowledge on the devise strategies to manage the vectors population below threshold levels and public health importance.

CO16: To undertake different preventive measures and start awareness programmes for maintenance of hygienic conditions, avoidance of contact from vector, destruction of breeding spots in the vicinity of houses and cattle shed by public health education campaign.

Title of Course	Insect Vectors and Diseases (MI-2)
Paper Code	MI-2P (Practical)
Credits	01
Hours	02 hours/week

The students of Zoology (Minor) of Semester-II will acquire the practical knowledge on the identification of different insect vectors through permanent slides and photographs, their mouth parts and different diseases transmitted by them by studying this course.

The practical paper (MI-2P) of this course (MI-2) provides the students with-

CO1: To study the mouth parts of different insects.

CO2: To study different insect vectors through permanent slides/ photographs.

CO3: To study the different diseases transmitted by insect vectors.

CO4: To prepare a project report on any insect vectors and disease transmitted by it.

Semester	II
Title of Course	Aquarium fish keeping SKILL ENHANCEMENT COURSES (SEC 2)
Paper Code	SEC2
Credits	04
Hours	04 hours/week

The students of Zoology (Honours & Major) of Semester-II will acquire a practical knowledge for sustainable ornamental fish farming and will be able to establish a large-scale aquarium fish farm as a cottage industry and to develop entrepreneurship in fish sector by studying this course.

The practical paper (SEC2) of this course (SEC-2) provides the students with-

CO1: To gain knowledge and study the identification about fresh water indigenous and exotic ornamental fishes.

CO2: To study the identification about marine indigenous and exotic aquarium fishes.

CO3: To understand the construction and installation of modern age aquahome.

CO4: To understand about the aquarium plants.

CO5: To understand the basic concept and gain knowledge on aquarium keeping.

CO6: To study the fish feed formation and preparation of pelleted diet for aquarium fishes and live fish food organism for ornamental fishes.

CO7: To gain knowledge on the ornamental fish breeding practice.

CO8: To understand the laws around aquarium keeping.

CO9: To study the different diseases of ornamental fishes.

CO10: To gain knowledge regarding ornamental fish health management practice.

CO11: To provide field exposure and develop understanding about the entrepreneurship in aquarium fish keeping.

CO12: To field visit to an ornamental fish farm and preparation of a field report on aquarium fish keeping to understand and gain knowledge regarding aquarium keeping industry.

Semester	II
Title of Course	Insect vector & disease (MI-02/C1-02)
Paper Code	MI-02T/C1-02T (Theory)
Credits	03
Hours	06 hours/week

The students of Zoology (Pass) of Semester-II will acquire knowledge about an insight into the common vector-borne diseases, their etiology and develop an awareness about the causative agents and control measures of many commonly occurring diseases, role of vectors in their spread, host- parasite relationship and finally the strategies to manage these vectors by studying this course.

The theory paper (MI-02T) of this course (MI-02) provides the students with-

CO1: To study the general and morphological features from head to eyes, types of antennae, mouth parts of insects.

CO2: To study the types of vectors, vector bionomics and morphological peculiarities of different vectors.

CO3: To understand the host-vector relationship, their adaptations as vectors, host specificity and vectorial capacity.

CO4: To study the role of Insects as Vectors and detailed features of orders with insects as vectors – Diptera, Siphonaptera, Siphunculata, Hemiptera.

CO5: To study the dipterans as important insect vectors – Mosquitoes, Sand fly, Houseflies.

CO6: To study the different mosquito-borne diseases and their control – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis.
CO7: To study the different sand fly-borne diseases and their control measures – Leishmaniasis.

CO8: To study the role of house fly as important mechanical vector, Myiasis.

CO9: To study the role of fleas (Siphonaptera) as important insect vectors and their host-specificity.

CO10: To study the different flea-borne diseases and their control measures – Plague, Typhus fever.

CO11: To study the role of different human louse (head, body and pubic louse) - Siphunculata as important insect vectors and their control measures.

CO12: To study the role of bugs (Hempitera) as insect mechanical vectors and their control and prevention measures – Bed bugs as vectors, Blood-sucking bugs, Chagas disease.

CO13: To develop an understanding about the favourable breeding conditions for the vectors.

CO14: To understand the different control methods of vectors – biological control, chemical control and sterile insect technique.

CO15: To acquire knowledge on the devise strategies to manage the vectors population below threshold levels and public health importance.

CO16: To undertake different preventive measures and start awareness programmes for maintenance of hygienic conditions, avoidance of contact from vector, destruction of breeding spots in the vicinity of houses and cattle shed by public health education campaign.

Title of Course	Insect Vectors and Diseases (MI-02/C1-02)
Paper Code	MI-02P/C1-02 (Practical)
Credits	01
Hours	02 hours/week

The students of Zoology (Pass) of Semester-II will acquire the practical knowledge on the identification of different insect vectors through permanent slides and photographs, their mouth parts and different diseases transmitted by them by studying this course.

The practical paper (MI-02P) of this course (MI-02) provides the students with-

CO1: To study the mouth parts of different insects.

CO2: To study different insect vectors through permanent slides/ photographs.

CO3: To study the different diseases transmitted by insect vectors.

CO4: To prepare a project report on any insect vectors and disease transmitted by it.