

# **K. K. Das College**

GRH – 17, Baishnabghata – Patuli

Kolkata – 700084

West Bengal

India



**Program Outcomes and Course Outcomes**

## Program Outcome: B. A. (Honours)

### Program Outcomes:

- Students will be eligible to pursue higher studies in the respective areas leading to research activities which will contribute to the society.
- Student will be more equipped to appear in All Competitive Examinations.
- The students can express their own critical opinions about various significant issues like representation, identity formation, gender issues etc.
- The program aims to improve the analytical faculty of the students.
- After the completion of B. A. Honours degree, candidates can opt for jobs both in government and private agencies.
- Develops advanced theoretical and research skills.

## Program Specific Outcome: Bengali (Honours)

### Program Specific Outcomes

- Student will be more equipped to appear in All Competitive Examinations.
- The students can express their own critical opinions about various significant issues like representation, identity formation, gender issues etc.
- The program aims to improve the analytical faculty of the students.
- Develops advanced theoretical and research skills.
- After the completion of B. A. Honours degree, candidates can opt for jobs both in government and private agencies.

### Course Outcomes

#### Type of Course: CC1

This course acquaints the students with the idea of Bengali language and literature from the time of its origin to 1800 AD. It discusses broadly about the divisions of the time period in the evolution of 'Bengali' as a language and also teaches the students about the earliest accounts of the language such as 'Charyapad', the life history and the impact of Chaitanyadev on Bengali literature and the MangalKabya.

#### Type of Course: CC2

This course targets to acquaint the students with the various intricate lingual characteristics of the Bengali language from different aspects.

Type of Course: CC3

This course deals with the evolution of Bengali literature under the influence of colonial modernization. It teaches the students about the contribution of MadhusudanDutt, Bankimchandra Chattopadhyay, Vivekananda, Swarnakumari Devi and others in the field of modern literature.

Type of Course: CC4

After the preliminary understanding of the Bengali language, literature and its evolution, this course lets the students enjoy the popular pieces of Bengali literature. It comprises of literary pieces from the earliest texts of Charyapad to modern literary works.

Type of Course: CC5

This core course teaches the students about the nature of various literary aspects of 19<sup>th</sup> century Bengal. It covers all aspects of Bengali literature such as Poetry, drama, fiction, non-fiction, periodicals etc.

Type of Course: CC6

This module covers the linguistic history of Bengali language, such as the origin and development of Bengali language to its present form. It traces the origin of the language from Ancient Indo-Aryan and discusses all the stages of its development with reference to old literary works such as Charyapad, Sri Krishnakirtan and AnnadamangalKavya.

Type of Course: CC7

This course is based on novels and short stories of Bengali literature in the modern era. Four masterpieces of Rabindranath Tagore, Sarat Chandra Chattopadhyay, ManikBandopadhyay and Mahashweta Devi, and five short stories of Rabindranath Tagore and five works of modern writers have been included in the syllabus. This course also aims to teach the students about the complexities of the inter-relationship between man and society, the position of woman in family and society, environmental awareness etc.

## Program Specific Outcome: English (Honours)

### Program Specific Outcomes

The Honours Program in English will help the students in gaining knowledge majorly about British Literature along with Indian English Literature and World Literatures. This program as a whole helps in developing the critical faculty of the students as they engage in close critical analysis of the texts prescribed in the syllabus. The students are encouraged to form their own critical opinions about various significant issues like representation, identity formation, gender issues etc. The program teaches the students to analyze a text keeping in mind the socio-cultural context, the biographical details of the author and the context in which the text had been written. The program aims to improve the analytical faculty of the students.

### Course Outcomes

Type of Course: CC1

Name of the Course: History of English Literature

In this paper, the students will read the history of English literature from Old English age to Modern period.

- Will provide an overarching panoramic view of English literature with all its swing of literary tradition in accordance to its age and attitude.
- Can understand how social, political and cultural aspect took a vital role in shaping the literary products of the period. It will deepen the idea from literature being a phenomenon of one's imagination to literature of dire, drab continuous reality which is shaped by and shape on.
- Will understand literary terminology for narrative, dramatic and poetic genre.
- Can develop reading, writing and analytical skills and communicate their ideas critically, creatively, and persuasively through the medium of language in the current information -intensive society.
- Will explore the world of great writers and their psyche like Chaucer, Shakespeare, Wordsworth, Dr. Jonson, Eliot, Woolf, Joyce, Beckett and many others.
- Will learn about the origin and development of the English language and various other nuances and aspects of the language.

Type of Course: CC2

Name of the Course: European Classics

In this particular core paper, the students will read the European classical literature beginning with Greek- translation of Homer, Sophocles and the translation of Ovid, Plautus and Horace from Roman literature.

- Demonstrate a clear understanding of primary literary texts and a familiarity with the ancient culture, genre especially the epic tradition, and place in literary history from whence they come.
- Can comprehend the notion of critical essay writing, analyze the primary text with the knowledge of socio-historical backdrop and literary theory. At the end of the semester they submit a term paper on the given topic which challenges and changes their

concept of tradition and culture structurally and universally.

- Can understand the sources and later development of English literature. How the great early works influence the subsequent generation and how they incepted the kernel of written European literature is demonstrated in this paper.
- Can trace the development of literary genres or forms such as tragedy, comedy, satire and so on.
- Appreciate the contribution of the classical master and recognize the shifting in modern times.

Type of Course: CC3

Name of the Course: Indian Writing in English

This is the core course where the students will read Indian Writing in English.

- To introduce the first generation such as Toru Datt, Nissim Ezekiel to the contemporary Indian authors like Mahesh Dattani who writes in English. This is very significance especially when the history of English writings in India is very small and mostly translation based.
- Can understand India's rich cultural lineage and diversity. How colonialism for almost 200 years changed socio-political as well as psychological domain will be explored.
- Will know some important literary theories and terms like colonialism, postcolonialism, nation, diaspora and others.
- Can perceive how literature, writers becomes the ideological tool to reconstruct India as a distinct nation and its history.

Type of Course: CC4

Name of the Course: British Poetry and Drama – 14<sup>th</sup> to 17<sup>th</sup> Century

This is the core course especially focusing on British poetry and drama (14<sup>th</sup> – 17<sup>th</sup> Century).

- Introduce to the early development of English poetry.
- Will read the pioneers of English literature like Geoffrey Chaucer, Edmund Spenser, Christopher Marlowe, William Shakespeare and others.
- Can explore how sonnet and metaphysical poetry initiates in English literature.
- Can understand how renaissance in Europe had a great impact in thought, culture and literature.

Type of Course: CC5

Name of the Course: American Literature

In this core course the students will read American literature viz. poetry, novel, drama and short stories.

- Will be informed about the essence of American literature. They will understand the typical American experience unlike British literature they have read so far.
- Can recognize how the concept, "America" as a nation, and how the American dream and the Great Depression closely related to American Literature.
- Can comprehend various significant social issues, movements manifested in literature such as racialism, black movement, and Civil war and so on.
- Can reflect on individual struggle, pain, sufferings and a positive attitude to this grim reality especially in Hemingway's *Old Man and the Sea*, Plath's *Daddy* and others.
- Identify and describe the major critical approaches to literary interpretation: New Criticism/Formalism, Psychoanalysis, Feminism, and Marxism etc.

Type of Course: CC6

Name of the Course: Popular Literature

In this core course, the students will read Popular Literature such as Sukumar Ray, Lewis Carroll, Agatha Christie and others.

- Know the meaning of Popular Literature and its distinct characters. They would explore how broad the very word, 'popular' in literature connotes and its significance.
- Read and understand some of the representative popular literary pieces theoretically.
- Understand how formulaic elements create the ideal world without limitations or uncertainties in readers' imagination.
- Probe into the literary and aesthetic merits of popular fictions.

Type of Course: CC7

Name of the Course: British Poetry and Drama (17<sup>th</sup> – 18<sup>th</sup> Century)

In this core course the students will read 17<sup>th</sup> century and the long 18<sup>th</sup> century British literature especially its poetry and drama.

- Will get the opportunity to read the works of stalwarts like John Milton, Alexander Pope, Aphra Behn and John Webster.
- Close analysis of the texts will provide the students with an understanding of the age in which the works have been written.
- The drama of Behn provides the students a view of the challenges faced a woman writer in the Restoration Period.

## Program Specific Outcome: History (Honours)

### Course Outcomes

Type of Course: CC1

Name of the Course: History of India from the earliest times to C 300 BCE

- This Course is designed perfectly for the new batch of the students of History Honours. The first part of this course helps the students to understand the sources of history, which is the main premise of any subject.
- Later part of this course gives a detailed view of pre-historic age with special reference to the hunter gatherers and the advent of food products.
- As a whole, this paper helps the students to grow their basic knowledge regarding the evolution of the human civilization and its transformation.

Type of Course: CC2

Name of the Course: Social formations and Cultural patterns of the ancient world other than India

- This course is very important for the students who have opted the honours course, because it helps them to get an idea of a world, outside India.
- From this course, they will get an idea of a comparative perspective of different societies and it will help them in future with the ongoing course in the honours syllabus, which includes slave societies in India as well.

Type of Course: CC3

Name of the Course: History of India C 300 BCE to C 750 CE

- This is the most vibrant part of early Indian history. It informs our students about the first Empire building mission in all India level.
- It gives them an overview of the first comprehensive governance in Indian history.
- This course also gives them, an idea of the development of languages like Sanskrit, Pali, Prakrit and Tamil and also about its enriched literature which are considered as a valuable part of our glorious past.

Type of Course: CC4

Name of the Course: Social formations and Cultural patterns of the Medieval World other than India

- This paper is the first one, which introduces European history to the students.
- It gives an idea of the political upheavals in the pre-feudal Europe and the interesting relationship between the politics and religion.
- The interesting prospects about religious beliefs, practices like witch craft and magic.
- It also addresses the rise of the urban spaces, universities and architectural styles which in long run in history has gained a world famous position.
- This is the most interesting part of the European history, which for the first time introduces the feudal mode of production to the students and their implications.

Type of Course: CC5

Name of the Course: History of India(CE 750-1206)

- This course introduces sources of the early medieval India and the debates on Indian feudal mode of production.
- This is the transitional period where in changes in almost all sphere happened.
- This course offers an interesting note on the Indo-Roman trade which comprises an important part of the economic development in early India.
- This course insights the development of the protestant religions like Buddhism and Jainism and their growth.
- Developments of various religious sects in parallel with the mainstream religions like Bhaktism and Tantrism.

Type of Course: CC6

Name of the Course: Rise of the Modern West-I

- This course plays the pivotal role to understand the transition of feudalism towards capitalism.
- This course helps to understand the entire economic transition of the world.
- This course additionally draws the attention of the students towards the changing economic developments, mainly the shift of economic balance from the Mediterranean to the Atlantic.
- It also depicts the development of the national monarchy and emergence of the European state system.

Type of Course: CC7

Name of the Course: History of India(C1206-1526)

- This course introduces the first rule of Islam in India.
- Along with the political history of the Delhi Sultanate this course also offers a deep insight into the sufi theological practices.
- It helps to understand the legacy of the peace full cohabitance of the various religious sects.
- Turkish and Afghan influence on the architecture which surprises us till date are the best gifts of this period.

Type of Course: CC8

Name of the Course: Rise of the Modern West II

- This course offers the scenario of Europe during 16<sup>th</sup> century to the 18<sup>th</sup> century.
- During this course students can observe the significant changes such as printing revolution, military revolution, advent of mercantilism which has a everlasting impact on world's socio-economic scenario of the whole world.
- It introduces students with the various forms of parliamentary government and transformation of national monarchy.

Type of Course: CC9

Name of the Course: History of India (C1550 - 1605)

- This course offers another vibrant phase of Muslim rule in India.
- This period of Indian history is enriched with vast range of literature which are unique by their contents, writing pattern and uphold the legacy of central Asian influence
- This course also helps students to understand the basic differences between two main muslim dynasty in india that is Sultan and Mughal.
- Students come to know about unique economic, political and cultural characteristics of Medieval India such as mansabdari system, zabt system, sufi silsilas through their course.
- This course also helps students to know about sufi mystical traditions and their contribution to the North Indian political environment.

Type of Course: CC10

Name of the Course: History of India (C1750 – 1939)

- This is the most significant period and the last phase of the Medieval Indian history. This course offers an insightful vision on the synoptic nature and role played by Sufism in medieval India.
- In this course students come to know about crisis in the Mughal India and the gradual decline.
- This course also informs students about the rise of local kingdom such as Rajputs and Marathas.
- Through this course students are also informed about the significance of 18<sup>th</sup> century debate about the decline of the Mughal empire.



Type of Course: CC11  
Name of the Course: History of Modern Europe(C1780 – 1939)

- This course offers the first modernization of European societies, Napoleonic era and its impact. Revolutionary changes throughout European societies.
- This course will discuss the common classes response to the congress of Vienna, capitalist development, the background and outcome of the most defining event of the Europe Industrial Revolution.
- Student will get to develop a layered and wide reaching understanding of the intellectual movements throughout Europe, the significance of Bolshevik revolution of 1917 and the ideological construction of the Soviet nation.
- This lesson will provide various theories and its effects. Students will be benefitted with the idea of expansionist policy of European countries.
- The final lesson of this paper will provide the two most important event of the world: the two world wars and its effect.

Type of Course: CC12  
Name of the Course: History of India(1750 – 1867)

- This course includes the great 18<sup>th</sup> century debate on Indian history. The transformation from early modern to modern period is very crucial for every society. Students will know about the changing society, economy and politics.
- This course informs students about the coming of the European and their ideologies and expansion of their empire.
- Through this paper students came to know about revenue policy, social policy of the british colonizers which implanted far reaching changes in Indian society.
- This course also offers an insightful vision about the effects of British imperialism on Indian society such as famines, drain of wealth etc with its repercussions such as Santhal Rebellion, Indigo Rebellion, Deccan riots which ultimately culminated in the Great uprising of 1857.

Type of Course: CC13  
Name of the Course: History of India(1857 – 1964)

- This particular paper helps student to evolve with the idea of the formation of Indian society in a new way through the diffusion of western knowledge.
- This course offers students about the knowledge of various reform movements such as Bramho Samaj movement, Arya Samaj movement, the role of Raja Rammohan Roy, Vidyasagar, Vivekananda – the modern thinkers who have revolutionary impact on Indian society which is still relevant in contemporary time.
- Students will get to know about the rise of nationalism with the role of great personalities like Mahatma Gandhi, Nehru. Their contribution to built up today's India.
- Besides all of these this course also tries to make students aware of various social, economic developments like the rise of tribal identity, dalit identity and their role in Indian society.

Type of Course: CC14  
Name of the Course: History of World Politics(1945 – 1994)

- This course helps to know about the downfall of the balance of power in Europe , the origins of cold war.
- From this lesson student will get to know about the power politics of U.S.A & USSR.
- Apart from this student will be provided with the knowledge of de-stalinisation.
- This course consists of disintegration & decline of the soviet union which reflects the ideological conflicts throughout the world.
- This course enable students to grow with the ideas of decolonization, protest politics, anti apartheid movement ,feminist movement and other related ideological transformations.

### **Program Outcome: B. A. (General)**

#### **Program Outcomes:**

- Students will be eligible to pursue higher studies in the respective areas leading to research activities which will contribute to the society.
- Student will be more equipped to appear in All Competitive Examinations.
- The students can express their own critical opinions about various significant issues like representation, identity formation, gender issues etc.
- The program aims to improve the analytical faculty of the students.
- After the completion of B. A. general degree, candidates can opt for jobs both in government and private agencies.
- Develops advanced theoretical and research skills.

### **Program Specific Outcome: Sociology (General)**

#### **Program Specific Outcomes**

1. **Discriminations Diminished:** The Choice Based Credit System (CBCS) aims at diminishing the discrimination between HONOURS and GENERAL courses of specific study.
2. **Freedom of Exercising Interest:** Under the CBCS, the undergraduate batch of students would be able to choose courses and subjects as per their interest in the last two academic sessions (Mainly 2018-19, 2019-20). This would positively encourage academic flexibility and enable the students to look beyond the stereotypes of a particular academic Discipline.
3. **Distribution of Academic load:** Under the CBCS, the academic load will definitely be distributed and there will be provision for Supplementary Tests to clear up backlogs. This will positively drive to the teaching, learning and evaluation process.
4. **A Uniform Syllabus:** If the UGC implements a uniform undergraduate syllabus for the Universities of India in future, the CBCS will be of great advantage as the only means to attain that end.
5. **Students more equipped to appear in All Competitive Examinations:** The Multiple Choice Questions and Short Answer Type Questions format and the contemporary approach of the syllabus under the CBCS will make the students more equipped to appear at State level and All-India level Competitive Examinations for Rail, Banking, Civil and other services.

### **Course Outcomes**

From the Academic Session 2018-19, the K. K. Das College has introduced CBCS system by the affiliating University of Calcutta at present. Under the Choice Based Credit System, expected Course Outcomes may be listed as follows:

- On the prescribed courses, the concerned student is expected to know his social conditions better, which also enables him to locate himself in his social atmosphere.
- Course deals with experiences and perceptions of a person in a society, and thus it helps a student to understand the various social factors and their influence on organizations in particular and institutions in general.
- The new syllabus under CBCS may be enables a student to develop a more focused approach of study.

### **Program Specific Outcome: Education (General)**

#### **Program Specific Outcomes**

- Community education Officer
- Education Administrator
- Learning Mentor
- Teaching Assistant
- Family Support Worker
- Museum Education Officer
- Careers Adviser
- Social researcher
- Social worker
- Rehabilitation
- Youth And Elderly Services
- Recreation
- Local, State and Federal Agencies
- Family Planning
- Rehabilitation Counseling

### Course Outcomes

#### Semester - I

Name of the Course: Introduction to Education

Course Unit	Outcomes
Concept of Education	To understand the meaning, nature, scope and aims of education.
Factors of Education	To explain the factors of education and their interrelationship.
Agencies of Education	To become aware of different agencies of education that influence education.
Child Centricism and Play-way in Education	To be acquainted with the concept of child-centricism and play- way in education.

#### Semester - II

Name of the Course: Psychological Foundation of Education

Course Unit	Outcomes
Relation between psychology and education.	To understand the meaning of psychology and be acquainted with its different aspects.
Stages and types of human development and their educational significance.	To know the patterns of different aspects of human development and relate this knowledge with education.

Learning: concept and theories.	To be acquainted with the cognitive approach of development and thus to understand the process and factors of cognition.
Intelligence.	To develop a better understanding of types of intelligence and intelligence testing.
Semester - III Name of the Course: Sociological Foundation of Education	
<b>Course Unit</b>	<b>Outcomes</b>
Introductory Concept of Sociology of Education.	To understand the relation between sociology and education, nature, and scope of sociology of education.
Social Groups.	To explain the concept of social groups and socialization process.
Social Change and Education.	To enable the students to understand the concept of social change and social interaction in education.
Social Communication in Education.	To become aware of social communication in education.
Semester - IV Name of the Course: Inclusive Education	
<b>Course Unit</b>	<b>Outcomes</b>
Inclusion Overview.	Understand the meaning of inclusion and exclusion.
Differently Abled.	Know the types of exclusion and their causes.
Socially Disabled.	Know how to bring about inclusion in different spheres.
Educational Reforms for Inclusive Society.	Students and their parents participate in setting learning goals and take part in decision that affect them.

### Program Specific Outcome: History (General)

<b>Course Outcomes</b>
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<p style="text-align: center;">Types of Course: CC – 1/GE – 1 Name of the Course: History of India from the Earliest Times Upto 300CE</p>
<p>This paper helps the students to understand the Ancient Indian history from an analytical perspective. It also helps them to develop their basic understanding of sources.</p>
<p style="text-align: center;">Types of Course: CC – 2/GE – 2 Name of the Course: History of India CE 300 To 1206</p>
<p>This paper helps them to build a sense of Early Medieval Indian history and the use of the Medieval sources.</p>
<p style="text-align: center;">Types of Course: CC – 3/GE – 3 Name of the Course: History of India 1206 – 1707</p>
<p>This is the paper through which the students will have a holistic understanding of the Medieval and early Modern India.</p>
<p style="text-align: center;">Types of Course: CC – 1/GE – 1 Name of the Course: History of India 1707 – 1950</p>
<p>This is the paper of Modern India. This paper helps the students to understand the scenario of the Modern India, specially after Independence</p>

## Program Outcome: B. Sc. (Honours)

### Program Outcomes:

- Students will be able to get job in technological and engineering fields as well as in education and health care sectors.
- Students will be confidence enough to write computer programming to calculate some advanced mathematical and logical problems.
- Students can appear in CDS(Combined Defence Services) Examination and after successful complication of SSB interview, they can join IMA, OTA.
- Students can join B.Ed which will lead them to academic sector if the students are interested in the fields.
- Students will be eligible for various competitive examination viz. IBPS PO, SSC CGL, WBCS, UPSC, etc.
- Academic degree given to undergraduate students.
- The Bachelor of Science degree focuses on developing mathematical, analytical, observation, scientific, experimental, problem solving, logical and research skills of the students.
- Develops advanced theoretical and research skills.
- After the completion of a B.Sc. degree, candidates can choose to pursue Master of Science (M.Sc.), secure admission in a professional job-oriented course (like MBA) and opt for jobs both in government and private agencies.

## Program Specific Outcome: Mathematics (Honours)

### Program Specific Outcomes

On successful completion of Mathematics Honours Program:

- Provide students sufficient knowledge and skills enabling them to undertake further studies in mathematics and its allied areas on multiple disciplines concerned with Mathematics.
- A student can acquire knowledge and understanding of various branches of Pure Mathematics and Applied Mathematics including Geometry, Algebra, Mathematical Analysis and Discrete Mathematics, Statistics, Operational Research and Differential Equations.
- He can also acquire knowledge of several specialized areas of advanced Mathematics and its applications.
- He will be able to analyze the results and apply it in various problems appearing in different branches of Mathematics.
- He will be able to understand mathematical statements ideas and results both verbally and in writing with correct use of Mathematical definition, terminology and symbolism.
- He will be able to communicate various concepts of mathematics effectively using examples and their geometrical visualizations.
- He will be able to work collaboratively with peers and instructors to acquire mathematical understanding and to formulate and solve problems and present solutions.
- He will be able to use computer packages where appropriate to develop a deeper understanding of mathematical problems.

### Course Outcomes

Type of Course: CCI

Name of the Course: Calculus, Geometry and Vector Analysis

- Trace curves in Cartesian and Polar coordinates.
- Understand the hyperbolic function with finding of higher order derivatives.
- Find the curvature, concavity, point of inflection envelopes, rectilinear asymptotes of standard curves.
- Find the limit using L'Hospital's rule.
- Find the arc length of a curve, area under a curve & volume of surface of revolution.
- Understand its applicable in the field of business, economics and life sciences.
- Apply transformations of coordinates to functions, including shifts and rotation.
- Classify different types of conics in 2D.
- Obtain the tangents, normals, chord of contacts, poles and polars w.r.t. different types of conics.
- Get the idea of direction ratios and direction cosines in 3D.
- Find distances between points and find midpoints of line segments connecting points in space.
- Write equation of plane in different forms and straight lines in space.

- Find the angle between two intersecting planes and that between two straight lines.
- Learn the condition of coplanarity of two lines.
- Distinguish between parallel lines and skew lines and determine the shortest distance between two skew lines.
- Perform standard operations on vectors in two-dimensional space and three dimensional space.
- Compute the dot product of vectors and determine the lengths of vectors and angles between vectors.
- Compute the cross product of vectors and interpret it geometrically.
- Determine the equations of lines and planes using vectors.
- Determine Gradient of vector fields and constructing potentials.
- Get ideas of divergence, curl and the Laplacian along with their physical interpretations, using differential forms to represent derivative operations.
- Write the equations of spheres, circles in space, cone and cylinders.
- Write the canonical equations of ellipsoid, hyperboloid, paraboloids.
- Find the equations of tangent planes, normal and enveloping cone.
- Get the knowledge of surface of revolution, ruled surface, generating lines of hyperboloid.

Type of Course: CC2

Name of the Course: Algebra

- Define a complex number and represent them in Cartesian form.
- Represent complex numbers in argand plane and express them in Polar form.
- Distinguish between a general argument and the principal value of the argument.
- Apply the De Moivre's formula.
- Find nth the roots of a complex number.
- Compute the value of an exponential, logarithm, exponent and trigonometric function of a complex number.
- Determine the number of real and complex roots using sturm functions.
- Find the roots of different polynomial equations & relations between the roots and coefficients of the equations.
- The concept of inequality with its importance in our daily life will be cleared.
- Can use relationship between AM, GM and HM to solve various inequality problems.
- Can use Cauchy-Schwartz inequality to work with inequality problems.
- Can form linear difference equation
- Solve linear difference equations of various type.
- Understand the role of set in modern algebra.
- Determine equivalence relations on sets and equivalence classes & partition, partial order relation, poset, linear order relation.
- Define and identify injective, surjective, and bijective mappings.
- Work with functions and in particular bijections, direct and inverse images and inverse functions.
- Define and interpret the concepts of divisibility, congruence, greatest common divisor and prime-factorization.
- Play with prime numbers and their properties considering related theorems.
- They will become familiar with arithmetic function and their properties.
- Able to find the rank and inverse of a matrix.



- Use matrix algebra.
- Will be able to reduced any given matrix to echelon form.
- Can solve system of linear equations with matrix inversion inversion method.

Type of Course: CC3  
Name of the Course: Real Analysis

- Define the rational numbers, the natural numbers, and the real numbers and understand their relationship to one another.
- Define the well-ordering principle, the completeness/supremum property of the real line and the Archimedean property.
- Prove the existence of irrational numbers.
- Define supremum and infimum.
- Define open, closed and bounded sets; define cluster points; define density.
- Prove standard results about closures, intersections, and unions of open and closed sets.
- State and prove the Bolzano-Weierstrass Theorem for sets.
- Can define real sequence, its limit, boundedness, and algebra of the limits.
- Become familiar with monotone sequence and their convergence.
- Can use various limit theorems for finding the limits of a given sequence.
- Will be introduced with subsequence, subsequential limit and its relation with the limit of sequence.
- Define Cauchy sequence and prove that specific sequences are Cauchy.
- Define convergence of series using the Cauchy criterion and use the comparison, ratio, and root tests to show convergence of series.
- Use the Weierstrass M-Test to check for uniform convergence of series.

Type of Course: CC4  
Name of the Course: Group Theory - I

- Assess properties implied by the definitions of a group.
- Use various canonical types of groups.
- Analyze and demonstrate examples of subgroups.
- Understand the necessarily and sufficient condition for a nonempty subsets of a group to be a subgroups.
- Assess properties implied by the definitions of a group .
- Use various canonical types of groups (including cyclic groups and groups of permutations) .
- Deal with Lagrange's theorem and its application Fermat's Little theorem.
- Use the concepts of isomorphism and homomorphism for groups.
- Analyze and demonstrate examples of subgroups, normal subgroups and quotient groups.
- Will be familiar with isomorphism theorems.

Type of Course: CC5  
Name of the Course: Theory of Real Function

- Prove and use properties of limits.
- Define continuity of a function and find isolated point.
- Deals with the properties of limits of continuous functions.
- Understand the concept of bounded function and the neighborhood properties of continuous functions.

- State and prove the intermediate value property.
- Can deal with different types of discontinuity of a function.
- Define uniform continuity and check the uniform continuity of given functions.
- Give standard examples of discontinuous functions such as the Dirichlet function.
- Define connectedness and identify connected and disconnected sets.
- Define derivatives of real- and extended-real-valued functions.
- Compute derivatives using the limit
- Definition and prove basic properties of derivatives.
- Will be able to state and prove the Mean Value Theorem and Rolle's theorem with its application.
- Can determine the point of local extremum using first order derivative with geometrical interpretation.

Type of Course: CC6

Name of the Course: Ring Theory & Linear Algebra - I

- Write precise and accurate mathematical definitions of objects in ring theory.
- Use mathematical definitions to identify and construct examples and to distinguish examples from non-examples.
- Use a combination of theoretical knowledge and independent mathematical thinking to investigate questions in ring theory and to construct proofs
- Recognize the concepts of the terms span, linear independence, basis and dimension and apply these concepts to various vector spaces and subspaces.
- Analyze finite and infinite dimensional vector spaces and subspaces over a field and their properties, including the basis structure of vector spaces.
- Understand the concept of Linear transformation. Able to write the matrix representation of linear transformation.
- Compute with the characteristic polynomial, eigen vectors, eigen values and eigen spaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result.

Type of Course: CC7

Name of the Course: Ordinary Differential Equation & Multivariate Calculus - I

- Solve differential equations of first order using analytical methods.
- Solve linear differential equations of second order (and higher).
- Solve linear differential equations using the Laplace transform technique.
- Find power series solutions of differential equations.
- Understand the definition of the functions of two or more variables.
- Define open, closed and bounded sets and define cluster points.
- Define double limit and repeated limits.
- Learn continuity, partial derivatives.
- Obtain the sufficient condition for continuity.
- Define differentiability and its sufficient condition.
- State and prove Euler's theorem and its converse.

- State and prove Young's and Schwarz theorem.
- Able to write Jacobian.
- Construct Taylor Series and state Taylor's Theorem for function of two variables.
- Use of Lagrange's method of undetermined multipliers for the functions of two variables.
- Can find the extremum of functions of two variables and constraint optimization problems.

Type of Course: SEC - I  
Name of the Course: C Programming Language

- Understand the basic of computer generation with its importance.
- Understand the fundamentals of C programming.
- Choose the loops and decision making statements to solve the problem.
- Implement different Operations on arrays.
- Use functions to solve the given problem.
- Understand pointers, structures and unions.
- Able to solve various mathematical problems by C programming.

Type of Course: CC8  
Name of the Course: Riemann Integration, Improper Integral and Series of Functions

- Determine the Riemann integrability and the Riemann-Stieltjes integrability of a bounded function and prove a selection of theorems concerning integration.
- Can state and prove necessary and sufficient condition for Riemann integrability.
- Concept of negligible set will be introduced with properties.
- Relationship between negligible set and Riemann integrability will be well understood.
- Can solve algebra of Riemann integrable functions.
- Have knowledge of working with the properties of definite integral.
- Can define and prove fundamental theorem of integral calculus and Mean Value theorem of integral calculus.
- Introduce with the concepts of improper integral.
- Learn methods to evaluate different kind of improper integrals.
- Can test the convergence of improper integral by using Comparison test, M-test, Abel's test, etc.
- Can work out with Beta and Gamma functions with their relationship.
- Compute different improper integral by using Beta and Gamma functions.
- A detailed understanding of Cauchy's criterion for the convergence of real sequence and series of functions and the ability to explain the steps in standard mathematical notation.
- Knowledge of some simple techniques for testing the convergence of sequence of functions and series of functions and confidence in applying them.
- Familiarity with a variety of well-known sequence and series of functions with a developing intuition about the behavior of new ones.
- An understanding of how the elementary functions can be defined by power series with an ability to deduce some of their easier properties.
- Find the Fourier series representation of a function of one variable.

Type of Course: CC9

Name of the Course: Partial Differential Equation and Multivariate Calculus –  
II

- Be familiar with the modeling assumptions and derivations that lead to PDE.
- Recognize the major classification of PDEs and the qualitative differences between the classes of equations.
- Be competent in solving linear PDEs using classical solution methods.
- Able to find the solution of the wave, heat and Laplace equations using the Fourier series.
- Will have knowledge of Cauchy-Kowalewskaya theorem.
- Can deal with the problems having semi-infinite string with a fixed end and free end.
- Can solve the heat conduction problem.
- Compute double integrals over rectangular and circular regions in the plane and over a sector of an annulus using polar coordinates.
- Memorize the statement of the change of variables theorem for double integrals, illustrate its geometric meaning with the aid of sketches and apply it to compute integrals over different regions.
- Memorize the formulae for integration in cylindrical and spherical coordinates.
- Compute (relatively simple) triple integrals in rectangular, cylindrical and spherical coordinates.
- Memorize formulae for integrals of functions and vector fields over parameterized curves and compute such integrals.
- Provide geometric and physical explanations of the integral of a vector field over a curve.
- Explain concept of a conservative vector field
- Apply Green's Theorem, Stoke's Theorem and divergence Theorem to compute vector integrals.
- Compute curl and divergence of vector valued function.

Type of Course: CC10

Name of the Course: Mechanics

- Understand the laws of friction.
- Find the angle of friction, cone of friction, positions of equilibrium.
- Understand the principle of virtual work.
- Find the position of stable and unstable equilibrium of a body or a system of bodies.
- Find the resultant force in the forces of three dimensions.
- Summarize position, velocity and acceleration.
- Calculate uniform rectilinear motion.
- Calculate rectangular components of velocity and acceleration.
- Summarize Newton's second law of motion.
- Apply the method of work and energy to problems involving a single body or connected bodies.
- Define conservative forces, potential energy, and the principle of conservation of energy.
- Identify mechanical loss mechanisms.
- Apply the principle of conservation of energy to problems involving a single body or connected bodies.

- Define the concept of linear impulse and derive the principle of impulse and momentum.
- Apply the principle of impulse and momentum to problems of direct and oblique central impact.
- Calculate the linear momentum of a particle and the rate of change.
- Create equations of motion.
- Calculate the angular momentum of a particle and its rate of change.
- Create equations of radial and transverse components of motion.
- find the centre of gravity of known shapes.
- Define the basic terms and concepts in dynamics of rigid bodies.
- State and derive the moment of inertia of various rigid bodies which arise in practice.
- Distinguish clearly between inertia and non-inertia frames of reference and solve some pertinent dynamical problems.
- Solve various dynamical problems involving one of translation of the center of mass plus rotation about an axis through the center of mass and perpendicular to a fixed plane.
- Solve various dynamical problems involving a translation of a fixed point of the body plus rotation about an axis through the fixed point which is not necessarily restricted in direction.

Type of Course: SEC - B  
Name of the Course: Mathematical Logic

- Construct simple mathematical proofs and possess the ability to verify them.
- Have substantial experience to comprehend formal logical arguments.
- Get skill in expressing mathematical properties formally via the formal language of propositional logic and predicate logic.
- Can solve various logical problems with the algebra of mathematical logic.
- Specify and manipulate basic mathematical objects such as sets, functions, and relations and will also be able to verify simple mathematical properties that these objects possess.
- Acquire ability to describe computer programs (e.g. recursive functions) in a formal mathematical manner.
- Can predicate logic with various defined theorems viz. Deduction theorem, equivalence theorem, replacement theorem, etc.

Type of Course: CC11  
Name of the Course: Probability and Statistics

- Define and illustrate the concepts of sample space, events and compute the probability and conditional probability of events, and use Bayes' Rule.
- Define, illustrate and apply the concepts of discrete and continuous random variables, the discrete and continuous probability distributions and the joint probability distributions.
- Apply Chebyshev's theorem.
- Define, illustrate and apply the concept of the expectation to the mean, variance and covariance of random variables.
- Define, illustrate and apply certain frequently used discrete and continuous probability distributions.
- Illustrate and apply theorems concerning the distributions of functions of random variables and the moment-generating functions.
- Define and examine the random sampling (population and sample, parameters and

statistic) data displays and graphical methods with technology.

- Recognize and compute the sampling distributions, sampling distributions of means and variances ( $S^2$ ) and the t- and F-distributions.
- Understand, apply and compute in one- and two- sample estimation problems.
- Understand, apply and compute maximum likelihood estimation.
- Understand, apply and compute in one- and two- sample tests of hypotheses problems.
- Recognize the relationship between the confidence interval estimation and tests of hypothesis.
- Understand, apply and examine the goodness-of-fit test, test for independence, and homogeneity.
- Recognize the basic concepts of simple linear regression and correlation.

Type of Course: CC12

Name of the Course: Group Theory – II and Linear Algebra - II

- Understand the definition of automorphism.
- Analyze and demonstrate examples of automorphism.
- Use the concepts of automorphism.
- Will be familiar with external direct product and its properties.
- Can state and prove Lagrange's theorem, Cauchy's theorem and fundamental theorem of finite abelian groups.
- Compute inner products and determine orthogonality on vector spaces, including Gram-Schmidt orthogonalization.
- Get an idea about bilinear, quadratic forms and can solve related problems.
- Can find critical point of a function of several variables using second derivative test.
- Will be familiar with the concepts of Hessian matrix, Sylvester's law of inertia, Index and signature.
- Distinguish between characteristic polynomial and minimal polynomial of a L.T and determine its Jordan form.

Type of Course: DSE - I

Name of the Course: Advanced Algebra

- Gain the concept of group action and theorems about group actions and structure of permutation groups.
- Solve problems using the concept of group action.
- Will explore applications of group actions.
- Can state and prove generalized Cayley's theorem and Index theorem.
- Understand Sylow's theorem and its properties.
- Get an idea of Polynomial rings, EDs, PIDs, & UFDs and relations among them.
- Ability to understand a large class of commutative rings by regarding them as quotients of polynomial rings by suitable ideals.
- Competent to work with ring embedding and quotient fields.
- Understand regular rings with examples and their properties.

Type of Course: DSE - II

Name of the Course: Linear Programming

- Formulate and model a linear programming problem from a word problem and solve them graphically in 2 dimensions, while employing some convex analysis.
- Place a Primal linear programming problem into standard form and use the Simplex Method or Revised Simplex Method to solve it.
- Find the dual, and identify and interpret the solution of the Dual Problem from the final tableau of the Primal problem.
- Be able to modify a Primal Problem, and use the Fundamental Insight of Linear Programming to identify the new solution, or use the Dual Simplex Method to restore feasibility.
- Formulate and solve a number of classical linear programming problems such as the assignment problem, the transportation problem while taking advantage of the special structures of certain problems.

Type of Course: CC13

Name of the Course: Metric Space & Complex Analysis

- Able to define metric space.
- Able to understand the definitions of open ball, open set, closed set, interior point, limit point.
- Able to understand subspace, convergent sequence, Cauchy sequence, completeness.
- Will understand the beauty of Cantor's intersection theorem.
- Can prove that  $\mathbb{R}$  is complete and  $\mathbb{Q}$  is not complete.
- Concept of connectedness in terms of metric spaces with examples.
- Deals with Banach Fixed point theorem and its properties/application.
- Represent complex numbers algebraically and geometrically.
- Define and analyze limits and continuity for complex functions as well as consequences of continuity.
- Apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions including the fundamental theorem of algebra.
- Analyze sequences and series of analytic functions and types of convergence.
- Evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula.
- Can represent analytic functions as power series.

Type of Course: CC14

Name of the Course: Numerical Methods

- Will become familiar with calculation and interpretation of errors in numerical method.
- Distinguish between Absolute, Relative and percentage errors.
- Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
- Apply various interpolation methods and finite difference concepts.
- Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
- Work numerically on the ordinary differential equations using different methods through the theory of finite differences.
- Compare the ability of different approaches to the numerical solution of problems arising in roots of solution of non-linear equations, interpolation and approximation, numerical differentiation and integration, solution of linear systems, solution of ordinary differential equations, dominant eigen values and eigen pair.

Type of Course: CC14 Practical  
Name of the Course: Numerical Methods Lab

- Will be competent to write programme using C/C++/FORTRAN 90
- Can write all numerical method in programming language.
- Can check the validity of the numerical method by running programme.
- Can write and run c-programme for root finding method.
- Can write and run c-programme for various interpolation method for finding the value of unknown argument.
- Can write and run c-programme for numerical integration.
- Can write and run c-programme for finding Eigen value by power method.
- Can write and run c-programme for fitting polynomial function.
- Can write and run c-programme for finding solution of ordinary differential equations using different method.

Type of Course: DSE - 3  
Name of the Course: Fluid Statics & Elementary Fluid Dynamics

- Know the definitions of fundamental concepts of fluid including: continuum, viscosity, surface tension, pressure, compressibility and incompressibility.
- Solve hydrostatic problems.
- Calculate the pressure distribution for incompressible fluids.
- Calculate the hydrostatic pressure and force on plane and curved surfaces
- Apply the basic equation of fluid statics to determine forces on planar and curved surfaces that are submerged in a static fluid to the determination of buoyancy and stability.
- Use of conservation laws in integral form and apply them to determine forces and moments on surfaces.
- Use of conservation laws in differential forms and apply them to determine velocities, pressures and acceleration in a moving fluid.
- Apply concepts of mass, momentum and energy conservation to flows.
- Apply the equation of the conservation of mass.
- Apply the equation of the conservation of momentum.
- Apply the equation of the conservation of energy.



Type of Course: DSE - 3  
Name of the Course: Point Set Topology

- Define Topological spaces.
- Get an idea of basis and subbasis for a topology.
- Obtain the concept of interior points, open sets, limit points, derived set, boundary of a set, closed sets, closure and interior of a set and dense subsets.
- Gain knowledge of product topological, Continuity, separation axioms, Connectedness, compactness and metric space reviews.
- Distinguishing spaces up to homeomorphisms.
- Understanding of topological spaces and having a grasp on basic results.
- Understand different separation axioms of topological spaces.
- Will have clear concept of Heine' continuity criterion.
- Will deal with connected spaces, compact spaces, Heine-Borel theorem.
- Understand the compactness properties of metric space.

### Program Specific Outcome: Economics (Honours)

Program Structure  
(followed in our college)

- 3 year honours (hons.) programme.
- Economics is the main subject in which the students will specialize in.
- Along with Economics the students have to study 4 other subsidiary subjects. The subsidiary subjects offered in K.K.Das College with Economics (Hons.) are Mathematics, Statistics, Computer Science, Sociology (pass paper; students are required to choose any two) and Compulsory Bengali/English and ENVS.

#### Program Specific Outcome

- Economics (Honours) students in general will be able to pinpoint and understand the past, present economic conditions of the country. They will also be able to forecast the future course of changes and development through their knowledge of policies and programmes set by the governments and other development agencies. They are equipped with the techniques to find solution of the problems like mobilization of manpower and materials available in the country.
- As the Under Graduate Course (UGC) contains the fields like statistics, mathematics and economics principles, it enhances them to compute and assess the real situation of the economy including the size and changes of population, income pattern, nature of an extend of employment, rate of development with pattern of investments and savings, policies in relation to other countries, and social security measures adopted in the country.
- Basically, economic graduates are familiar with the knowledge and application of microeconomics and macroeconomics for the formulation of policies and planning. They are equipped with all the relevant tools/ knowledge based on economic principles including market functions and structures, efficiency in manpower and resources management, need of credit/finance for initiating and accelerating projects.
- Students will learn techniques to collect and disseminate information like primary and secondary data, preparation of questionnaire. Students are deployed to do survey and on

the spot interaction with the personnel of the case under study. Students who graduated from this institution are directly involved and effectively participate in the discussions and final presentation of the findings of the projects undertaken.

- An economics degree will boost the student's employability in many areas in India. Careers in economics are as diverse as they come, with job roles covering everything from food and agriculture to business and banking. Depending on the student's area of interest, an economics degree will help them to develop specialized analytical skills, enabling one to successfully enter multiple industries as a professional economist, or as another type of professional with an eye for economics. Common career paths for economics graduates include: Economist, Financial risk analyst, Data analyst, Financial planner, Accountant, Economic researcher, Financial consultant, Investment analyst and Teacher in private and public sectors.
- One can also choose to pursue higher studies completing Masters Courses and further opt for research.

<b>Semester I</b>	
Type of Course: CC1	
Name of Course: Introductory Microeconomics	
Course Content	Course Outcome
<p><b>Unit 1: Exploring the subject matter of Economics</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• To study Scope and Method of Economics</li> <li>• Understanding the Principles of Microeconomics</li> <li>• Explaining Interdependence and the Gains from Trade</li> <li>• Learning Reading and working with graphs</li> </ul>	<ul style="list-style-type: none"> <li>• Students will learn concepts like wants, scarcity, competing ends and choice – which are basics to define Economics. Students will learn to answer basic economic questions involving microeconomics and macroeconomics.</li> <li>• Students shall gain knowledge on principles of individual decision making and principles of economic interactions. Using concepts of trade off, opportunity cost, efficiency, marginal changes and cost-benefit they shall be able to explain how trade, market economy, property rights, market failure, externality and market power occurs</li> <li>• With the help of production possibilities frontier and increasing costs concepts basis of why trade occurs and gains from trade can be understood</li> <li>• Reading and working with graphs will make the course matter easy to understand</li> </ul>
<b>Unit 2: Demand and Supply: How</b>	<ul style="list-style-type: none"> <li>• Students shall learn the determinants of</li> </ul>

<p><b>Markets Work</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>● Understanding the elementary theory of demand and supply</li> <li>● Knowing how market prices for goods are determined</li> <li>● Learning how market adjustments take place without Government</li> </ul>	<p>household and market demand – when and how the changes in such demand takes place</p> <ul style="list-style-type: none"> <li>● Clarity shall be gained on factors affecting supply and their role in influencing individual and market supply</li> <li>● Knowledge of demand and supply conditions in an economy the students shall be able to know how equilibrium prices in a competitive market is determined</li> <li>● The above stated knowledge shall in turn help the students to know how to allocate economy’s scarce recourses</li> </ul>
<p><b>Unit 3: Market and Adjustments</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>● Understanding how market economies evolved and works</li> </ul>	<ul style="list-style-type: none"> <li>● In this unit students shall learn how guided by self-interest of economic agents goods and services are bought and sold in a market through the price system</li> <li>● Insights on how different markets operate are also gained</li> <li>● Students will learn to distinguish between market competitiveness, goods and factor markets, free and controlled markets, Market and non-market sectors, public and private sectors, economies- free market, command and mixed economy</li> <li>● Role and need of government intervention is also introduced in this unit in gist</li> </ul>
<p><b>Unit 4: Market Sensitivity and Elasticity</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>● Learning the concept of elasticity; its methods of calculations</li> <li>● Knowing the determinants of elasticity</li> <li>● Evaluating its importance through case studies</li> </ul>	<ul style="list-style-type: none"> <li>● This unit will help the students to understand the driving force behind formulation of government policies, factor price determinations and how business firms make decisions regarding prices and amount of goods and services to be produced</li> <li>● Applying the concept to real life economic situations shall improve the understanding of the students</li> </ul>

<p><b>Unit 5: Government Intervention</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning The Economic Role of Government with respect to Market</li> <li>• Knowing the Comparison of markets with and without government</li> </ul>	<ul style="list-style-type: none"> <li>• This section shall elucidate the role of government in a market economy</li> <li>• It shall help one to understand why the government needs to administer agricultural prices, impose rent controls and minimum wage laws</li> <li>• The students shall get a brief idea on why black markets exist, role of government in controlling them</li> <li>• Comparison of markets with and without government shall clear the understanding on working of the economy</li> </ul>
<p><b>Unit 6: Utilitarian Approach</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning the cardinal utility approach</li> <li>• Learning to derive the consumer's demand from cardinal utility theory</li> <li>• Knowing the limitations of this theory</li> <li>• Knowing the neo-classical theory of consumer's preference</li> <li>• Learning to construct consumer's utility function from preference ordering</li> <li>• Knowing the concept of affordability</li> <li>• Understanding consumer's choice problem</li> <li>• Learning to derive consumer's demand from ordinal approach of utility theory</li> </ul>	<ul style="list-style-type: none"> <li>• This section first try to make students understand that how consumer's utility is measured in terms of money</li> <li>• It then tries to make an elaboration of consumers demand and hence an understanding of consumer's preference and choice</li> <li>• However, as this theory works under very restrictive conditions, hence students are then elaborated with the ordinal utility theory</li> <li>• This is helpful for the students to understand the logical reversal of the neo-classical theory – from preference to utility – as opposed to the cardinal utility theory – from utility to preference</li> <li>• With the help of consumer's preference ordering and the budget constraint that consumer faces, students can get an intuitive idea of how an economic agent's (consumer) psyche actually functions in an market driven structure</li> <li>• From the equilibrium of the consumer, students might get an idea of consumer's choice problem when given with a number of bundles of commodities</li> <li>• Intuitively the ideas of bargaining-agreement-contract can be understood by the students</li> <li>• Through the mathematical and diagrammatic techniques students can formally elaborate their intuitions</li> </ul>
<p><b>CC1 Outcome:</b> This course is an introductory course on Microeconomics. One shall study how individuals and the government make decision, in rudiment. The course will provide a useful tool to explain how efficient allocation of resources can be achieved. One shall also know the need for government intervention.</p>	

<b>Semester I</b>	
Type of Course: CC2	
Name of Course: Mathematical Methods in Economics-I	
Course Content	Course Outcome
<p><b>Unit 1: Preliminaries</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning about Sets and set operations</li> <li>• Number systems</li> <li>• Convex sets; convex functions, their characterizations, properties and applications;</li> <li>• Quasi-convex functions</li> <li>• Limit and continuity</li> </ul>	<p>This unit shall enable the students to learn about</p> <ul style="list-style-type: none"> <li>• Functions and their properties</li> <li>• Geometric properties of functions: convex functions, their characterizations, properties and applications</li> <li>• Quasi-convex functions, their characterizations, properties and applications</li> <li>• Theorems with proof along with the concept of first principle</li> <li>• Using the concept of continuity</li> </ul>
<p><b>Unit 2: Functions of one real variable</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Continuous functions of different types and their graphs</li> <li>• Concept of derivatives</li> <li>• Application in economics - concept of marginal, Concept of elasticity, Concept of average function</li> </ul>	<p>This unit shall help the students to learn about</p> <ul style="list-style-type: none"> <li>• Various types of functions like quadratic, polynomial, power, exponential, and logarithmic</li> <li>• The limit of a function at a point numerically and algebraically using appropriate techniques including L'Hospital's rule</li> <li>• Graphical meaning of derivatives - sketch the graph of the derivative from the given graph of a function</li> <li>• Derivatives of first and second order and their properties - interpret the derivative of a function at a point as the slope</li> <li>• Convex, concave and linear function</li> <li>• Concept of average and marginal function</li> <li>• Concept of elasticity</li> </ul>
<p><b>Unit 3: Single variable optimization</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Local and global optima</li> <li>• Interpretation of necessary and</li> </ul>	<p>In this unit, the students shall learn about</p> <ul style="list-style-type: none"> <li>• Geometric characterizations, characterizations using calculus</li> <li>• Significance of first and second order</li> </ul>

<p>sufficient conditions with examples</p> <ul style="list-style-type: none"> <li>• Applications in Economics - profit maximization and cost minimization</li> </ul>	<p>conditions</p> <ul style="list-style-type: none"> <li>• Interpretation of necessary and sufficient conditions with examples</li> <li>• Applications in Economics- profit maximization and cost minimization</li> </ul>
<p><b>Unit 4: Integration of functions</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Integration of different types of functions</li> <li>• Methods of Substitution and integration by parts</li> <li>• Applications in economics - obtaining total from the marginal</li> </ul>	<ul style="list-style-type: none"> <li>• On completing the course, students can now evaluate a definite integral using properties of definite integrals</li> <li>• Using the Fundamental Theorem of Calculus the students will be able to find the area under a curve, as used to interpret different economic activities</li> </ul>
<p><b>Unit 5: Matrix Algebra</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• To study the elementary operations and different types of matrix.</li> <li>• To understand the concepts of Determinants and inverse of a square matrix.</li> <li>• To learn the concept of comparative statics</li> </ul>	<ul style="list-style-type: none"> <li>• A proper completion of this course shall make the students able to learn how to calculate the Rank of matrix and also to calculate the inverse of a square matrix</li> <li>• This course helps to solve the system of linear equations by applying Cramer's rule; and System of nonlinear equations by using Jacobian determinant</li> <li>• The students become capable enough to apply Matrix Algebra in input-output analysis-the Leontief Static Open Model (LSOM) and the Hawkins-Simon conditions and explain the interdependence of the two industries in a economy, easily, through input-output matrix operations</li> </ul>
<p><b>Unit 6: Game Theory</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• To get a clear concept of a game, strategies and payoffs</li> <li>• To understand the Zero-sum games and learn to solve them</li> <li>• To learn Dominant Strategy Equilibrium and Nash equilibrium</li> </ul>	<ul style="list-style-type: none"> <li>• A successful completion of the course shall make the students able to distinguish between a game situation from a pure individual's decision problem</li> <li>• Students should be able to solve a game and arrive at the optimal strategy and value of game by using, i) dominance principle, ii) maxi-min criteria, iii) randomization principle</li> <li>• Students now have a clear idea about a pure strategy and mixed strategy equilibrium</li> <li>• From the concept of Nash equilibrium student are now efficient enough to solve some common games like – Prisoners' Dilemma, Battle of Sexes,</li> </ul>

	Matching Pennies
<p><b>CC2 Outcome:</b> This course is a preliminary course in Mathematical Methods in Economics. This course intends to equip the students about set theory, types of functions and their properties and graphical representation. They will also get an idea about derivatives, single variable optimization and their economic applications. Students also learn the elementary operations of matrix algebra and apply different methods to solve linear and non-linear equation. Game theory makes the students use the strategic behaviors in solving certain common games.</p>	

<b>Semester II</b>	
Type of Course: CC3	
Name of Course: Introductory Macroeconomics	
Course Content	Course Outcome
<p><b>Unit 1: National Income Accounting</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Knowing the basic concept of National Income Accounting</li> <li>• Understanding the concepts of different measures of National Income in market price and factor cost</li> <li>• Knowing the methods of national income accounting</li> <li>• An overview of India's national income</li> </ul>	<ul style="list-style-type: none"> <li>• From this unit, first of all, students might get a theoretical idea of how the macroeconomy functions in a closed economy and how the national income of that economy can be determined</li> <li>• Along with this, students can also get a clear understanding of how the national income measure can be adjusted for inflation</li> <li>• This unit tries to provide the understanding of different methods of measuring national income, their associated problems and the techniques that are being followed to avoid those problems</li> <li>• It provides the basis of understanding the income determination model in the short run</li> </ul>
<p><b>Unit 2: Income Determination in the Short Run (Part I): The Simple Keynesian Model in a Closed Economy</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Knowing the basic framework of demand side analysis of an economy</li> <li>• Understanding the income determination in the short run</li> <li>• Providing an idea of Keynesian consumption function, saving function and investment function</li> <li>• Understanding the importance of fiscal policy through multiplier analysis</li> </ul>	<ul style="list-style-type: none"> <li>• This unit fundamentally provides an idea of Keynesianism – a structuralist understanding of the economy</li> <li>• From the Keynesian cross model students might get a clear idea of functioning of the economy in a depression situation</li> <li>• It is to make students understand that the depression can be do away with a expansionary fiscal policy that generates a multiplier effect on the national income by expanding the effective demand – the demand side argument</li> <li>• Students might get an understanding of Keynesian consumption function, saving function (structuralist) and investment function (humanist) from this unit</li> </ul>

	<ul style="list-style-type: none"> <li>• Other associated problems such as paradox of thrift is described and analysed to provide the students a clear idea of the demand side argument of Keynes</li> <li>• This unit also analyses the different kind of multipliers that a government can follow in order to stabilize the economy</li> <li>• This unit, thereby, tries to make students understand the role of government intervention in an economy as opposed to laissez-faire policy</li> </ul>
<p><b>Unit 3: The Classical System</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Knowing the basic idea of supply side analysis of the market economy</li> <li>• Understanding the output and employment determination in the classical system – full employment output determination when wages and prices are flexible</li> <li>• Explaining the dichotomy between real sector and monetary sector and hence ineffectiveness of monetary policy</li> </ul>	<ul style="list-style-type: none"> <li>• The quantity theory of money and Say’s tries to make students understand the supply side argument of functioning of market</li> <li>• It explains how full employment and output are determined in the long run when wages and prices are flexible</li> <li>• Through the analysis of classical dichotomy students might get a clear idea of the methodological individualist advocacy of laissez-faire policy</li> </ul>
<p><b>Unit 4: Macroeconomic Foundations - I</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Knowing the concept of bond market and money market</li> <li>• Determination of rate of interest – Keynesian Liquidity Preference</li> <li>• Learning the Theory of Investment</li> </ul>	<ul style="list-style-type: none"> <li>• This unit shall clear the student’s understanding on how market rate of interest is determined and its impact on the economic activity of a country</li> <li>• The Keynesian Theory of Liquidity Preference shall help one to understand the role of money in determining the rate of interest</li> <li>• The students will form an idea on influence of monetary authority on market rate of interest</li> <li>• Investment expenditure plays a key role in theories of business cycle. This unit will help the students to understand the main determinants of investment. One shall get profound knowledge on rate of interest as the main determinant of investment</li> </ul>
<p><b>CC3 Outcome:</b> This course is an introductory course on Macroeconomics. Students will be introduced to concepts essential to study the behavior of the aggregate economy. One will understand how an economy works.</p>	
<p><b>Semester II</b></p>	
<p>Type of Course: CC4</p> <p>Name of Course: Mathematical Methods in Economics-II</p>	



Course Content	Course Outcome
<p><b>Unit 1: Function of several variables</b></p> <p>Objectives</p> <ul style="list-style-type: none"> <li>• Continuous and differentiable functions</li> <li>• Euler's theorem, implicit function theorem (without proof)</li> <li>• Economic applications</li> </ul>	<p>The students will be equipped to handle:</p> <ul style="list-style-type: none"> <li>• Partial derivatives and Hessian matrix</li> <li>• Homogeneous and homothetic functions</li> <li>• Application to comparative statics problems</li> <li>• The idea of level curves, theories of consumer behaviour and theory of production</li> </ul>
<p><b>Unit 2: Multi-variable optimization</b></p> <p>Objectives</p> <ul style="list-style-type: none"> <li>• Optimization of nonlinear functions</li> <li>• Unconstrained optimization</li> <li>• Constrained optimization with equality constraints</li> <li>• Inequality constraints</li> <li>• Value function and Envelope theorem</li> <li>• Economic applications – consumer behaviour and theory of production.</li> <li>• Optimization of linear function:</li> <li>• Economic Applications of Linear programming</li> </ul>	<p>After the completion of this unit, students would have known the following concepts:</p> <ul style="list-style-type: none"> <li>• Unconstrained optimization</li> <li>• Lagrangian multiplier method and the role of Hessian determinant</li> <li>• Kuhn-Tucker Conditions</li> <li>• Economic applications – consumer behaviour and theory of production</li> <li>• Linear programming - how to develop linear programming models for simple problems, graphical solution of a two variable linear programming model, importance of extreme points</li> <li>• Know the use and interpretation of the concepts of slack and surplus variables (graphical solution only), describe the process of decision making</li> <li>• The Duality Theorem</li> </ul>
<p><b>Unit 3: Difference Equations</b></p> <p>Objectives</p> <ul style="list-style-type: none"> <li>• Finite difference equations</li> <li>• Application in Economics</li> </ul>	<p>In this section, the students will learn about:</p> <ul style="list-style-type: none"> <li>• Equations of first and 2nd orders and their solutions</li> <li>• Cobweb model, Multiplier-Accelerator model</li> </ul>
<p><b>Unit 4: Differential Equations</b></p> <p>Objectives</p> <ul style="list-style-type: none"> <li>• Differential equations</li> <li>• Economic Application</li> <li>• Economic application-</li> <li>• Qualitative graphic solution to 2x2 linear simultaneous non-linear differential equation system</li> </ul>	<p>After the completion of this unit, students will know:</p> <ul style="list-style-type: none"> <li>• Solution of Differential equations of first order and second order of linear differential equations and the meaning of the solution</li> <li>• Price dynamics in a single market-multimarket supply demand model with two independent markets</li> <li>• Phase diagram, fixed point and stability</li> </ul>

	<ul style="list-style-type: none"> <li>Economic applications in microeconomics and macroeconomics</li> </ul>
<p><b>CC4 Outcome:</b> This course is a continuation of CC2 - Mathematical Methods in Economics. In this course the students will further get an idea about functions of several variables, constrained and unconstrained optimizations and their application in Economics. They will be equipped to solve first and second order difference and differential equations and their economic applications.</p>	
<h3>Semester III</h3>	
<p>Type of Course: CC5</p> <p>Name of Course: Intermediate Microeconomics –I</p>	
Course Content	Course Outcome
<p><b>Unit 1: Theories of Consumer Behaviour and Applications</b></p> <ul style="list-style-type: none"> <li>Inter-temporal choice (saving and borrowing)</li> <li>Revealed preference</li> <li>Choice under uncertainty – utility function and expected utility, risk aversion and risk preference</li> <li>Applications of Consumer Behaviour in Construction of Price Indices – Laspeyres and Paasche's</li> </ul>	<p>17 lecture hours</p> <ul style="list-style-type: none"> <li>In this course students learn to apply the elementary theories and mathematical operations they have learnt in their previous semesters</li> <li>This course makes the students deal with more realistic problems of consumer's decision making problem regarding their spending habits: today or in future. Also various investment decisions involve intertemporal choice, which the students are now well equipped to deal with</li> <li>Revealed preference theory gives the students a scientific explanation to use the behavioural method in order to derive the demand theorem and establish the law of demand</li> <li>Students also get the concept of lottery and what risk means. Thus they are now able to select among different lotteries according to their preferences.</li> </ul>
<p><b>Unit 2: Technology</b></p> <ul style="list-style-type: none"> <li>General concept of Production Function - Production with one and two variable inputs</li> <li>Cost structure</li> </ul>	<p>The students will be equipped to handle:</p> <ul style="list-style-type: none"> <li>Define the term "production" and explain what a production function is; define the term "production inputs," and differentiate between labor, land, capital, entrepreneurship, technology</li> <li>Define and differentiate between marginal, average, and total product; compute and graph marginal, average, and total product; explain diminishing marginal product and diminishing marginal returns</li> <li>Isoquants and marginal rate of technical substitution</li> </ul>

	<ul style="list-style-type: none"> <li>• Isocost line and firm's equilibrium elasticity of substitution</li> <li>• Types of production functions - Cobb-Douglas, fixed-coefficient and CES functions</li> <li>• Differentiate between Explicit and Implicit Costs, Accounting and Economic Profit</li> <li>• Identify sunk costs</li> <li>• Define and differentiate between marginal, average, and total cost; compute and graph marginal, average, and total cost; differentiate between variable and fixed costs</li> <li>• Differentiate between short-run and long-run costs; interpret the relationship between short-run and long-run costs</li> <li>• Calculate and graph the firm's fixed, variable, average, marginal and total costs;</li> <li>• Define and explain long-run costs, economies of scale, diseconomies of scale, and constant returns to scale</li> <li>• Cost minimization and expansion path, economies of scale</li> </ul>
<p><b>Unit 3: The Firm and Perfect Market Structure</b></p> <ul style="list-style-type: none"> <li>• Define the characteristics of Perfect Competition</li> <li>• Revenue</li> <li>• Equilibrium</li> <li>• Understand why perfectly competitive markets are efficient</li> </ul>	<p>In this section, the students will learn the following concepts:</p> <ul style="list-style-type: none"> <li>• Understand the difference between the firm and the industry; explain and illustrate the differences between the demand curve for a perfectly competitive firm and that for a perfectly competitive industry</li> <li>• Calculate and graph the firm's average, marginal and total revenues; determine the profit maximizing output level and price using graphs and demand schedules; calculate and graphically illustrate where marginal revenue equals marginal costs</li> <li>• Calculate and graphically illustrate profit and losses for a perfectly competitive firm</li> <li>• Determine the break-even, and the shutdown points of production for a perfectly competitive firm</li> </ul>

	<ul style="list-style-type: none"> <li>• Short run and long run supply curve</li> <li>• Explain the difference between short-run and long-run equilibrium; explain the concept of “zero economic profit”</li> <li>• Consumer and Producer surplus, welfare and efficiency of competitive equilibrium. Government intervention and dead weight loss, Application- Minimum prices and price supports (price ceiling and price floors)</li> </ul>
<b>Unit 4: Input Market in Perfect Competition</b> <ul style="list-style-type: none"> <li>• Basic concepts</li> <li>• Labour market</li> <li>• Land market</li> </ul>	<ul style="list-style-type: none"> <li>• Derived demand, productivity of an input, marginal product of an input, marginal revenue product</li> <li>• Marginal productivity theory of distribution</li> <li>• Labor market-supply of labor, competitive labor markets</li> <li>• Land markets and rent</li> </ul>

**CC5 Outcome:** This course mainly allows the students to apply the theoretical concepts of consumer behavior they have learnt in their previous semesters. They will learn to explain how consumer behavior shapes the demand curve with respect to utility and loss, analyze the relationship between inputs used in production and the resulting outputs and costs and assess how resource markets/factors of production work under perfect competition.

### Semester III

Type of Course: CC6

Name of Course: Intermediate Macroeconomics –I

Course Content	Course Outcome
<b>Unit 1: Income Determination in Short Run (Part II): The IS-LM Model</b> Objectives: <ul style="list-style-type: none"> <li>• Knowing the simultaneous equilibrium in commodity market and money market</li> <li>• Understanding the stability of the equilibrium and the crowding out effect</li> <li>• Understanding the idea of policy effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>• On the basis of the understanding of the Simple Keynesian system in the previous semester, here, in this section, the money market is brought in to discussion along with the commodity market which might provide the students more clarity in understanding the phenomenon of short run equilibrium income determination</li> <li>• This section deals with money market and commodity market simultaneously and thereby explains the simultaneous equilibrium of these markets and the stability of the equilibrium</li> <li>• The analyses of the multipliers and different shapes of the IS and LM curves in this system might give the students the idea of policy effectiveness – both fiscal and monetary policies – in different situations</li> <li>• However, this unit shows the students</li> </ul>

	<p>how monetary policy affects short run equilibrium income as opposed to the classical analysis of neutrality of money</p>
<p><b>Unit 2: Aggregate Demand and Aggregate Supply – the Complete Keynesian Model</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning to derive aggregate demand and aggregate supply curves in complete Keynesian system</li> <li>• Understanding the simultaneous equilibrium in the economy in short run and its stability</li> <li>• Knowing the fiscal and monetary policy effectiveness.</li> <li>• Getting an idea of unemployment equilibrium, its causes and remedies including the real balance effect</li> </ul>	<ul style="list-style-type: none"> <li>• In this section we bring labour market in the discussion of Keynesian system and try to make students learn to derive the aggregate demand and supply curve in the short run</li> <li>• From the analysis of aggregate demand and supply curves students might get a clear idea of the macroeconomic equilibrium in the short run and how stable it is</li> <li>• It is aimed to provide students a clear idea of fiscal and monetary policy effectiveness in this system</li> <li>• In the end, this section tries to analyse the reasons behind unemployment equilibrium and how this can be overcome, with special reference to real balance effect</li> </ul>
<p><b>Unit 3: Keynes vs. Classics</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Understanding the Keynesian system vis-à-vis the Classical system</li> <li>• Learning some hybrid models under Classical and Keynesian framework</li> <li>• Knowing Friedman’s restatement of Classical ideas</li> </ul>	<ul style="list-style-type: none"> <li>• This section first tries to make a comparative analysis Keynesian system vis-à-vis the Classical system to make students understand the methodological, analytical and philosophical differences between these two frameworks</li> <li>• Through the elaboration of some hybrid models students might get an idea of incorporating classical arguments in Keynesian framework and Keynesian arguments in classical framework</li> <li>• In the end of this section, it will be tried to provide students with the idea of Friedman’s restatement of the classical system which makes classical economics stronger to defend the Keynesian attack</li> </ul>
<p><b>Unit 4: Money Supply, Monetary Policy and Government Budgetary Operations</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Knowing the measures of money supply with special reference to India</li> <li>• Learning the importance of money supply in stimulating the economy</li> <li>• Learning the monetary policy operations of the Central bank</li> <li>• Understanding the budgetary operations of the Government</li> </ul>	<ul style="list-style-type: none"> <li>• From this unit one shall get insights on concept of money supply and its role in stimulating economic activities</li> <li>• Concepts of multipliers in the context of theory of money supply shall help the students to measure the maximum amount of money that can be created by various financial institutions</li> <li>• The balance sheet view of the banking sector and the RBI shall clear their understanding on the workings of the institutions</li> <li>• Knowledge on conduct of monetary policy will help the students to know the function of RBI in fostering economic</li> </ul>

	<p>growth</p> <ul style="list-style-type: none"> <li>• Conceptions on budget deficits, its causes and its impacts shall facilitate the students in understanding the working of the government</li> </ul>
<p><b>Unit 5: Inflation, Unemployment and Expectations</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• To study the concept of inflation, its causes, its impact</li> <li>• Learning Central Bank's role in controlling inflation</li> <li>• Knowing the need to control inflation</li> </ul>	<ul style="list-style-type: none"> <li>• This unit shall help the students to understand why prices of goods and services vary over time and across countries</li> <li>• The theories on inflation shall illustrate the meaning of inflation, deflation, stagflation and reflation, identify different kinds of inflation, causes and effects of inflation on different sectors of the economy, and describe different measures to control inflation</li> <li>• The students will also learn why and how RBI intervenes in controlling inflation</li> </ul>
<p><b>CC6 Outcome:</b> In this course you will learn major principles of macroeconomics. Students will get to learn core macroeconomic models.</p>	

<b>Semester III</b>	
Type of Course: CC7	
Name of Course: Statistical Methods for Economics	
Course Content	Course Outcome
<p><b>Unit 1: Introduction and Overview</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Knowing the subject matter of statistics</li> <li>• Representation of data</li> </ul>	<ul style="list-style-type: none"> <li>• This section shall give you an overview on the subject matter of economics</li> <li>• You will learn how to represent statistical information in graphical and tabular form</li> </ul>
<p><b>Unit 2: Descriptive Statistics</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning measures of descriptive statistics <ul style="list-style-type: none"> <li>- Measures of Central Tendency (Mean, Median, Mode)</li> <li>- Measures of Dispersion (Absolute and relative measures)</li> <li>- Moments, Skewness and Kurtosis</li> </ul> </li> <li>• Learning correlation and regression</li> </ul>	<ul style="list-style-type: none"> <li>• In this unit you shall learn various measures of descriptive statistics</li> <li>• Descriptive statistics will assist you to quantitatively describe the main features of a collection of information, called data. It will enable you to present the data in a more meaningful way, which allows simpler interpretation of the data</li> </ul>
<p><b>Unit 3: Elementary Probability Theory</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Sample spaces and events (concepts and definitions using set theory)</li> <li>• Axiomatic definition of probability and properties, theorem of total probability</li> </ul>	<ul style="list-style-type: none"> <li>• Because data used in statistical analyses often involves some amount of "chance" or random variation, understanding probability helps you to understand statistics and how to apply it</li> <li>• Its application in economic theories</li> </ul>

<ul style="list-style-type: none"> <li>• Conditional probability, theorem of compound probability</li> <li>• Bayes' theorem and its applications</li> </ul>	will help you to explain economic situations that you often come across in newspaper
<p><b>Unit 4: Probability Distributions</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning – Random Variables <ul style="list-style-type: none"> <li>- Probability Distributions (Binomial, Poisson and Normal)</li> <li>- Expected Value of Random Variables</li> <li>- Joint Distribution functions of random variables</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• In economics, we do not deal with homogeneous cases. Human action and economic actions cannot be analyzed in the same way that one would analyze objects. To make sense of an historical data one must scrutinize it not by means of statistical methods but by means of trying to grasp and understand how it emerged. The knowledge on probability distributions will help you to understand economic situations well</li> </ul>
<p><b>Unit 5: Sampling</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning - Principal steps in a sample survey (concepts of population, sample, parameter, statistic) <ul style="list-style-type: none"> <li>- Methods of sampling</li> <li>- Sampling distribution of sample mean and sample proportion</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• In this unit you will learn methods of sampling from within a statistical population to estimate characteristics of the whole population. Economists attempt for the samples to represent the population in question. Two advantages of sampling are lower cost and faster data collection than measuring the entire population</li> </ul>
<p><b>Unit 6: Statistical inference</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning methods of statistical inference <ul style="list-style-type: none"> <li>- Point and Interval Estimation</li> <li>- Basic principles of ordinary least squares, maximum likelihood and method of moments</li> <li>- Testing of Hypothesis</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• This unit will help you to interpret economic situations precisely</li> <li>• With techniques of hypothesis testing you shall be able to refute or accept economic theories for real life data</li> </ul>
<p><b>CC7 Outcome:</b> Statistics play a vital role in every field of human activity. In particular, they are quantitative tools widely used in the areas of economics and finance. Knowledge of modern probability and statistics is essential for the development of economic and finance theories and for the testing of their validity through robust analysis of real-world data. For example, probability and statistics could help to shape effective monetary and fiscal policies and to develop pricing models for financial assets such as equities, bonds, currencies, and derivative securities.</p>	

<b>Semester III</b>	
Type of Course: SEC I	
Name of Course: Skill Enhancement Course I	
<b>Course Content</b>	<b>Course Outcome</b>
<p style="text-align: center;"><b>(A) Data Analysis</b></p> <p>Objective:</p>	<ul style="list-style-type: none"> <li>• The data analysis unit will help improve your analytical skills</li> </ul>

<ul style="list-style-type: none"> <li>• One shall learn: Collection and representation of data <ul style="list-style-type: none"> <li>- Methodology of collection of Indian official statistics</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• This unit shall facilitate you to apply the theories of statistics learnt in practice</li> <li>• The knowledge of statistical packages like STATA/E-Views/R shall help you in management of data</li> <li>• You shall gather profound knowledge on how Indian official statistics offices (CSO, NSSO, RBI) collect and disseminate data on important economic variables like GNP, GDP, Price, Monetary aggregates, Consumer Expenditure, Employment and unemployment, Census, etc.</li> </ul>
<p style="text-align: center;"><b>(B) Rural Development</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• Students shall learn: - Aspects of Rural Development <ul style="list-style-type: none"> <li>- Development of Panchayats and rural areas</li> <li>- Working of self help groups and rural credit</li> </ul> </li> <li>• Critically evaluate selected government programmes and rural development</li> </ul>	<ul style="list-style-type: none"> <li>• This unit will help you to understand the aspects of rural development. You will get to learn what is rural development, its nexus with agricultural development, role of NGOs in rural development</li> <li>• You shall know the reason for decentralized planning in India and the role of panchayats in rural development with special reference to West Bengal</li> <li>• You will be able to discern the necessity of rural credit and role of grameen banks and self-help groups in necessitating the availability of rural credit</li> <li>• You shall be able to critically evaluate various government programmes (MNREGA, Mid-day meal, NRHM, etc.) undertaken to facilitate rural development</li> </ul>
<p><b>SEC I Outcome:</b> The course content of SEC I will facilitate the students to understand and interpret economic situations analytically. It will help in practical analysis of economic theories. Students will get to learn the working of the government and various government statistical organizations. It will help them to understand how theories are applied in practice.</p>	

<b>Semester IV</b>	
Type of Course: CC8	
Name of Course: Intermediate Microeconomics II	
<b>Course Content</b>	<b>Course Outcome</b>
<p><b>Unit 1: Imperfect Market Structure</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• To study the Monopoly market</li> </ul>	<ul style="list-style-type: none"> <li>• On successfully completing the course students will be able to distinguish between a perfectly competitive market situation from the set of imperfect</li> </ul>



<p>structure, output determination and price rule</p> <ul style="list-style-type: none"> <li>• To learn how to measure and locate the sources of monopoly power and also to get an idea of social costs of monopoly power-deadweight loss</li> <li>• Study the mechanism of pricing with market power- first, second and third degree price discrimination, multiplant monopoly</li> <li>• To study Monopolistic competition</li> <li>• To study Oligopoly market and solve Oligopoly equilibrium as Nash equilibrium</li> <li>• To use isoprofit curves and simple game theoretic interpretation</li> <li>• Study Sweezy's kinked demand curve model and non-collusive equilibrium</li> <li>• Students will also learn the concept of competition versus collusion. the Prisoners' Dilemma. Collusive Oligopoly –Cartels and Price Leadership</li> </ul>	<p>market structures</p> <ul style="list-style-type: none"> <li>• On studying the pricing with market power students can apply such concepts in daily life and also solve different types of real life pricing problems</li> <li>• Studying the monopolistically competitive market structure students will be able to arrive at the short run and long run equilibrium, using the concept of the two sets of demand curves, proportional and perceived. Students also now have a clear idea of excess capacity in the market</li> <li>• As the students have already studied game theory in the semester I in their CC2 course it will be an area to apply the theory in order to solve the different oligopolistic models like Cournot, Bertrand and Stackelberg Model. They also apply the concept of game theory in the concept of collusion and competition</li> </ul>
<p><b>Unit 2: Input market under Imperfect Competition</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• To learn about other market forms</li> </ul>	<ul style="list-style-type: none"> <li>• To learn how labour market works under Monopsony, bilateral monopoly</li> </ul>
<p><b>Unit 3: General Equilibrium, Efficiency and Welfare</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• To understand the concepts of General equilibrium and efficiencies</li> <li>• To know about market failure</li> <li>• To get an idea about asymmetric information</li> </ul>	<p>The students will get an idea about</p> <ul style="list-style-type: none"> <li>• Exchange, production and welfare, Pareto Optimality, Edgeworth box and contract curve, Pareto efficiency and perfect competition</li> <li>• Reasons for Market failure, Pareto efficiency and market failure (externalities and public goods), property right and Coase Theorem</li> <li>• Markets with asymmetric information- adverse selection, moral hazards, agency problems</li> </ul>
<p><b>CC8 Outcome:</b> In this course students get a departure from the perfectly competitive market structure in both eth commodity and factor markets into their respective imperfect market structures and gives the students an idea about how prices and output are determined under imperfect markets and the social costs associated with it. The students will also learn about determination input prices under imperfect markets. They will know the concept of general equilibrium, economic efficiency and market failures. They will get an idea about how markets work in presence of asymmetric information.</p>	
<p><b>Semester IV</b></p>	
<p>Type of Course: CC9</p>	

Name of Course: Intermediate Macroeconomics II	
Course Content	Course Outcome
<p><b>Unit 1: Basic Tenets of New Classical and New Keynesian Theories</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• Learning the introductory ideas of New Classical Theory</li> <li>• Learning the introductory ideas of New Keynesian Theory</li> </ul>	<ul style="list-style-type: none"> <li>• This section gives a brief idea of rational expectation and the theory of real business cycle. This helps students to understand the idea of new classical theories</li> <li>• The discussion of the ideas of New Classical theories make students understand the philosophical stand point of this doctrine and hence the methodological favour towards a laissez-faire policy</li> <li>• It also helps students to understand the real sector analysis and neutrality of money</li> <li>• The students get an idea of New Keynesian Theories as well from this section. It is helpful for the students to understand how the short run Keynesian system can be extended to long run</li> <li>• At the end of this section, students might get the ideas of nominal rigidities, real rigidities, rigidities in interest rates in this context and the introductory idea of credit rationing</li> </ul>
<p><b>Unit 2: Macroeconomic Foundations –II</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• Learning theories of consumption</li> <li>• Learning theories of demand for money</li> </ul>	<ul style="list-style-type: none"> <li>• This unit will help you to determine the driving forces of economic growth</li> <li>• Consumption is one of the bigger concepts in economics and is extremely important because it helps determine the growth and success of the economy. Theories of consumption will help you to understand the determinants of it and what can be done to increase the level of consumption in an economy</li> <li>• The theories of demand for money will provide you a set of tools to analyze monetary policy and the financial sector effectively</li> <li>• It will also help you to analyze household's decision of how much money to hold</li> </ul>
<p><b>Unit 3: Economic Growth</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning economic growth models – Harrod-Domar Model, Solow model of economic growth, Endogenous growth theory</li> </ul>	<ul style="list-style-type: none"> <li>• The subject of the course is theories of economic growth: tradeoff between present and future consumption, stability of capitalist economies, effects of technological progress and consequence of sustained economic growth</li> </ul>

	<ul style="list-style-type: none"> <li>• This section will help you to explain causes of difference in income over time and across countries</li> <li>• You will understand that economic growth is a relatively recent phenomenon, and identify key institutional factors that contribute to economic growth</li> </ul>
<p><b>CC9 Outcome:</b> This course provides advanced insights into macroeconomic theories. The course content will demonstrate an understanding of the connection between microeconomics and macroeconomics. Students will understand standard models of economic growth and shall be able to evaluate the long-run macroeconomic behavior and short-run macroeconomic behavior of relevant macroeconomic variables like income, output, rate of interest, etc. Use these models to will help you to analyze the macroeconomic effects of monetary and fiscal policy changes as well as other economic shocks. Use these models to interpret historical and current macroeconomic events.</p>	

<b>Semester IV</b>	
Type of Course: CC10	
Name of Course: Introductory Econometrics	
Course Content	Course Outcome
<p><b>Unit 1: Nature and Scope of Econometrics</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning – Distinction between economic and econometric models <ul style="list-style-type: none"> <li>- Importance of econometrics in economics</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• This section will help the students in distinguishing between economic and econometric models</li> <li>• Students will be able to learn the role of random disturbance in econometric models</li> <li>• You shall be able to apply econometrics in different branches of social science</li> </ul>
<p><b>Unit 2: Classical Linear Regression Model (Simple linear regression and multiple linear regression) Part I:</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning – Estimation of Simple and Multiple Linear Regression Models by Ordinary Least Squares Methods</li> </ul>	<ul style="list-style-type: none"> <li>• This unit shall help the students learning the basic interpretations of linear regression models.</li> <li>• Knowledge on concepts of population regression function and sample regression function shall facilitate the students to interpret regression results</li> <li>• Learning Estimation techniques will help the students to estimate econometric model</li> <li>• This unit will provide a foundation to advance econometric estimations</li> <li>• Students will learn to interpret the results of simple and multiple linear regression models will the help of the concepts of simple correlation, partial correlation and multiple correlation</li> <li>• At the end of the unit students will be able to make economic interpretations of</li> </ul>

	econometric models
<p><b>Unit 3: Classical Linear Regression Model (Simple linear regression and multiple linear regression) Part II:</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning – BLUE Property of estimators in SLRM (Simple Linear Regression Model) <ul style="list-style-type: none"> <li>- Introduction to dummy independent variable models</li> <li>- Forecasting</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• This section will demonstrate the properties of the Least Squares Estimators (BLUE) in SLRM- Gauss-Markov theorem</li> <li>• Given variables can be both quantitative and qualitative, this section will also help the students to learn how to estimate models in the presence to attributes</li> <li>• You will be able to learn interpretation of dummy variables</li> <li>• Forecasting models will help you to utilize relevant and reliable information about the past and present events and the forecast the likely future events. You will be able to learn how to mitigate forecasting errors</li> </ul>
<p><b>Unit 4: Statistical inference in linear regression model</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learn - Use of standard normal, chi<sup>2</sup>, t, and F statistics in linear regression model <ul style="list-style-type: none"> <li>- Testing hypothesis</li> <li>- Goodness of fit (in terms of R<sup>2</sup>, adjusted R<sup>2</sup> and F statistic), Analysis of Variance (ANOVA)</li> <li>- Statistical significance and economic importance [2 lecture hours</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• This unit will help the students to infer econometric results</li> <li>• One will be able to interpret the statistical significance of the regression results and deduct the economic importance of the results</li> </ul>
<p><b>Unit 5: Violations of Classical Assumptions</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning - Multicollinearity - Consequences, Detection (Variance Inflationary Factor (VIF)) and Remedies <ul style="list-style-type: none"> <li>- Heteroscedasticity - Consequences, Detection (Lagrange Multiplier test) and Remedies</li> <li>- Autocorrelation - Consequences, Detection (Durbin-Watson test) and Remedies</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• The classical linear regression model is based to certain set of assumptions, which makes the OLS estimators the best estimators. Violation of any one of the assumption reduces the efficiency of the OLS estimator</li> <li>• In this unit students will learn the consequences of the violations of classical assumptions</li> <li>• Students will learn how to detect the problems of multicollinearity, heteroscedaticity and autocorrelation</li> <li>• Students will also learn how the regress the models in the presence of such problems</li> </ul>
<p><b>Unit 6: Specification Analysis</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learn – Omission of a relevant variable <ul style="list-style-type: none"> <li>- Inclusion of irrelevant variable</li> <li>- Tests of specification errors</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• From this unit students will be able to diagnose appropriateness of a regression model that is required to be fitted to interpret any economic model</li> </ul>

<ul style="list-style-type: none"> <li>- Testing for linearity and normality assumptions</li> </ul>	
<p><b>CC10 Outcome:</b>On successful completion of this course, students will be able to explain econometric concepts and results intuitively and conduct independent data analysis and inquiry using the tools of statistics and econometrics. The course focuses on the estimation, inference and identification of linear regression models. Particular attention is paid to the econometric theory and to the interpretation of the estimation results.</p>	

<b>Semester IV</b>	
Type of Course: SEC II	
Name of Course: Skill Enhancement Course II	
Course Content	Course Outcome
<p><b>(A) Research Methodology</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• Students will learn methodological issues in theoretical and empirical research in economics</li> <li>-</li> </ul>	<p><b>(A) Research Methodology</b></p> <ul style="list-style-type: none"> <li>• The research methodology course is designed for the students to plan to persuade research in economics after completion of their post-graduation in economics</li> <li>• This unit will show how to use economic theories, statistical and econometric methods for conducting research to find answers to puzzling issues in modern economies.</li> <li>• One will learn how to test predications of models based on theoretical analysis from optimizing models in micro or macro, finance or business related fields of economics using empirical evidence using basic econometric or statistical or applied general equilibrium or strategic analyses is discussed and illustrated</li> </ul>
<p><b>(B) Managerial Economics</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• One will learn – Demand and Profit Analysis of Firms <ul style="list-style-type: none"> <li>- Pricing policies of firms</li> <li>- Capital Budgeting</li> <li>- Inventory Management</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• This unit is used synonymously with business economics</li> <li>• The content of the unit is profoundly designed for students who wish to pursue professional and job oriented courses after graduating in economics</li> <li>• This course will help the students to deal with the application of microeconomic analysis to decision-making techniques of businesses and management units</li> </ul>
<p><b>SEC II Outcome:</b>The SEC II course aims at bridging the gap between “theory and practice”. A student can choose between Research methodology and Managerial Economics. Students who wish to pursue research in economics can opt for the research methodology course. Aim of this course is to complement to the programme in order to achieve an excellence in research methods required for economics. The Managerial economics course will facilitate the analytical skill of the students. This course will enable the students to apply their</p>	

microeconomic knowledge in the field of business decisions. This course improves the managerial skills of the students and hence is job-oriented.

## Semester V

Type of Course: CC11

Name of Course: International Economics

Course Content	Course Outcome
<p><b>Unit 1: Absolute and Comparative Advantages of Trade</b></p> <p>Objective</p> <ul style="list-style-type: none"> <li>• Learning the absolute advantage hypothesis and its shortcomings</li> <li>• Learning Ricardian comparative advantage hypothesis</li> <li>• Understanding the basis and direction of trade.</li> <li>• Knowing how trade occurs in a Ricardian one factor world</li> </ul>	<ul style="list-style-type: none"> <li>• This unit deals with the basics of classical trade models. This helps students to understand the basic idea of trade theory</li> <li>• The first question that occurs in the discussion is that why countries trade. In the process of answering this question students might get an idea of Adam Smith's absolute advantage hypothesis which is followed by its limitations and the Ricardian intervention in to this genre with his idea of comparative advantage</li> <li>• This unit provides the analysis, to the students, of arbitrage as the basis and direction of the trade and the arbitrage-concept of comparative advantage</li> <li>• This also helps students to understand the role of externalities, regulation and perverse comparative advantage in trade.</li> <li>• With the elaboration of the one factor Ricardian World, this section tries to make students clear about the following: <ul style="list-style-type: none"> <li>- The production possibilities in the Ricardian World</li> <li>- Relative demand and relative supply</li> <li>- Determination of terms of trade</li> <li>- Complete and incomplete specialization</li> <li>- And lastly, the gains from trade</li> </ul> </li> <li>• The unit also establishes the three basic questions that students have to keep in mind while studying trade theory. These questions are: <ul style="list-style-type: none"> <li>- What is the 'terms of trade'?</li> <li>- What is the equilibrium price ratio?</li> <li>- And last but not the least, whether the countries gain from trade or not</li> </ul> </li> </ul>

<p><b>Unit 2: The Building Blocks of Trade Theory</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning the concept of social indifference curve and its properties</li> <li>• Understanding trade indifference curve, offer curve, international equilibrium and the stability of equilibrium</li> <li>• Knowing gains from trade in detail</li> </ul>	<ul style="list-style-type: none"> <li>• It is helpful for the students to learn how a social indifference curve can be constructed</li> <li>• The elaboration of social indifference curve might be helpful for the students to conceptualize, under what circumstances and assumptions a social indifference curve behaves like individual indifference curve</li> <li>• This unit also makes students understand the need for a trade indifference curve. It is also helpful to learn how to derive a trade indifference curve</li> <li>• From the trade indifference curve it is possible to derive offer curve for a country. This helps students to understand how much one country will export for each quantity of the other country's product that it imports</li> <li>• From this unit, students can learn how to derive international trade equilibrium and the equilibrium price ratio using offer curves</li> <li>• Students can also get an idea about the elasticity of offer curve, demand for exports and supply of imports and hence understand the stability of the equilibrium and the condition for stability</li> <li>• The detailed analysis of gains from trade using production possibility frontier and social indifference curve, students might learn how to decompose gains from trade into production gain (gain due to resource mobilization) and consumption gain (gain due to change in the price ratio)</li> </ul>
<p><b>Unit 3: Factor Endowment and Trade (Heckscher-Ohlin-Samuelson Model)</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Knowing Heckscher-Ohlin theorem and different definitions of relative factor abundance</li> <li>• Learning the concept of factor intensity reversal in the context of this theorem</li> <li>• Understanding Stolper-Samuelson theorem</li> <li>• Knowing Rybczynski's theorem</li> <li>• Getting an idea about the factor price equalization theorem</li> <li>• Learning the Leontief Paradox</li> </ul>	<ul style="list-style-type: none"> <li>• As opposed to classical trade models of Smith and Ricardo, Neo-classical trade model deals with a 2X2 framework (two factors – two commodities). Studying this model might help the students to get an idea about another source of comparative advantage – relative factor abundance</li> <li>• Elaboration of this model helps students to learn that a country specializes and exports that commodity which uses the abundant factor more intensively</li> <li>• Understanding the concept of factor intensity reversal students might get the</li> </ul>

	<p>idea of invalidity of Heckscher-Ohlin theorem in presence of factor intensity reversal</p> <ul style="list-style-type: none"> <li>• Students can understand the one-to-one correspondence between commodity price ratio and factor price ratio by studying Stolper-Samuelson theorem</li> <li>• Students can also get an idea about the one-to-one correspondence between factor endowment ratio and production proportion by studying the Rybczynski's theorem</li> <li>• Factor price equalization theorem states that when trade takes place between two countries ultimately the factor prices in two countries will be equalized. Learning this theorem might help the students to conceptualize the process through which the factor prices are actually equalized in two countries under free trade</li> <li>• A brief empirical study in the end might foreground a paradox – namely Leontief Paradox – to the students</li> </ul>
<p><b>Unit 4: Application of Neo-classical Trade Models for Developing Countries</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• Learning Jones model</li> <li>• Knowing the significance of constant returns to scale</li> <li>• Knowing the implications of Stolper-Samuelson and Rybczynski theorems in this context</li> <li>• Knowing the specific factor model elaborated by Jones</li> </ul>	<ul style="list-style-type: none"> <li>• Jones model is based on Heckscher-Ohlin type of 2X2 model. Learning this model will help students to understand how trade affects a small open developing economy</li> <li>• It will be also helpful for the students to understand the significance of : <ul style="list-style-type: none"> <li>- The assumption of constant returns to scale</li> <li>- The decomposability property</li> <li>- The capital intensity condition in physical and value terms</li> </ul> </li> <li>• Students can learn the implications of Stolper-Samuelson and Rybczynski theorems in the context of a small open developing economy.</li> <li>• It will be also helpful for the students to conceptualize the price and output magnification effects</li> <li>• Through the study of the specific factor model students might get a clear idea of a 3X2 framework (three factors – two commodities) where one factor is specific to one commodity</li> <li>• Students might also understand from this model: <ul style="list-style-type: none"> <li>- The significance of the assumption of constant returns to scale</li> </ul> </li> </ul>



	<ul style="list-style-type: none"> <li>- The indecomposability property</li> <li>- The implications of price magnification effects in specific factor model</li> </ul>
<p><b>Unit 5: Trade Policy</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning the partial equilibrium analysis in presence of: <ul style="list-style-type: none"> <li>- Tariff and Quota</li> <li>- Trade subsidy</li> <li>- Voluntary export restraint</li> </ul> </li> <li>• Understanding the tariff-quota equivalence and nonequivalence</li> <li>• Knowing the monopoly effects of quota</li> <li>• Learning the general equilibrium analysis</li> <li>• Understanding the distinction between large and small country and the welfare effect of tariff on them</li> <li>• Learning to derive the tariff ridden Offer Curve, optimal tariff for a large country and the Metzler's Paradox</li> </ul>	<ul style="list-style-type: none"> <li>• Students can learn the equilibrium of one country in presence of tariff, quota, trade subsidy and voluntary export restraint. However these all are hindrances to free trade</li> <li>• By studying this unit students might understand when tariff and quotas are equivalent and when they are not. Students can also get an idea of the monopoly effects of quota</li> <li>• Students also learn to conceptualise the simultaneous equilibrium in both countries in presence of trade restrictions</li> <li>• Through the study of the distinctive features of large country and small country the students might understand the welfare effect of tariff on a small country</li> <li>• Students can also learn to derive the tariff ridden offer curve from this unit</li> <li>• The unit on the other hand teaches the students how to derive the optimal rate of tariff for a large country</li> <li>• In the end the section tries to provide the basic idea of Metzler's paradox to the students</li> </ul>
<p><b>Unit 6: Open Economy Macro Economics and Balance of Payment</b></p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Learning to determine the equilibrium income in an open economy</li> <li>• Knowing the Balance of Payment account in an open economy</li> <li>• Understanding the fixed and flexible exchange rate regimes</li> </ul>	<ul style="list-style-type: none"> <li>• This unit deals with the macroeconomic analysis of an economy in presence of trade. This helps the students to know how the equilibrium income is determined in such a situation</li> <li>• Students might also get an idea of foreign trade multiplier with and without repercussion effects from the study of the macroeconomics of an open economy</li> <li>• The study of balance of payments helps students to get an idea of the accounting structure of the BoP. It also helps the students to understand the ideas of autonomous and accommodating transactions</li> <li>• The study of fixed and flexible exchange rate regimes distinctively tries to make students to conceptualise the adjustment of demand and supply of foreign exchange</li> </ul>

	<ul style="list-style-type: none"> <li>• From this students also might get an understanding of the effect of devaluation</li> <li>• The study of Mundel-Fleming Model in the end of this section helps students to know how the IS-LM model can be analysed for an open economy. The model then becomes the IS-LM-BP (BoP) model that actually deals with the simultaneous equilibrium in real sector, monetary sector and external sector</li> </ul>
<p><b>CC11 Outcome:</b> This course tries to provide an overview of international economic theories to the students. From this one might build an understanding of different theories of international trade elaborated by economists from classical and neo-classical schools of thoughts. This section also tries to explain how the macroeconomic structure of a country functions in presence of trade. Along with the theory part, this paper also tries to give a brief overview of the international trade policy that a country might follow.</p>	

<b>Semester V</b>	
Type of Course: CC12	
Name of Course: Indian Economy	
Course Content	Course Outcome
<p><b>Unit 1: Economic Development since Independence</b></p> <p>Objective</p> <p>To learn:</p> <ul style="list-style-type: none"> <li>• Growth and development under different policy regimes</li> <li>• Structural changes in the post-reforms period</li> <li>• Regional variation of growth and development</li> </ul>	<ul style="list-style-type: none"> <li>• In this unit you shall learn the various growth and development strategies that have been undertaken in India since independence.</li> <li>• You shall gain knowledge on the objectives, achievements and failures of Indian planning</li> <li>• You will be able to analyze the structural transformation of India during the plan periods</li> <li>• Student shall critically analyze economic reforms</li> </ul>
<p><b>Unit 2: Population and Human Development</b></p> <p>Objective</p> <p>To learn the trends and pattern of population growth in India</p>	<ul style="list-style-type: none"> <li>• At the end of the unit the students will gain knowledge on the demographic trends and issues of India</li> <li>• Students will learn the policies adopted in India to develop human resources</li> <li>• The unit shall provide knowledge on the education and health policies adopted in India (like RTE, 2009)</li> </ul>
<p><b>Unit 3: Growth and Distribution</b></p> <p>Objective</p> <p>To learn:</p> <ul style="list-style-type: none"> <li>• Trends in GDP and Per-capita GDP</li> </ul>	<ul style="list-style-type: none"> <li>• This unit discusses the development issues facing the Indian economy</li> <li>• Studying the trends in GDP and per-capita GDP will help the students to analyze the growth path of the Indian</li> </ul>

<ul style="list-style-type: none"> <li>• Growth, poverty and inequality</li> <li>• Youth unemployment</li> <li>• Policy perspective in growth and distribution</li> </ul>	<p>economy</p> <ul style="list-style-type: none"> <li>• In this unit you will be introduced to the poverty and inequality scenario of Indian economy over the last 7 decades</li> <li>• Given human resources is one of the important factor that fosters economic growth, this unit will also help the students to get an idea about the employment and unemployment situations in India</li> <li>• You shall also be able to critically evaluate the policy perspectives in growth and distribution</li> </ul>
<p><b>Unit 4: Economic Reforms in India</b></p> <p>Objective</p> <p>To Learn:</p> <ul style="list-style-type: none"> <li>• Banking sector reforms</li> <li>• Reforms in tax policy</li> <li>• Reforms in external sector</li> <li>• Reforms in labour market</li> </ul>	<ul style="list-style-type: none"> <li>• Reforms are aimed at bringing rapid economic growth</li> <li>• As the macroeconomic theories posits effective and collaborative working of various sectors like industrial sector, agricultural sector, trade, public sector, financial sector, etc. is needed for economic growth</li> <li>• In this unit students will gain knowledge on the reforms that have been targeted at various sectors in India over the years since independence</li> <li>• Students will learn how a structural transformation took place in India in 1991.</li> <li>• Learning the policy objectives you will learn how India transformed into a globally competitive economy</li> <li>• You shall also be able to critically evaluate the success of this reforms</li> </ul>
<p><b>CC12 Outcome:</b> On the completion of the course students will be able to develop ideas of the basic characteristics of Indian economy, its potential on natural resources. You will understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development. Students will be able to grasp the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government.</p>	

<h2>Semester V</h2>	
<p>Type of Course: DSE A(I)</p>	
<p>Name of Course: Discipline Specific Elective - AI</p>	
<p><b>Course Content</b></p>	<p><b>Course Outcome</b></p>
<p>(A) Econometrics</p> <p>Objective</p> <p>To learn:</p>	<ul style="list-style-type: none"> <li>• The econometrics course is prepared for students to teach the use of econometric models in empirical research</li> </ul>

<ul style="list-style-type: none"> <li>• Steps in empirical research</li> <li>• Regression diagnostics and specification</li> <li>• Application of Regression Analysis</li> </ul>	<ul style="list-style-type: none"> <li>• The course will help the students to apply the theories learnt in CC10 and Sec II course in practice</li> <li>• Application of regression analysis to real life data (like survey data of NSSO or any time series data) will increase the capability of students to comprehend economic situations</li> <li>• You will learn how to use the programme package STATA to do regression analyses of empirical data</li> </ul>
<p align="center"><b>(B) Economic History of India (1857-1947)</b></p> <p>Objective</p> <p>To learn:</p> <ul style="list-style-type: none"> <li>• The impact of British rule in India</li> <li>• Aspects of Economic Policies in British India</li> </ul>	<ul style="list-style-type: none"> <li>• At the end of the course students will get an idea on The Pre-British Indian economy.</li> <li>• Students will acquire knowledge on features of British India - the economic exploitation of India, Rationale of economic planning after independence and features of the globalized economy</li> </ul>
<p><b>DSE A(I) Outcome:</b> The course contains two option out of which students have to choose any one.</p> <p>The <b>Econometrics course</b> specifically prepares the students today's world where good decision making relies on data and data analysis. This course helps students develop the understanding that they will need to make informed decisions using data, and to communicate the results effectively. The focus is on concepts, reasoning, interpretation and thinking rather than computation, formulae and theory. Much of the work will require students to write effectively and communicate their ideas with clarity. The course covers two main branches of statistics: descriptive statistics and inferential statistics.</p> <p>The <b>Economic history of India course</b> will assist the students to know the Indian economy in retrospect. The knowledge of the structure of Indian economy during the pre independence era will help the students to understand the rationales for adapting the economic policies as taught in CC12 course.</p>	

<b>Semester V</b>	
Type of Course: DSE B (I)	
Name of Course: Discipline Specific Elective - BI	
<b>Course Content</b>	<b>Course Outcome</b>
<p><b>(A) Comparative Economic Development (1850-1950)</b></p> <p>Objective</p> <p>To learn:</p> <ul style="list-style-type: none"> <li>• Strategies and Policies for Economic Development</li> <li>• Regions of contemporary development</li> </ul>	<ul style="list-style-type: none"> <li>• From this unit students will learn to deal with comparing and contrasting economic systems and transitions between them</li> <li>• You will gather knowledge on the strategy of industrialization in Soviet Union</li> <li>• You will get to learn Success stories of Asia : Japan, South East Asia and China</li> <li>• The crisis and failures of Latin America</li> </ul>

	<p>and Africa shall also be taught</p> <ul style="list-style-type: none"> <li>• By utilizing comparative economic systems, one will be able to identify similarities, differences, and problems and their solutions that of specific economy types</li> </ul>
<p><b>(B) Financial Economics</b></p> <p>Objective:</p> <p>To Learn –</p> <ul style="list-style-type: none"> <li>• Investment Theory and Portfolio Analysis</li> <li>• Options and Derivatives</li> <li>• Corporate Finance</li> </ul>	<p>On successful completion of this course, students will be able to:</p> <ul style="list-style-type: none"> <li>• Apply utility theory to describe and analyze investment decisions under risk aversion</li> <li>• Describe and apply modern portfolio theory</li> <li>• Describe, apply and criticize single and multiple factor models of risk and return</li> <li>• Describe, apply, compare and criticize the efficient markets hypothesis and behavioural finance theory</li> <li>• Identify and describe the risks of managing portfolios of fixed income securities</li> </ul>
<p><b>DSE B (I) Outcome:</b> Like the previous course this one also provides the students with two options of comparative economic development and financial economics, between they need to choose one.</p> <p>The first course of <b>Economic development</b> helps the students to compare and contrast economic systems and transitions between them. Students also learn about the success stories of East Asian countries, Japan and China. On learning about the Industrialization of Soviet Union, and crisis in the Africa and Latin America, students can compare between their problems and solutions.</p> <p>From the second option of <b>Financial economics</b> students get to understand and apply investment decision under risk aversion, modern portfolio theory, single and multiple factor models of risk and return, risks of managing portfolios of fixed income securities.</p>	

<b>Semester VI</b>	
Type of Course: CC13	
Name of Course: Public Economics	
Course Content	Course Outcome
<p><b>Unit 1: Government in market economy</b></p> <p>Objective</p> <p>To learn:</p> <ul style="list-style-type: none"> <li>• The role of government in market economy</li> </ul>	<ul style="list-style-type: none"> <li>• This unit will enable the students to understand the role of government in a market economy</li> <li>• As learnt in the previous courses, market economy allocates scarce resources efficiently</li> <li>• In this section you will get to know how in the presence of market failure,</li> </ul>

	<p>externalities, public and merit goods government intervene to ensure efficient allocation of resources</p> <ul style="list-style-type: none"> <li>• The role of public expenditure for financing development shall be emphasized in this unit</li> </ul>
<p><b>Unit 2: Choice and Public Economics</b></p> <p>Objectives</p> <ul style="list-style-type: none"> <li>• To learn in details the characteristics of pure public goods</li> <li>• Knowing the distinction between public and private goods</li> <li>• Understanding Private and Public Provisioning of public goods – the equilibrium theories</li> </ul>	<ul style="list-style-type: none"> <li>• At the end of the unit students shall be able to distinguish between public and private goods</li> <li>• With the help of Lindahl and voting equilibrium models one will understand how the provisioning of public good in done by the government</li> <li>• Students shall be able to answer the questions of how to raise the cost of providing public good and how to distribute public good</li> <li>• They shall be able to analyse policy challenges facing governments around the world and learn about potential solutions to these challenges as well as obstacles in implementing them</li> </ul>
<p><b>Unit 3: The Revenue and Expenditure of the Government</b></p> <ul style="list-style-type: none"> <li>• To learn the Principles of Taxation</li> </ul>	<ul style="list-style-type: none"> <li>• This unit will be useful to students in understanding the principles of taxation</li> <li>• Tax being one of the main revenue source of the government of finance its expenditure needs an explicit understanding</li> <li>• From this unit one will know <ul style="list-style-type: none"> <li>- the classification of taxes and the characteristics of a good tax system</li> <li>- the principles guided by which the government should impose tax</li> <li>- concept of the incidence and burden of taxation</li> <li>- comparison between direct and indirect tax</li> <li>- the optimal tax</li> </ul> </li> <li>• Students shall be able to formulate a perspective on how public policies on taxes are formulated</li> </ul>
<p><b>Unit 4: Public Finance</b></p> <p>Objective</p> <p>To learn:</p> <ul style="list-style-type: none"> <li>• The meaning and classification of Public expenditure</li> <li>• Meaning of public debt</li> <li>• Indian Public Finance</li> </ul>	<ul style="list-style-type: none"> <li>• At the end of the module one will attaintheadvantagesandknowledgeofpublicinvestments and other government expenditures.</li> <li>• Understand the causes of growingpublicexpendituresforvarious programmesandpolicies within and outside thecountry</li> <li>• Understand the needs of public</li> </ul>

	<p>borrowing from all possible sources to meet necessary public investment/expenditures</p> <ul style="list-style-type: none"> <li>• Deliver effectively the preparation of budget and how they are passed in the house. Understand the changes in size and flexibility of state and central budget along with the role played by Finance Commission</li> </ul>
<p><b>CC13 Outcome:</b> The course investigates the role of public sector in economic area. On completion of this course, students would be able to know the scope and breadth of public economics. They will understand the core principles of efficiency and welfare distribution and their application to problems in public economics. One will be able to utilize the detailed skills and techniques to address and facilitate public economic policy, such as mechanism design schemes and setting of tax structures.</p>	

<b>Semester VI</b>	
Type of Course: CC14	
Name of Course: Development Economics	
Course Content	Course Outcome
<p><b>Unit 1: Meaning of Economic Development</b></p> <p>Objective</p> <ul style="list-style-type: none"> <li>• To understand the Income Approach and Capability Approach</li> <li>• To learn the Construction and interpretation of HDI</li> <li>• To study the Dependency school of development</li> </ul>	<ul style="list-style-type: none"> <li>• Students would get a clear idea to differentiate between the two approaches</li> <li>• Students learn how the HDI is constructed and also get to know other indices that measure development over the globe and compare and rank the nations on the basis of their individual development trajectory</li> </ul>
<p><b>Unit 2: Poverty and Inequality</b></p> <p>Objective</p> <ul style="list-style-type: none"> <li>• To study the Inequality axioms; a comparison of commonly used inequality measures</li> <li>• To learn the Gender Inequality, connections between inequality and development and the different Poverty measurements</li> </ul>	<ul style="list-style-type: none"> <li>• From this course the students get the multidimensional concept of poverty and learn different measure to compute inequality and poverty, like the HPI</li> <li>• Along with this they also learn the problems related to the developing economies like the poverty traps and the vicious circle of Poverty</li> </ul>
<p><b>Unit 3: Dual Economy Models</b></p> <p>Objective</p> <ul style="list-style-type: none"> <li>• To learn the concept of surplus labour</li> <li>• To understand the concept of Dualism</li> </ul>	<ul style="list-style-type: none"> <li>• Studying the labour surplus concept helps the students to understand the problem of disguised unemployment</li> <li>• Students get to understand the interdependence between the agricultural sector and the industrial sector on studying the two models of</li> </ul>

<p>with and without surplus labour</p> <ul style="list-style-type: none"> <li>To study the Lewis model and Ranis-Fei model and the Harris- Todaro model</li> </ul>	<p>Lewis and Ranis-Fei</p> <ul style="list-style-type: none"> <li>The Harris- Todaro model help the students to get the concept of the rural-urban migration</li> </ul>
<p><b>Unit 4: Population Growth and Economic Development</b></p> <p>Objective</p> <ul style="list-style-type: none"> <li>To teach the basic concepts (Birth and Death Rates, mortality, fertility)</li> <li>To learn the demographic transition theory</li> <li>Study the Low Level Equilibrium Trap models</li> </ul>	<ul style="list-style-type: none"> <li>The basic concepts of population help the students to easily go through the theories related to the population growth as now students are more accustomed to the terms</li> <li>Students can now follow the demographic graph easily and can understand in which stage a nation is</li> <li>Students read the model and also their criticism, they also get to understand the concepts of critical minimum effort theory given by Nelson and Leibenstein</li> </ul>
<p><b>Unit 5: Development Strategies</b></p> <p>Objective</p> <ul style="list-style-type: none"> <li>To understand the Balanced and Unbalanced Growth Theories</li> <li>To study Choice of Techniques</li> </ul>	<ul style="list-style-type: none"> <li>Here students learn the two very important development strategies and also the arguments for and against such theories</li> <li>The choice between labor and capital intensive techniques are made clear through this course and students get to understand how the technique to be used is decided</li> </ul>
<p><b>Unit 6: Political Institutions and the State</b></p> <p>Objective</p> <ul style="list-style-type: none"> <li>Study the definition of institutions, Evolution of Political and Economic Institutions</li> <li>Study the determinants of democracy</li> <li>Study the within-country differences in the functioning of state institutions. State ownership and regulation</li> </ul>	<ul style="list-style-type: none"> <li>Students get to know the different political institutions and also regarding their evolution</li> <li>Students also learn in this course the alternative institutional trajectories and how they are related to the economic performances</li> <li>This course also makes the students aware of the Government failures and corruption</li> </ul>
<p><b>CC14 Outcome:</b> Through this course of economic development students cover a wide range of theories related to the development. Different approaches to define development and different indices to measure developmental trajectory are taught. The multidimensional poverty concepts and the different measures have also been covered. The course explains the demographic transition and deals with the problem of population growth. The course also covers the political institutions and the concepts of democracy and makes students aware of the Government failures and corruption.</p>	
<p><b>Semester VI</b></p>	
<p>Type of Course: DSE A(2)</p>	



Name of Course: Discipline Specific Elective A(2)	
Course Content	Course Outcome
<p><b>(A) Money and Financial Markets</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• To learn theories of money supply determination</li> <li>• Understanding the role of financial markets, institutions, instruments and financial innovations</li> <li>• Knowing the working of financial markets and interest behavior</li> <li>• Perceive the structure of banking system</li> <li>• Comprehending the role of central bank and its conduct of monetary policy</li> </ul>	<p>On successful completion of this course, students will be able to:</p> <ul style="list-style-type: none"> <li>• Identify the economic principles underlying the operation of financial intermediaries</li> <li>• Explain how central banks conduct monetary policy</li> <li>• Use models to analyze monetary and macroeconomic issues</li> <li>• Conduct a theoretical analysis of real-world issues and phenomena</li> </ul>
<p><b>(B) Issues in Indian Economy</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• Analyzing the growth and structural changes in India</li> <li>• Grasping the macroeconomic policies undertaken in India and their impact</li> <li>• Knowing the policies and performance of Indian agricultural sector</li> <li>• Knowing the policies and performance of Indian industrial sector</li> <li>• Studying the trends and performance of Indian services sector</li> </ul>	<p>On successful completion of this course, students will be able to:</p> <ul style="list-style-type: none"> <li>• Analyze the growth and structural changes that took place in India using Indian official statistics as disseminated by NSSO and NAS</li> <li>• Evaluate the financial, fiscal, monetary and trade and investment policy adopted in India to bring about structural transformation</li> <li>• Know the nature and policies on the agricultural, industrial and tertiary sector in Indian context</li> </ul>
<p><b>DSE A(2) Outcome:</b> The course consists of two parts where the students have to choose any one.</p> <p>The <b>Money and financial markets course</b> links the fields of macroeconomics and central banking. The role of money in the economy and the impact of monetary policy on the macroeconomy are examined. The course aims at providing students with the means to analyse monetary questions and institutions. The course is also designed to further technical expertise in the instruments used in financial markets.</p> <p>The <b>Issues in Indian Economy course</b> links the theories of macroeconomics in policy making. The evaluation of policies undertaken in Indian context will help the students to understand how the economy emerged itself as a global economy over the period of time.</p>	

## Semester VI

Type of Course: DSE B(2)

Name of Course: Discipline Specific Elective B(2)

Course Content	Course Outcome
<p style="text-align: center;"><b>(A) Environmental Economics</b></p> <p>Objective:</p> <ul style="list-style-type: none"> <li>• To learn what environmental economics is all about</li> <li>• To know about the Efficiency and Market Failure</li> <li>• To understand the Design and Implementation of Environmental Policy</li> <li>• To have an idea about International Environmental Problems</li> <li>• To get equipped regarding measurement of the values of Environmental Costs and Benefits</li> </ul>	<p>The students will be acquainted with:</p> <ul style="list-style-type: none"> <li>• Review of microeconomics and welfare economics.</li> <li>• Interlinkages between the economy and environment</li> <li>• Pareto optimality and market failure in the presence of externalities</li> <li>• Property rights and the Coase theorem</li> <li>• Public goods/ bads and market failure</li> <li>• Pigouvian Fees – Single Polluter, Multiple Polluters, Fees vs Subsidies</li> <li>• Regulating Pollution : Command and Control, Economic Incentives</li> <li>• The Basic Theory of Tradeable Pollution Permits</li> <li>• Transboundary Pollution – Transboundary Pollution as a problem of international externalities</li> <li>• International Trade and Environment – Pollution Havens</li> <li>• International Environmental Agreements – Basic idea about Montreal and Kyoto Protocol and Talks on Climate Change</li> <li>• Concepts of Willingness to pay (WTP) and Willingness to accept compensation (WTAC), Difference between the two concepts</li> <li>• Direct and Indirect Methods of Valuation – Contingent valuation, Travel Cost, hedonic Pricing – basic concepts only (no econometric techniques) – when they should be used, what are the advantages and disadvantages of these methods</li> </ul>

**DSE B (2):** This Discipline Specific Course will make the students aware about some environmental issues and its link with Economics. It will help the students to know why market failures occur or how market efficiencies are affected in presence of externalities created due to various environmental conditions. They will get an idea about various international environmental problems and the designing and implementation of different

policies to deal with such problems. They will also learn about the measurement of environmental costs and benefits.

**(B) Issues in Development Economics**

Objective:

- To know the meaning of Economic Development
- To understand what poverty and inequality is all about
- To study about the dual economy models
- To understand the relationship between population growth and economic development
- To envisage the development strategies
- To become aware about the political institutions and the state

The students will be acquainted with:

- Income Approach and Capability Approach
- Construction and interpretation of HDI; international variations in development measures; comparing development trajectories across nations and within them
- Dependency school of development
- Inequality axioms; a comparison of commonly used inequality measures
- Gender Inequality, connections between inequality and development
- Poverty measurement, HPI; poverty traps and path dependence of growth processes
- Vicious Circle of Poverty Hypothesis
- The concept of surplus labour and disguised unemployment
- Peasants and Dualism with and without surplus labour
- Interdependence of agriculture and Industry (Lewis model, Ranis-Fei model)
- Rural-Urban Migration (Harris- Todaro model)
- Basic concepts (Birth and Death Rates, mortality, fertility)
- Demographic transition theory
- Cost of children, externalities
- Low Level Equilibrium Trap models and their criticism-critical minimum effort theory (Nelson and Leibenstein)
- Balanced vs. Unbalanced Growth Theories
- Choice of Techniques
- Definition of institutions, Evolution of Political and Economic Institutions
- The determinants of democracy
- Alternative institutional trajectories and their relationship with economic

	<p>performance</p> <ul style="list-style-type: none"> <li>• Within-country differences in the functioning of state institutions</li> <li>• State ownership and regulation</li> <li>• Government failures and corruption</li> </ul>
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## **Program Outcome: B. Sc. (General)**

### **Program Outcomes:**

- After the completion of B. Sc. General degree, candidates can opt for jobs both in government and private agencies.
- Develops advanced theoretical and research skills.
- Understand how technological advances impact society and the social, legal, ethical and cultural ramifications of computer technology and their usage.
- A student will be able to get job in technological and engineering fields as well as in education and health care sectors.
- Students will be confident enough to write computer programming to calculate some advanced mathematical and logical problems.
- Students can appear in CDS(Combined Defence Services) Examination and after successful completion of SSB interview, they can join IMA, OTA.
- Students can join B.Ed which will lead them to academic sector if the students are interested in the fields.
- Students will be eligible for various competitive examination viz. IBPS PO, SSC CGL, WBCS, UPSC, etc.

## **Program Specific Outcome: Computer Science (General)**

### **Program Specific Outcomes**

This course basically focuses on to provide basic to advanced level programming and data analyzing knowledge to the students. In the theoretical portion students are introduced to different data structures and their implementation, different searching and sorting techniques, Operating systems. They will learn about computer organization, software engineering, network security etc. On the other hand in the practical portion they are taught visual C, PYTHON, shell programming languages, which are useful not only for learning programming, but also it will nurture their programming ability so that they can easily learn and work with different programming languages in future.

Summarized project outcome is the following;

Students will learn to

- Proficiency with the fundamental knowledge in algorithms, programming languages, and architecture.
- Ability to apply reasoning, problem solving, and technical skills to solve a problem with minimal guidance.
- Demonstrate proficiency of Computer Science in the following core knowledge areas
  1. Algorithms, Data Structures, and Complexity
  2. Programming Languages and Compilers
  3. Software Engineering and Development
  4. Computer Hardware and Architecture
  5. Computer networking
  6. Information security
  7. Database and its application
- Apply system-level perspective by thinking at multiple levels of detail and abstraction and by recognizing the context in which a computer system may function, including its interactions with people and the physical world.
- Apply problem-solving skills and the knowledge of computer science to solve real problems.
- Understand how technological advances impact society and the social, legal, ethical and cultural ramifications of computer technology and their usage.
- Write about and orally communicate technical material about computer science and computer systems, broadly conceived.

## **Course Outcomes**

Type of Course: CMS-G-CC-1-1TH

Name of the Course: Computer Fundamentals and Digital Logic Design

### **Group A : Computer Fundamentals**

#### **Course objective:**

- After completion of this course the students will be well informed about how a machine named “computer” actually works. in the 1<sup>st</sup> couple of classes they will get to know how computer has evolved throughout these years, i.e. history of computers and different types of computer used over the world.
- Students will also understand how computer takes input of raw data and produces information as the outcome of processing.
- They will get to know about computer hardware – different types of memory, i/o devices, bus structure, bios and the total internal structure of this complex machine.
- Students will know about the types of software (system and application) we use in day to day life and their necessity in computer domain.
- Students will know about instructions, programmes and programming languages, and their classifications.
- Students will get an idea of problem solving, using pseudo codes, flowcharts and decision tables, which will help the in future writing/understanding programmes.
- They will have a further idea of system software, their classification, operating systems, translators – compilers and interpreters, their difference and respective significance. Preprocessors, assemblers, loaders, linkers, line and screen editors and

their utilities.

- Students will also attain a clear concept of different types of viruses, how to detect them, and necessary preventive measures to take against them.
- Students will be provided a basic idea of multimedia and different multimedia software used in practical domain.
- Lastly, students will be introduced to programming. Different types of programming paradigm. Basic concepts of POP, OOP. Basic characteristics of object-oriented programming paradigm and its edges over the other programming paradigms.

### **Group B: Digital Logic Design & Digital Electronics**

The objectives of the course can be grouped into two categories. The first one relates to understanding the basics of Boolean algebra and the operation of logic components, combinational, and sequential circuits. The second set of objectives relates to the design of digital circuits and systems.

#### **Digital Logic Design**

- **Number systems and codes**

Student gets to know about the weighted and non weighted codes, various number systems suitable for representing information in digital systems. The binary, octal, hexadecimal, decimal, BCD number system is explained and is illustrated. Examples are given for addition and subtraction of signed binary numbers and decimal numbers in binary-coded decimal (BCD) format. Concepts about gray codes, Alphanumeric, ASCII, EBDIC, fixed and floating point representation is also provided to them.

- **BOOLEAN ALGEBRA**

Students will learn the basic postulates of Boolean algebra and will be shown the correlations between Boolean expressions and their corresponding logic diagrams. All possible logic operations for two variables will be investigated, and the most useful logic gates used in the design of digital systems will be identified. They will be also introduced to basic logic gates.

The course also covers the K-map method for simplifying Boolean expressions. The map method is also used to simplify digital circuits constructed with AND-OR, NAND, or NOR gates. All other possible two-level gate circuits are considered, and their method of implementation is explained.

#### **Digital Electronics**

This course outlines the formal procedures for the analysis and design of combinational circuits. Some basic components used in the design of digital systems, such as adders and code converters, are introduced as design examples. Frequently used digital logic functions such as multi bit adders and subtractors, decoders, encoders, priority encoders and multiplexers, demultiplexers are explained, and their use in the design of combinational circuits is illustrated.

Students also get to know about the model of sequential computing, difference between

combinational and sequential circuits, RS latch: using universal gates, its use as static RAM cell, problems related to basic latch circuits. They will know how to design various kinds of flipflops. Level triggers and edge trigger, excitation of flipflops, flipflops with preset and clear.

They are also given the idea of asynchronous counter, decade counter, Mod n counter, ring counters, registers etc.

Type of Course: CMS-G-CC-1-1-P

Name of the Course: Word Processing, Spreadsheet, Presentation and Web Design by HTML/PHP

Introduces the basic features of Microsoft Office, Windows basics, and file management. Develops familiarity with Word, Excel, Access, PowerPoint, email, and web development basics.

Upon completion of the course students will be able to:

Recognize when to use each of the Microsoft Office programs to create professional and academic documents. Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.

Students will also be able to know how to create web pages, hyperlinks etc with the help of HTML or PHP

**Word Processing Skills**

- Create and edit Word documents
- Copy/Move/Paste text
- Create and edit a multi-page Word document
- Format and enhance Word documents
- Insert Clipart. Header, footer, images, comments, tables
- Creating mail merge, macros

**Spreadsheet Skills**

- Create and edit basic Excel spreadsheets
- Format and enhance, filtering, sorting spreadsheets
- Use Auto Sum and create basic formulas
- Create basic charts, functions, macros,
- Importing exporting files.

**Presentation Skills**

- Create and edit basic PowerPoint presentations.
- Use template, color schemes, animation, slide transition.
- Insert images including digital pictures

**Web designing skills**

- Creating, editing, formatting WebPages using HTML and PHP

Type of Course: CMS-G-CC-2-2-TH

Name of the Course: Algorithms & Data Structure

Students will learn about algorithms and abstract datatypes used commonly. In class common data structures will be discussed in detail. Such as, arrays (including one dimensional, two dimensional arrays, row major and column major forms etc), linked list (including singly and doubly linked list), insertion, deletion, searching in linked list.

Stacks and queues – basic concepts of stacks and queues will be provided first, then thorough discussion about insertion, deletion of elements; array and linked list representation of stacks and queues will take place in the class. Writing the pseudo code of implementation will be also taught.

Evaluation of infix, prefix, postfix expression and conversion to infix to postfix will be demonstrated.

Students will be given clear concepts of Algorithms, of sequential and binary search techniques.

Different types of sorting techniques such as, bubble sort, selection sort, insertion sort, quick sort, mergesort, heap sort will be discussed and practiced in the class

Type of Course: CMS-G-CC-2-2-P

Name of the Course: Programming with C

Students will be able to;

- Solve simple problems using the fundamental syntax and semantics of the C programming language.
- Apply elementary techniques in C programming.
- Apply elementary techniques in C programming.
- Use generally accepted principals of good programming style.
- Write C programs that use selection (if, switch, conditional operator).
- Write C programs that use loops (while, do while, for).
- Write C programs that make use of functions for program modularization.
- Write C programs that use one-dimensional arrays.
- Apply simple searching and sorting algorithms.
- Write C programs that use pointers to manipulate arrays and to implement dynamic memory allocation.
- Initialization arrays of structures, arrays within structures, structure within structures, size of structures and dynamic storage allocation.
- Choose appropriate loops, decision structures, data structures, and modularization in the creation of C programs.

Type of Course: Computer Science (Gen) Part – II

PAPER-II (THEORY)



This paper aims to introduce students to Algorithms & Data Structure- Algorithms and Problem Solving, software engineering concepts and Database Management System- Overview, Data Models.

- Learn about how to represent program pictorially through flowchart.
- To find complexity of any algorithm.
- Learn about the concept of stack, queue, array, linked list.
- Learn about the concept of trees, graph.
- Concept of binary tree, traversal, binary search tree.
- Learn about the different search like binary and linear search.
- Different sorting algorithm such as bubble, selection, quick sort etc.
- Learn about how the software is build using software life cycle and development model.
- Different model like waterfall model, iterative waterfall model, spiral model.
- Testing of software.
- Data flow diagram.
  1. Learn the difference between traditional file system and database.
  2. How large amount of data are managed in the computer system.
  3. Learn the different relational data model.
  4. Concept of normalization.
  5. E-R model.
  6. Learn the how to create data base, insert, update, delete.
  7. Access data of data base.

Type of Course: Computer Science (Gen) Part -II

### PAPER-III (PRACTICAL)

- This paper aims to introduce students to Word processing, Document Preparation & Presentation and Spreadsheet, introduction to programming language C and database query language SQL (structural Query Language).
- Learn the how to work on Microsoft office and Learn to prepare power point presentation and excel sheet and make documents.
- Learn about the basic concept of C programming, its basic operators, how to use control statement for program looping.
- Learn the how to write program using array for implementation of matrix mortification, addition, sparse matrix.
- Learn the how to write program using string, string handling function and write program of implementing string without using string functions.
- Learn how to write program using functions.
- Introduce to the iterative and recursion function.
- How to create structure so that different program can be access easily using this structure.
- Learn how to write program using pointer, passing parameter through call by value and call by references.
- How to Access value of variable using memory address through pointer.
- On successful completion of c programming language student learn to prepare small software programs.
- Introduction to the SQL.
- Learn to create database table, insert data into the database that is creation and modification of database using SQL query.

- Learn how to access database using complex queries such as nested queries.
- Learn the correctness and integrity of database.

Type of Course: Computer Science (Gen) Part-III

PAPER-IV (THEORY)

- This paper aims to introduce students to the introduction of computer network and Communication concept of computer network.
- Learn the basic concept and comparison between analog and digital communication.
- Concept of signals, bandwidth, channel capacity.
- Modulation and demodulation concept.
- Introduce students to the concept of transmission media. And Audio and video communication system.
- Learn the concept of LAN, MAN and WAN.
- Distributed processing and resource sharing.
- Learn the principle of operation, characteristics and comparison of Ethernet and token ring topology.
- Concept of high speed LAN, internetworking, bridge, router and gateway.
- Learn how the basic idea of internet, domain name server, URL, IP address, browsers.
- Learn about the architecture and service of email.

Type of Course: Computer Science (Gen) Part-III

PAPER-IV (THEORY)

- This paper introduces students to the unix/ linux shell programming and programming in visual basic.
- Learn how to create files and directories, different commands use in files and directories.
- Learn the concept and programming of shell programming.
- Learn about programming on the topic related to objects with classes. Operation on objects, class libraries.
- Multithreading applications, software design involving forms, object, event, functions, procedure and methods.
- Learn about ODBC driver.
- Learn to front and development of database.
- Learn about the MFC based multimedia applications.

**Program Specific Outcome: Mathematics (General)**

**Program Specific Outcomes**

On successful completion of the courses of Mathematics General Programme:

- Provide students sufficient knowledge and skills enabling them to undertake further studies in mathematics and its allied areas on multiple disciplines concerned with Mathematics.
- A student can acquire knowledge and understanding of various branches of Pure Mathematics and Applied Mathematics including Geometry, Algebra, Mathematical Analysis and Discrete Mathematics, Statistics, Operational Research and Differential Equations.
- He can also acquire knowledge of several specialized areas of advanced Mathematics and its applications.
- He will be able to analyze the results and apply the min various problems appearing indifferent branches of Mathematics.
- He will be able to understand mathematical statements ideas and results both verbally and in writing with correct use of Mathematical definition, terminology and symbolism.
- He will be able to communicate various concepts of mathematics effectively using examples and their geometrical visualizations.
- He will be able to work collaboratively with peers and instructors to acquire mathematical understanding and to formulate and solve problems and present solutions.
- He will be able to use computer packages where appropriate to develop a deeper understanding of mathematical problems.

### **Course Outcomes**

SEMESTER - I

Type of Course: CC-1

Name of the Course: Algebra-I, Differential Calculus-I, Differential Equation-I and Coordinate Geometry

#### **Algebra I**

- Define a complex number and represent them in Cartesian form.
- Represent complex numbers in argand plane and express them in Polar form.
- Distinguish between a general argument and the principal value of the argument.
- Apply the De Moivre's formula.
- Find nth the roots of a complex number.
- Compute the value of an exponential, logarithm, exponent and trigonometric function of a complex number.
- Determine the number of real and complex roots using sturm functions.
- Find the roots of different polynomial equations & relations between the roots and coefficients of the equations.
- Understand Rolle's Theorem and its application.
- Can solve cubic equation by using Cardan's method.
- Able to find the rank and inverse of a matrix.
- Use matrix algebra.

#### **Differential Calculus I**

- Define the rational numbers, the natural numbers, and the real numbers and understand their relationship to one another.
- Define the well-ordering principle.
- Prove and use properties of limits.
- Define continuity
- Define uniform continuity and check the uniform continuity of given functions.
- Give standard examples of discontinuous functions such as the Dirichlet function.
- compute derivatives using the limit
- Definition and prove basic properties of derivatives.
- Understand the definition of the functions of two or more variables.
- Define double limit and repeated limits of function of several variables.
- Learn continuity and partial derivatives of a multivariable functions.
- Define differentiability and its sufficient condition of a function of two or more variables.
- State and prove Euler's theorem and its converse for a homogeneous function of two or more variables.
- State and apply Schwarz theorem.
- Find the curvature, concavity, point of inflection, envelopes, rectilinear asymptotes of standard curves.

### **Differential Equation 1**

- Can formulate ODE with the knowledge order and degree of ODE.
- Solve differential equations of first order and first degree using analytical methods.
- Solve differential equations of first order and higher degree including Clairaut's equations.
- Solve and apply linear differential equations of second order using D operator method, method of variation of parameters and method undetermined coefficients.

### **Coordinate Geometry**

- Apply transformations of coordinates to functions, including shifts and rotation.
- Deals with invariant in the transformation.
- Classify different types of conics in 2D.
- Solve the problem regarding pair of straight lines.
- Obtain the tangents, normals, chord of contacts, poles and polars w.r.t. different types of conics.
- Give ideas of polar equations.
- Get the idea of direction ratios and direction cosines in 3D.
- Write equation of plane in different forms and straight lines in space.
- Solve problems on sphere and cone.

SEMESTER - II

Type of Course: CC - 2

Name of the Course: Differential Calculus – II, Differential Equation – II, Vector Algebra and Discrete Mathematics

## **Differential Calculus - II**

- Define convergence sequence and series of real numbers.
- Will have clear concepts of convergence and divergence of monotone sequences with application.
- State and prove the Bolzano-Weierstrass Theorem.
- Define Cauchy sequence and prove that specific sequences are Cauchy.
- define convergence of series using the Cauchy criterion
- Use the comparison, ratio, and root tests to show convergence of series.
  
- State Rolle's theorem and apply it to solve problems
- State and prove the intermediate value property.
- State the Mean Value Theorem and use it in proofs.
- State and apply Taylor's and Maclaurin's theorem with Lagrange's and Cauchy's form of remainder.
- Find the limit using L'Hospital's rule.
- Find maxima and minima of a function of single variable.
- Use of Lagrange's method of undetermined multipliers for the functions of two variables.

## **Differential Equation II**

- Solve Cauchy Euler equation
- Determine order and degree of a Partial Differential Equation
- Distinguish between linear and non-linear partial differential equations
- Formulate Partial Differential Equation of first order
- Solve Partial Differential Equation of first order by Lagrange's method and Charpit's method.

## **Vector Algebra**

- Perform standard operations on vectors in two-dimensional space and three dimensional space.
- Distinguish between collinear and coplanar vectors
- Compute the dot product of vectors and determine the lengths of vectors and angles between vectors.
- Compute the cross product of vectors and interpret it geometrically.
- Determine the equations of lines and planes using vectors.
- Apply the concept of vector algebra to solve problems of Mechanics.

## **Discrete Mathematics**

- Introduce with the concept of integers and its properties.
- Define and interpret the concepts of divisibility, congruence, greatest common divisor, prime and prime-factorization of integers
- Apply the concept of congruences in divisibility tests, in Check-digit and an ISBN, in Universal Product Code, in major credit cards and in Error detection.
- Some well known theorems related to congruence relation will be discuss.
- Give a concept of Boolean algebra.
- Solve problems using recurrence relations and generating functions including Fibonacci

sequence and Tower of Hanoi problems.

**SEMESTER - III**

Type of Course: CC – 3

Name of the Course: Integral Calculus, Numerical Methods and Linear Programming

**Integral Calculus**

- Evaluate various integrals using Reduction Formula
- Evaluate improper integrals
- Use Beta and Gamma functions
- Determine the area and volume by applying the techniques of double and triple integrals.
- Calculate the length of an arc of a curve.
- Evaluate the volumes of solids using cross sections.
- Evaluate the area of surfaces of revolutions.

**Numerical Methods**

- Familiar with calculation and interpretation of errors in numerical method.
- Distinguish between Absolute, Relative and percentage errors.
- Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
- Apply various interpolation methods and finite difference concepts.
- Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
- Work numerically on the ordinary differential equations using different methods through the theory of finite differences.

**Linear Programming**

- Formulate and model a linear programming problem from a word problem and solve them graphically in 2 dimensions, while employing some convex analysis.
- Place a Primal linear programming problem into standard form and use the Simplex Method to solve it.
- Find the dual and identify and interpret the solution of the Dual Problem from the final table of the Primal problem.
- Be able to modify a Primal Problem and use the Fundamental Insight of Linear Programming to identify the new solution.
- Formulate and solve a number of classical linear programming problems such as the assignment problem, the transportation problem while taking advantage of the special structures of certain problems.

**SEMESTER – III**

Type of Course: SEC – I

Name of the Course: C Programming Language

Students will;

- Understand the fundamentals of C programming.
- Choose the loops and decision making statements to solve the problem.
- Implement different Operations on arrays.
- Use functions to solve the given problem.

- Understand pointers, structures and unions.
- Able to solve various mathematical problem by C programming.
- Can understand the use of various library functions.

#### SEMESTER – IV

Type of Course: CC – 4

Name of the Course: Algebra – II, Computer Science and Programming & Probability and Statistics

#### **Algebra II**

- Assess properties implied by the definitions of a group.
- Use various canonical types of groups.
- Analyze and demonstrate examples of subgroups.
- Write precise and accurate mathematical definitions of objects in ring theory
- Use mathematical definitions to identify and construct examples and to distinguish examples from non-examples.
- Define field and give examples of field.
- Analyze finite and infinite dimensional vector spaces and subspaces over a field and their properties, including the basis structure of vector spaces.
- Can solve real quadratic form.
- State Cayley-Hamilton Theorem and compute with the characteristic polynomial, eigen values and eigen vectors.

#### **Computer Science and Programming**

- Get an idea about decimal, binary, octal and hexadecimal number system.
- Convert a number from one number system to another.
- Do addition, subtraction and multiplication of binary numbers.
- Understand the fundamentals of Computer.
- Will be familiar with different types of programming language.
- Write an algorithm and construct a flow chart of a certain problem.
- Write a C-program based on algorithm and flow chart of a certain problem.

#### **Probability and Statistics**

- Define and illustrate the concepts of sample space, events and compute the probability and conditional probability of events, and use Bayes' Rule.
- Define, illustrate and apply the concepts of discrete and continuous random variables, the discrete and continuous probability distributions and the joint probability distributions.
- Apply Chebyshev's theorem.
- Define, illustrate and apply the concept of the expectation to the mean, variance and covariance of random variables.
- Define, illustrate and apply certain frequently used discrete and continuous probability distributions.
- Illustrate and apply theorems concerning the distributions of functions of random variables and the moment-generating functions.
- Define and examine the random sampling (population and sample, parameters and

<p>statistic) data displays and graphical methods with technology.</p> <ul style="list-style-type: none"> <li>• Recognize and compute the sampling distributions, sampling distributions of means and variances (S2) and the t- and F-distributions.</li> <li>• Understand, apply and compute in one- and two- sample estimation problems.</li> <li>• Understand, apply and compute maximum likelihood estimation.</li> <li>• Understand, apply and compute in one- and two- sample tests of hypotheses problems.</li> <li>• Recognize the relationship between the confidence interval estimation and tests of hypothesis.</li> <li>• Understand, apply and examine the goodness-of-fit test, test for independence, and homogeneity.</li> <li>• Recognize the basic concepts of simple linear regression and correlation.</li> </ul>
<p style="text-align: center;">SEMESTER – IV Type of Course: SEC – II Name of the Course: Mathematical Logic</p>
<ul style="list-style-type: none"> <li>• Construct simple mathematical proofs and possess the ability to verify them.</li> <li>• Have substantial experience to comprehend formal logical arguments .</li> <li>• Get skill in expressing mathematical properties formally via the formal language of propositional logic and predicate logic.</li> <li>• Specify and manipulate basic mathematical objects such as sets, functions, and relations and will also be able to verify simple mathematical properties that these objects possess.</li> <li>• Acquire ability to describe computer programs (e.g. recursive functions) in a formal mathematical manner.</li> </ul>
<p style="text-align: center;">SEMESTER – V Type of Course: SEC – III Name of the Course: Object Oriented Programming in C++</p>
<ul style="list-style-type: none"> <li>• To understand how C++ improves C with object-oriented features.</li> <li>• To learn how to write inline functions for efficiency and performance.</li> <li>• To learn the syntax and semantics of the C++ programming language.</li> <li>• To learn how to design C++ classes for code reuse.</li> <li>• To learn how to implement copy constructors and class member functions.</li> <li>• To understand the concept of data abstraction and encapsulation.</li> <li>• To learn how to overload functions and operators in C++.</li> <li>• To learn how containment and inheritance promote code reuse in C++.</li> <li>• To learn how to design and implement generic classes with C++ templates.</li> <li>• To learn how to use exception handling in C++ programs.</li> <li>•</li> </ul>
<p style="text-align: center;">SEMESTER – V Type of Course: DSE – I Name of the Course: Particle Dynamics</p>
<ul style="list-style-type: none"> <li>• To solve problems on velocity and acceleration of a particle.</li> <li>• Apply Newton's second law of motion in problem solving.</li> <li>• Create equations of motion.</li> <li>• Apply the method of work and energy to problems involving a single body or connected bodies.</li> <li>• Calculate uniform rectilinear motion.</li> <li>• Calculate rectangular components of velocity and acceleration.</li> </ul>



- Apply the principle of conservation of energy to problems involving a single body or connected bodies.
- Define the concept of linear impulse.
- Create equations of radial and transverse components of motion.
- Solve problems on projectile motion, kepler’s law, S.H.M and motion under inverse square law.

**SEMESTER – VI**

Type of Course: SEC – IV

Name of the Course: Boolean Algebra

- Prove a number of useful basic theorems from given Boolean axioms;
- Simplify and complement Boolean expressions by the axioms of Boolean algebra;
- Define the fundamental logic operations AND, OR, NOT.
- Relate Boolean expressions to truth tables and logic diagrams.
- Construct Karnaugh diagrams to simplify Boolean expression.
- Draw switching circuits of a Boolean expression.

**SEMESTER – V**

Type of Course: DSE – II

Name of the Course: Advances Calculus

- Distinguish between pointwise convergence and uniform convergence of sequence of functions and series of functions.
- Solve problems on uniform convergence of sequence of functions
- Use the Weierstrass M-Test to check for uniform convergence of series.
- Determine the radius of convergence of power series.
- Solve problems on convergence of power series.
- Determine fourier coefficients
- State and apply Dirichlet’s conditions of convergence of fourier series.
- Give a concept of laplace and inverse laplace transform.
- State and apply convolution theorem.
- Solve linear differential equations using the Laplace transform technique.

## **Program Specific Outcome: Statistics (General)**

### **Programme Outcomes**

- Application of statistics in various walks of life.
- Ability to apply various statistical tools to research problem.
- Understanding how to collect, present, analyze and interpret the data.
- Ability to analyze the data by using MS-Excel.
- Knowing the statistical organization in India and Abroad.
- Ability to build statistical knowledge.
- Application of various distributions to real life situation.

## **Course Outcomes**

### **Semester-I**

#### **CC-1**

### **Descriptive Statistics**

1. Define and use the basic terminology of statistics.
2. Organize and display data by means of various tables, charts, and graphs.
3. Analyze statistical data using measures of central tendency, dispersion and location.
4. Find and interpret the sample correlation coefficient ( $r$ ) to determine the strength and direction of the linear relationship between predictor and response variables.
5. Use scatter plots to determine if outliers are present and if data can be represented by a simple linear regression model.
6. Find the simple linear regression model and be able to interpret the slope and y-intercept.
7. Use r-squared to determine if a simple linear regression model is a strong predictor.
8. Predict values of “y” using the simple linear regression model

### **Semester-II**

#### **CC-2**

### **Elementary Probability Theory**

1. Calculate probabilities by applying probability laws and theoretical results.
2. Identify an appropriate probability distribution for a given discrete or continuous random variable and use its properties to calculate probabilities.
3. Derive probability distributions of functions of random variables.
4. Derive expressions for measures such as the mean and variance of common probability distributions using calculus and algebra.
5. Calculate probabilities for joint distributions including marginal and conditional probabilities.
6. Apply results from large-sample theory and the Central Limit Theorem to approximate a sampling distribution.

### **Semester-III**

#### **CC-3**

### **Introduction to Statistical Inference**

1. Explain the concept of estimation of parameters.
2. Calculate the problems related to point estimation and interval estimation.
3. Explain the concepts of Testing of Hypotheses, (Large Sample Tests small sample test).
4. Solve the problems related to Testing of Hypotheses, (Large Sample Tests small sample test).
5. Identify situations where one—way ANOVA is and is not appropriate.
6. State the modeling assumptions underlying ANOVA.
7. State the null and alternative hypotheses for the ANOVA test.
8. Explain the partitioning of the total sum of squares into the “within” and “between” group components.
9. Understand the basic terms used in design of experiments.
10. Use appropriate experimental designs to analyze the experimental data.

## **Semester-IV**

### **CC-4**

#### **Applications of Statistics**

1. The basic principles underlying survey design and estimation.
2. Methods for designing and selecting a sample from a population.
3. How to estimate finite population parameters e.g. totals and means, for some standard sampling schemes.
4. How to assess estimation errors.
5. The ability to analyses and solve problems.
6. Understand the origins and basic features of axiomatic, economic and stochastic approaches to price index.
7. Apply the common elementary index formulae and the characteristic hedonic index method.
8. Assess the uncertainty associated with price index numbers calculated based on a sample of products.
9. Appreciate the fundamental challenges of price index based on scanner data and web scraping data.
10. Understand the basic structure of the consumer price index (CPI) and perform calculations involving its use.

11. Understand the concepts of time series analysis in the time domain.
12. Be able to determine and apply appropriate models for the real life datasets.
13. Have developed skills in statistical computing of time series problems.
14. Understand and apply advanced methods in demography Interpret complex demographic data.
15. Analyses data using key advanced demographic methods.
16. Generate clear and professional reports based on demographic analyses.
17. Apply demographic methods to understanding current issues in demography and health.

## **Program Outcome: B. Com. (Honours & General)**

### **Program Outcomes:**

- Students will be eligible to pursue higher studies in the respective areas leading to research activities which will contribute to the society.
- Student will be more equipped to appear in All Competitive Examinations.
- The program aims to improve the analytical faculty of the students.
- After the completion of B. Com. Honours degree, candidates can opt for jobs both in government and private agencies.
- Develops advanced theoretical and research skills.

### **Course Outcomes**

#### Type of Course: Financial Accounting I

- To enable the students to learn the principles and concepts of Accountancy.
- To make them aware about the Financial Accounting Standards.
- It gives the students the concepts for determining business income, concepts of capital, revenue etc. And also finalization of accounting for trading concern.
- Helps the students to learn to prepare financial statements for Non-profit seeking concern as well as concerns with incomplete records.
- They are made to learn about accounting for special sales transaction eg consignment.
- To make them aware of concept of self-balancing sectional balancing ledger.
- To make them aware about calculation procedure of loss of profit and loss of stock.

#### Type of Course: Business Law

- To give an overview of the concepts of agreement & contract.
- To make the students aware of the concepts of offer, acceptance & consideration, rules relating to offer and acceptance, revocation of offer & acceptance, elements of consideration etc.
- To make them know about the parties competent to enter into contract.
- To enable them to learn about the concepts of consent, free consent, coercion, undue influence, fraud, misrepresentation and mistake.
- To help them to get an idea of different types of agreements, discharge of contract & special contracts. (Contingent contract, quasi contract, contract of indemnity, contract of guarantee, bailment, pledge).
- To make them aware of the introduction of 'The sale of goods Act, 1930', conditions and warranties, Doctrine of Caveat Emptor, transfer of ownership, transfer of title by non-owners.
- To make them aware of concept of partnership, types, registration, minors position, regret and duties, dissolution of firms.
- To give them overall idea of Promissory Note, Bill of Exchange and cheque, endorsement, Holder & Holder in due course, Dishonor of Negotiable Instruments.
- To help the students to get an in-depth idea about Consumer Protection Act, 1986 – objection, complaint, consumer dispute, goods, services, central & state council, Consumer Dispute Redressal Agencies, manner of lodging a complaint.

#### Type of Course: Principles of Management

- To provides the students on overview of the basic concepts of management: definition, importance, functions, nature, universality, levels, different schools of management thoughts (classical, neo-classical and modern)
- To give them the idea of the planning: concept importance, steps, types, barriers, remedial measures strategic planning and forecasting.
- To give them an in-depth concept of importance, principles, models of organizing, delegations, centralization and decentralization of authority, span of management etc.
- To make them aware of directing, staffing & leadership.
- Last but not the least, the students also need to know the models of motivation, concepts and importance of co-ordination and control.

#### Type of Course: Financial Accounting – II

- This course helps the intermediate level students of under graduate studies in B.Com programme.
- The students get to learn about the concepts of basic Partnership Accounts.
- The students learn about Branch Accounting, Departmental Accounting.
- The students learn about Investment Accounting.
- The concept of business acquisition and conversion of partnership into limited company is also being introduce

#### Type of Course: Corporate Accounting

- This course aims to enlighten the students on accounting procedures followed by companies as per the provisions of companies act.
- The various areas made familiar to students are accounting for Shares and Debenture, Buyback of shares and redemption of preference shares & debentures, Company Final Accounts, valuations of shares and finally concepts of company

merger and reconstruction.

### Types of Course: Auditing and Assurance

- This course enables the students to learn about the phenomenal expansion of the field of Auditing as a result of the complexities in the corporate world.
- The students start by learning the various basic concepts relating to Audit.
- The students are acquainted with the concept of types of audit, technique of audit and procedures of audit.
- The students get to learn about the various facts of company Audit including idea about schedule III of Company Act 2013'.
- They also learn about other audits like Cost Audit, Management Audit, Social Audit, Environment Audit etc.
- The various case laws relating to audit have also been incorporated so as to make the students aware about the legal factors.

### Types of Course: Indian Financial System

- Acquaints the students to get a vivid idea about the Indian Financial System and its components.
- At the end of the course, the students get very good idea about Financial Markets, both Money and the Capital Market.
- Concepts of Financial Institutions, Financial Services are also elaborately explained.
- The concepts of Investors Protection and Grievance Mechanisms are also made clear.

### Types of Course: Taxation – I

- This course aims to make the students familiarize with the various provisions of Direct Tax.
- After completion of the course, the students would know about the concepts of residential status, agricultural income and the basic ideas as to Gross total income, Tax evasion, Tax Avoidance and Tax Planning and Tax Free Income.
- The students will be made aware of the five heads of income i.e. income from salary, income from house property, income from profits & gains of business and profession, income from capital gains and income from other sources.
- Besides a very clean idea about set off and carry forward of losses under Income Tax Act is also made clear.
- Students become knowledgeable about the deductions from Gross Total Income, which would later on help them to compute the tax liability of individuals.

### Types of Course: Taxation – II

- After completion of the course the students develop skill to compute total tax liability, and also get concept.
- Students learn tax management concepts involving filing of return, assessment of returns advance tax, interest and fees and TDS.
- Students get good idea about Customs Duties and Goods & Service Tax. The concept of GST being relatively new, the students are made aware of the basic concepts, like time value and place charge of GST. Levy of GST under CGST. Also the input-output ton computation, input tax credit and composition scheme under GST is also thought.

### Types of Course: Cost & Management Accounting – I

- Cost & Management Accounting being specialized branches of accounting, the students get an overview of how both the sub-fields of accounting helps in decision making process.
- The subject gives an insight on the basic principles of cost and management accounting. The various concepts of cost, classification of cost, and analysis of total cost are explained.
- The students get idea about concepts of classification and treatment of material, labour and overhead components of cost.
- The students learn about the various methods of costing. Also about the process costing.
- The students gather knowledge as to methods of costing applicable to service industry.
- Finally the students learn how to focus on cost control accounting, reconciliation of Cost and Financial profits.

#### Types of Course: Cost & Management Accounting – II

- The survival and growth of an organization depend upon accurate decision making. This course enables the students to learn about how to take vital decision in product pricing, determining product mix, accepting orders etc.
- After completion of the course the students will get good idea regarding. (i) Joint products & By products. (ii) Activity based costing. (iii) Budget and Budgetary Control. (iv) Standard Costing. (v) CVP analysis and Marginal Costing.
- The thorough knowledge about the various Cost & Management Accounting techniques would provide the students the ability in short term decision making process.

#### Types of Course: Micro Economics – I & Statistics

- This course is designed for the undergraduate B.Com students to make them understand the basic concepts of micro economics and statistics the emphasis is on the fundamentals.
- After completion, the students get knowledge about concept of demand, demand function, law of demands, derivation of individual and market demand curves, and elasticity of demand. Along with the demand concept, a related topic of consumer behavior is also fully explained.
- The students are given a very good insight into cost function and production function relating to both short run and long run as well.
- Students also learn about the concept of perfect competition and related concept including Walrasian and Marshallian theories demand supply analysis.
- In statistics, the fundamentals are made known to the students. They also learn about measures of Central Tendency, dispersion, Moments, skewness and kurtosis and also interpolation.

#### Types of Course: Micro Economics – II & Indian Economy

##### **Micro Economics – II**

- Concept of Monopoly: Sources of monopoly power; Short-run and Long-run equilibrium of a monopoly firm; Price discrimination; Social Cost of Monopoly (concept only)
- Concept of Imperfectly Competitive market
- Monopolistic Competition: Features and examples
- Oligopoly: Non-Collusive Oligopoly: Sweezy's Kinked demand Curve Model, Collusive Oligopoly: Cartel (concept with example)
- Introduction; Marginal Productivity Theory of Distribution

- Marginal Productivity Theory of Wage, Demand Curve of Labour, Supply Curve of Labour; Wage Determination in an Imperfectly Competitive Labour Market: Case of Collective Bargaining, Factors determining the power of trade unions to raise wages
- Theory of Rent: Ricardian Theory of Rent, Modern Theory of Rent, Quasi-rent
- Theory of Profit: Gross Profit and Net Profit, Accounting Profit and Normal Profit, Different Theories of Determination of Profit
- Concept of Interest: Gross Interest and Net Interest, Classic Theory of Interest Rate Determination

### **Indian Economy**

- Concepts and measures of development and underdevelopment; Concept of national income: GDP, GNP, NDP, NNP, NI (concepts only)
- Studying the trends in GDP and per-capita GDP will help the students to analyze the growth path of the Indian economy
- Sectoral distribution of National Income and Occupational Structure; Structural Change in Indian Economy, issue of Service-led Growth
- Agricultural Sector: Problem of low productivity; Green Revolution and its impact; Land Reforms; Problems of rural credit and marketing
- Industry and Service Sector: An overview of industrial growth during pre-reform and post reform period; Role of Public Sector: its performance and the issue of disinvestment; Role of MSME sector, problems faced by the MSME Sector; Role of the Service Sector: growth of banking and insurance sector during the post-reform period
- Know the nature and policies on the agricultural, industrial and tertiary sector in Indian context
- Interpret the performance of Indian agriculture and industrial sector
- Evaluate the policies adopted in India to develop the two sectors
- External Sector: Problem of unfavourable balance of payments and policy measures
- Analyze the performance and policies of Indian foreign trade – know the balance of payments position of India in recent years; India's export and import policies
- Problem of Poverty, Poverty alleviation measures; Problem of Unemployment and the policy measures
- In this unit you will be introduced to the poverty and inequality scenario of Indian economy over the last 7 decades
- Given human resources is one of the important factor that fosters economic growth, this unit will also help the students to get an idea about the employment and unemployment situations in India

### **Types of Course: Macroeconomics**

- Concepts and variables of Macroeconomics
- Concepts and measurement of National Income (numerical examples preferred); Circular flow of income – Real and Nominal GDP –Implicit deflator
- From this unit, first of all, students might get a theoretical idea of how the macroeconomy functions in a closed economy and how the national income of that economy can be determined
- Along with this, students can also get a clear understanding of how the national income measure can be adjusted for inflation
- This unit tries to provide the understanding of different methods of measuring national income, their associated problems and the techniques that are being followed to avoid those problems
- It provides the basis of understanding the income determination model in the short run



- Simple Keynesian Model; Consumption, saving and investment functions – National income determination; Investment multiplier, Government expenditure multiplier, Tax multiplier, Balanced Budget multiplier
- From the Keynesian cross model students might get a clear idea of functioning of the economy in a depression situation
- It is to make students understand that the depression can be do away with a expansionary fiscal policy that generates a multiplier effect on the national income by expanding the effective demand – the demand side argument
- Students might get an understanding of Keynesian consumption function, saving function and investment function from this unit
- This unit also analyses the different kind of multipliers that a government can follow in order to stabilize the economy
- This unit, thereby, tries to make students understand the role of government intervention in an economy as opposed to laissez-faire policy
- Concept of demand for Money: Liquidity Preference Approach; Derivation of IS and LM curves – Shifts of IS and LM curves-equilibrium in IS-LM model – Effectiveness of monetary and fiscal policies
- This unit shall clear the student’s understanding on how market rate of interest is determined and its impact on the economic activity of a country
- The Keynesian Theory of Liquidity Preference shall help one to understand the role of money in determining the rate of interest
- The students will form an idea on influence of monetary authority on market rate of interest
- This unit will help the students to understand the main determinants of investment. One shall get profound knowledge on rate of interest as the main determinant of investment
- In this section, the money market is brought in to discussion along with the commodity market which might provide the students more clarity in understanding the phenomenon of short run equilibrium income determination
- This section deals with money market and commodity market simultaneously and thereby explains the simultaneous equilibrium of these markets and the stability of the equilibrium
- this section also gives the students the idea of policy effectiveness – both fiscal and monetary policies – in different situation
- Concept of supply of money; Measures of money supply – High powered money – Money multiplier. Concept of Inflation – Demand-pull and Cost-push theories of inflation – Monetary and fiscal policies to control inflation; Unemployment: Voluntary and Involuntary, Frictional and Natural Rate of Unemployment (Concepts only)
- This unit shall help the students to understand why prices of goods and services vary over time and across countries
- The theories on inflation shall illustrate the meaning of inflation, deflation, stagflation, identify different kinds of inflation, causes and effects of inflation on different sectors of the economy, and describe different measures to control inflation
- The students will also learn why and how RBI intervenes in controlling inflation

#### Types of Course: Entrepreneurship Development

- Introduction: It helps to understand the concept and importance of entrepreneurship and creative behavior and the concept of MSME sectors, and to understand the concept of Family Business.
- Public and Private system of Stimulation: This chapter helps to (i) Understand

the Public & Private sector. (ii) Requirement of a business. (iii) Also helps to create optimum capital structure.

- Sources of Business Idea: this chapter helps to (i) Generic Ideas, Selection of Ideas and the flexibility test of Idea. (ii) Selection of location. (iii) Planning and control of entrepreneurship.
- Mobilizing Resource: This chapter helps to understand how to mobilize people and resources. Students identify and secure customers, stakeholders and team members through networks. Primary customer research and competitive and industry analysis.

#### Types of Course: Business Ethics

- Introduction: Promote understanding of the importance for business and the community of ethical conduct. For better understanding of corporate social responsibility.
- Corporate Culture: Enhance awareness and critical self examination of one's own values and to appreciate the relevance of personal values in the business/workplace setting.
- Principles of BE: Encourage reflection on the ethical dimension of your own decision making in work place and other setting.
- Ethics in Management: Provide the skills which to recognize and resolve ethical issues in business.

#### Outcomes;

- Define explain and illustrate the theoretical foundations of business ethics.
- Explain and illustrate the importance for business and the community of ethical conduct.
- Reflect on and critically examine their own values and the importance of the ethical dimension in business and workplace decision making.
- Confidently apply systematic ethical reasoning to business dilemmas and communicate effectively in oral and written forms these using the concepts, logic and rhetorical conversions of business ethics.

#### Type of Course: Business Mathematics

On Completion of this course the students will be able to:

#### Set Theory

- Define sets and give examples of sets.
- Describe sets verbally using appropriate mathematical terms (e.g., inclusive) and be able to write sets in roster form and set-builder notation.
- Determine whether an object is an element of a set.
- Determine whether a set is finite or infinite.
- Determine whether two sets are equal, equivalent, or neither.
- Determine the cardinal number of a set.
- Determine whether sets are the empty set or the universal set.
- Determine whether sets are subsets, proper subsets, or neither.
- Develop a general formula for finding the number of distinct subsets of a given set and be able to use the formula.
- Find the complement of a set and the intersection and union involving two or more sets.
- Apply Venn diagrams to solve practical problems.

#### Permutation and Combination

- Set up and compute factorials.
- Distinguish between Permutation and combination.
- Apply and calculate permutations.
- Apply and calculate combinations.
- Solve applications involving permutations and combinations.

### **Logarithm**

- Define logarithm
- Understand the relation between base and exponent.
- Perform calculations using exponents and logarithms to any base.
- Convert between logarithms of different bases.
- Solve problems using the laws for logarithms.
- Solve equations involving logarithms and exponents.
- Apply logarithms and exponents to real-life situations.

### **Binomial Theorem**

- State binomial theorem
- Compute the value of a given number using binomial theorem.
- Find the general and middle term using binomial theorem.

### **Compound Interest and Annuities**

- Define 'interest'
- Distinguish between simple and compound interest
- Apply the formula to calculate compound interest
- Explain the difference between a compound amount and an annuity
- Calculate the future value of an ordinary annuity by using the formula or the table for annuities.
- Calculate the amount necessary to establish a present value annuity by using the formula or a table for annuities.
- Calculate the regular payment necessary for establishing a sinking fund by using the formula or a table for annuities.
- Calculate the equal regular payments that will amortize a specific sum of money over a set period of time.

## **Types of Course: Advanced Business Mathematics**

### **Function**

- Define the terms “function”, “domain” and “range” and describe each of these mathematical concepts in a given context.
- Define the terms “one-to-one function” and “inverse function”.
- Distinguish between different type of functions.
- Understand the definition of the functions of two or more variables.

### **Limit and Continuity**

- Define limit and continuity
- Use properties of limits to evaluate different limits.
- Define double limit and repeated limits of function of several variables.
- Check a functions whether it is continuous or not.
- Give standard examples of discontinuous functions such as the Dirichlet function

### **Differentiation**

- Define differentiability and its sufficient condition of a function of one or more variables.
- compute derivatives using the limit
- Apply basic properties of derivatives to solve problems.
- Compute partial derivatives of a multivariable functions.
- State and apply Euler's theorem and its converse for a homogeneous function of two or more variables.
- Solve problems on differentiation of implicit functions.

### **Application of Derivatives**

- Apply the concept of derivatives to find maxima and minima of a function
- Solve problems regarding cost function, demand function, profit function, increasing and decreasing function.
- Solve applied problems on average cost and marginal cost.

### **Integration**

- Find indefinite and definite integrals using substitution.
- Find indefinite and definite integrals using integration by parts.
- Find indefinite and definite integrals of partial fractions.

### **Matrix and determinants**

- Distinguish between matrix and determinants.
- Determine the order of matrix and determinants.
- Do addition, subtraction and multiplication of matrices and determinants.
- Determine the value of determinants.
- Solve problems on matrix and determinant using algebraic properties of matrix and determinants.
- Solve system of linear equations by Cramer's rule and by matrix inversion method.

### **Probability**

- Give basic idea on probability.
- Define probability, independent events, mutually exclusive events, exhaustive events, conditional probabilities.
- Solve problems using the concept of probability.

## B. A. & B. Sc. General

### Program Specific Outcome: Economics (General)

Program Structure (followed in our college)
<ul style="list-style-type: none"><li>• 3 year degree programme.</li><li>• The subject Economics falls under both BA and BSc two types of structures</li><li>• Honours students in any other discipline can choose Economics as a subsidiary subject in any two of Sem I to IV.</li><li>• Candidates opting for general course can have Economics as a core subject or generic elective subject. When chosen as a core subject, Economics will be one subject among any of the three subjects chosen for the entire course of study. The course will be covered in all the semesters</li><li>• When Economics is opted as a generic elective subject it shall be studied in any one semester covering Semester I and II.</li></ul>
<b>Program Specific Outcome</b>
<p>Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course or General course</p> <ul style="list-style-type: none"><li>• The Economics major shall develop three skills: logical thought used in solving problems, observation and inference from data.</li><li>• A degree in Economics provides students with the flexibility to adapt in a changing environment and take advantage of new opportunities. Majoring in Economics is excellent preparation for a variety of careers and occupations. Individuals who wish to be competitive in today's job market need to be ready and able to adapt as our economy evolves and grows.</li><li>• Graduates of the Economics program can pursue a variety of careers, including entry-level business/management, sales, data processing, staff analysis and research, and teaching.</li></ul>

### Course Outcome (Semester-wise)

<b>Semester I</b>
<b>Introductory Microeconomics (CC1/GE1)</b>
<p>On successful completion of this course students will be able to:</p> <ul style="list-style-type: none"><li>• Explore the subject matter of economics. Students will be able to address the economic problem of scarcity and choice and can find solutions to the three basic choices faced by an economy: what to produce, how to produce and for whom to produce</li><li>• The course provides an analysis of the way in which the market system functions as a mechanism for coordinating the independent choices of individual economic agents. It develops a basis for evaluating the efficiency and equity implications of competition and other market structures, and a perspective on the appropriate role of government</li><li>• Explain consumers' and firms' behavior using mathematical tools</li></ul>
<b>Semester II</b>

<b>Introductory Macroeconomics (CC2/GE2)</b>
<p>This course will help the students to:</p> <ul style="list-style-type: none"> <li>• Get a broad overview of macroeconomics. They will study the behavior of the economy as a whole</li> <li>• Explain national income, calculation methods of national income, and concepts related to national income</li> <li>• Comprehend why some experience high inflation while others have stable prices and why all countries experience recessions and booms. The theories of aggregate output, money and inflation shall also help the students to know if government policies can have an impact on these factors</li> <li>• Interpret macroeconomic issues such as money, foreign exchange, inflation, unemployment, economic growth and foreign trade</li> <li>• Relate basic macroeconomic theory and principles to current macroeconomic issues</li> </ul>
<b>Semester III</b>
<b>Issues in Economic Development and India (CC3/GE3)</b>
<p>At the end of the course, students will be able to:</p> <ul style="list-style-type: none"> <li>• Comprehend the understanding of the difference between growth and development, major growth theories, the measurement of inequality, significance of agriculture in developing countries, poverty and population issues facing the world, international trade, and importance of foreign aid.</li> <li>• Analyze empirical evidence on the patterns of economic development in the context of India.</li> <li>• Special references to education and health sectors in India and growth and development of Indian economy under different policy regimes shall facilitate their understanding of transition of Indian economy from an under-developed to a developing country</li> <li>• Know the importance of international organizations (IMF, World Bank, WTO) and their roles in economic development of economies, specifically India.</li> </ul>
<b>Semester IV</b>
<b>Indian Economic Policies (CC4/GE4)</b>
<p>On the completion of this course students will be able to:</p> <ul style="list-style-type: none"> <li>• Know various economic policies that have been adopted in India since independence</li> <li>• Comprehend the impact of fiscal policy, trade and investment policy, financial and monetary policies, labour regulation on Indian economy</li> <li>• Interpret the performance of Indian agriculture and industrial sector.</li> <li>• Evaluate the policies adopted in India to develop the two sectors shall</li> <li>• Analyze the performance and policies of Indian foreign trade – know the balance of payments position of India in recent years; India’s export and import policies</li> </ul>
<b>Semester V</b>
<p><i>(students are required to chose any one)</i></p> <p><i>(only for general candidates taking Economics as core subject)</i></p>
<b>Money and Banking (DSE – A)</b>
<p>The course aims to provide the student with:</p> <ul style="list-style-type: none"> <li>• An introduction to the role of money, financial markets, financial institutions and monetary policy in the economy, thus providing a solid foundation for further study or employment in the financial services industry.</li> </ul>

- An understanding of the role of financial markets in the economy with a particular emphasis on bond markets and interest rate determination.
- An insight into the main aspects of banks and other financial institutions before turning to an investigation of the role of money, central banking and monetary policy in the context of India

### **Sustainable Development (DSE – A)**

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

- Key environmental issues and problems, economic way of thinking about these problems, circular flow of environmental pollutants and waste recycling-laws of thermodynamics, renewable and non-renewable resources-the issue of sustainability
- Different definitions of sustainable development, rules of sustainable development, measures of sustainable development, sustainable management of resources-the role of property rights, stakeholders associated with sustainable management of different types of renewable resources-fishery, forestry and water, the concept of sustainable livelihood in the context of sustainable resource management
- Implementation of environmental policies in developing countries and international experience; transboundary environmental problems-international meetings, protocols and treaties; economics of climate change-basic ideas of the carbon credit market-clean development mechanism and international emission trading

Water policy, forestry policy and fishery policy of India. Basic objectives of the policies along with goals and visions

### **Semester VI**

*(students are required to chose any one)*

*(only for general candidates taking Economics as core subject)*

### **Public Finance (DSE B)**

Students successfully completing this unit will have the ability to:

- Understand the sources of finance both public and private; demonstrate the role of government to correct market failures and possible advantage of public financing.
- Attain the advantages and knowledge of public investments and other government expenditures. Understand the causes of growing public expenditures for various programmes and policies within and outside the country.
- Understand the possible burden, benefits and distribution of various types of taxes among various classes of people, know the general trend and impact on general welfare and arouse them to suggest good and bad tax system.
- Deliver effectively the preparation of budget and how they are passed in the house. Understand the changes in size and flexibility of state and central budget along with the role played by Finance Commission

### **Economic History of India (1857-1947) (DSE B)**

On completion of the course students shall:

- Get an over view of colonial Indian economy
- Know the structure of Indian economy by analyzing the macro trends of national income, population and occupational pattern during the period of Bristish rule in India
- Know the history of Indian railways and its importance during the colonial period in promoting industrialization of the Western countries
- In this context, learn the agrarian structure and land relations during the British rule

- Get insights into the position of the economy and state in Imperial context; the drain of wealth shall be focused upon

### **Semester III or V**

#### **Skill Enhancement Course**

*(students are required to chose any one)*

*(only for general candidates taking Economics as core subject)*

#### **Introductory Methods of Field Survey (SEC A)**

Students successfully completing this unit will have the ability to:

- Master the skill to deal with economic data
- Form basic ideas of economic data. They will know the types of economic data – cross-section, time series, pooled, panel data, etc in details and the techniques to handle and interpret them
- Perform field surveys since they will be taught methodologies of collection of data through sampling techniques, practical methods of drawing random samples using random number tables and preparation of questionnaire depending on the nature of survey
- Record and represent data after completion of survey both manually and by use of computers

The course will increase the job competitiveness of the students as data collector and data complier in various government and private institutions

#### **Elementary Rural Development (SEC A)**

Students successfully completing this unit will have the ability to:

- Understand distinctively between rural development and agricultural development.
- Know the idea of decentralized planning and participatory Development strategies.
- They will learn the basic idea of decentralized planning in the context of Panchayat system.
- Understand the rural development technique through Panchayat in the context of West Bengal.
- They will get to know the role of NGOs in rural development.
- Through the study of rural credit system and the Self Help Groups students might get the idea of the constraints that rural micro-enterprises face.
- They can build an understanding of the credit requirements of the rural non-farm sectors.
- It is helpful for the students to understand the role of Grameen Bank, need for SHGs in the context of micro credit in rural areas.
- They can conceptualize the formation, functioning and need for SHGs in Indian context.
- Students will learn about some selected Government Programmes in the context of rural development, such as:
  - Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
  - Mid-day Meal
  - Pradhan Mantri Gram Sadak Yojana (PMGSY)

The course will increase the job competitiveness of the students in the NGO sector, Government sector and private sectors working in agricultural marketing.

### **Semester IV or VI**



### **Skill Enhancement Course**

*(students are required to chose any one)*

*(only for general candidates taking Economics as core subject)*

#### **Data Analysis and Report Writing (SEC B)**

The aim of the course is to provide participants with an introduction to research methods and report writing.

Upon successful completion of the course students are expected to:

- Develop an understanding on various kinds of research, objectives of doing research, research process, research designs and sampling
- Have basic knowledge on qualitative research techniques
- Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis
- Have basic awareness of data analysis-and hypothesis testing procedures by learning tabular and graphical representation of Statistical data and methods of calculating basic descriptive statistics like Mean, Median, Mode, Measures of dispersion, correlation and regression analysis

#### **Entrepreneurship and Development (SEC B)**

This course tries to provide the students with the basic issues of the entrepreneurship and economic development. It explains the growth strategies taken up by the small businesses and also the sickness these businesses suffer.

On successfully completing the course students are expected to:

- Learn the link between entrepreneurship and the economic development and also learn the development of entrepreneurship in India and its role in the nation's development. Students are also made aware of the problems in the rural entrepreneurship
- Get the idea of the source of finance and capital structure for the new entrepreneurial ventures along with the different institutional supports
- Learn the different types of growth strategies taken up by the small firms and also the stages of the growth they follow
- Be aware of the concept of industrial sickness and their basic symptoms, causes and consequences