2018-19

PROGRAM OUTCOMES, PROGRAM SPECIFIC OUTCOMES, COURSE OUTCOMES

BACHELOR OF COMMERCE (BCOM)

Program	The students will be ready for employment in functional areas like
Outcome	accounting, taxation, banking, insurance and corporate law. An attitude for working effectively and efficiently in a business environment. Learners will gain knowledge of various disciplines of commerce, business, accounting, economics, and finance, auditing, marketing, e- commerce and GST. Student can indecently setup their own business . capability of the student to make decision at personal and professional level will increase
Program	after completion of this course.
Specific Outcome	Students also acquire skills to work as tax consultant, audit assistant and other financial supporting services. Students have choices to pursue professional courses such as CA, M.COM, MBA, CMA, ICWA, CS, etc Students are able to play roles of businessmen, entrepreneur, managers, consultant, which will help learners to possess knowledge and other soft skills and to react aptly when confronted with critical decision making.
taint stodents with the homan resource of an	The students will acquire the knowledge skill in different areas of communication, decision making, innovation and problem solving in day to day business activities.
B.COM (2015-2018)	OUTCOMES
Financial accounting	On successful completion of this course the student are enabled with the Knowledge in the practical applications of accounting, learn principles and concepts of Accountancy, basic concepts of Partnership Accounting, company accounts etc.
Business law	The objective of the course is to impart basic knowledge of the important Business laws along with relevant case laws. To develop the awareness among the students regarding these laws affecting trade business and commerce.
Corporate law	The objective of the course is to impart basic knowledge of the provisions of the Companies Act, 2013 and the Depositories Act, 1996. Case studies involving issues in corporate laws are required to be discussed. Students would acquire knowledge about the legal framework and the ways and means to deal with the legal aspect of different situations of corporate sector.
Corporate accounting	To help the students to acquire the conceptual knowledge of the corporate accounting and to learn the techniques of preparing the financial statements. This paper can provide conceptual clarity about the techniques to prepare financial statements of companies along with accounting treatment of various situations viz. floating of shares, amalgamation and liquidation of companies.
Income tax law and practice	To provide basic knowledge and equip students with the application of principles and provisions of Income Tax Act 1961.

it and ittoined it from	This paper would provide the understanding of various provisions of Income Tax Act as well as equip the students to make practical applications of the provisions for taxation purpose.
Indirect Tax	The objective is to equip students with the principle and provision of different taxes like custom duty, VAT, service tax and sales tax etc. and the set them is personal and marker in each set of the set of th
Business Mathematics	The objective of this course is to familiarize the students with the basic mathematical tools with emphasis on applications to business and economic situations. After reading this subject the students will be able to understand basic concepts in the areas of business calculus and financial mathematics and to connect acquired knowledge with practical problems in economic practice
Principle of marketing	The objective of this course is to provide basic knowledge of concepts, principles, tools and techniques of marketing. After the completion of this paper, the students will able to identify marketing components and fit them in the value chain along with the various marketing strategies.
Human resource and management	The objective of the course is to acquaint students with the techniques and principles to manage human resource of an organization. This paper can enhance the capability of the students to manage the most important assets of organization i.e. human beings which is much needed to ensure enough of that organization
Financial management	To familiarize the students with the principles and practices of financial management. After the completion of this paper, students will be able to understand finance in a better way along with giving them insight to practical management of long and short finance for real business houses.
Auditing and corporate governance	At the end of the paper student will have detail knowledge about principles and techniques of audit in accordance with current legal requirement and as per the guidelines of different statutory authorities.
Business organization and management	Analyze effective application of BOM knowledge to diagnose and solve organizational problems and develop optimal managerial devisions
Cost and Management Accounting	To acquaint the students with basic concepts of cost and management accounting, and basic understanding of tools and techniques used for managerial decision making. To acquaint the students with basic concepts of management accounting, and basic understanding of tools and techniques used for management

THE UNDER GRADUATE COURSE IN HISTORY

Programme outcome - Bachelor of Arts (B.A): 2018-19

At first the Odisha Government has introduced choice based credit system (CBSC) pattern of Education uniformly for undergraduate course in all the colleges during the session from 2019-20. The semester wise pattern of examination started having 14 core papers in History and 4 DSE papers, which was divided into six semesters in 3 years undergraduate programme in respective subjects.

The introduction of uniform CBCS pattern of Education helps the studens to gain more knowledge for the higher studies and actively participated in different competitive Examination.

The main focus in the History course at the UG level is on the stages the growth of Human Civilizations and the evolution of mankind scial systems, cultural and scientific development etc. By reading History students should understand academic honesty a concept presented to them in all History classes. They should understand the basic skills that Historians use in research. Students should understand the basic skills that Historian use in writing and basic tools of historical analysis students should develop a secular outlook towards society and the value of diversity. History inputs in students to believe in the equally of man irrespective of caste, creed, religion and colour. They should learn to believe in the ideas of religious toleration.

There is huge potentiality in future of a History student. Various options are opened to History students to choose their career. first of all, History is a subject from primary Education level to higher study so they can engage themselves in teaching profession in primary, secondary and post secondary schools and colleges. History is also helpful for those who are preparing civil services, ssc etc. A History students may choose his or her career in journalism or any other editorial board. They may get job in museum archives and libraries. Besides those in the field of research and archaeology they may proceed.

Specific outcome – part –l <u>Paper –l History of Inida upto from ancient times to C AD 650.</u>

Students of History Honours can archieve knowledge regarding geological background and sources with approaches to ancient Indian history. They learn about pre to proto history of our country, emergence and growth of earlier dynasties like Maurya, Gupta the empires in post Maurya period as well as in past Gupta period.

History of India from 650-1550:

History students will acquire knowledge about historiography of ancient India. The socio, political economic religious and cultural features of early medieval India are vividly depicted in this paper. The History of Delhi Sultanate is thoroughly described in this portion. Students can gather knowledge regarding Sultanate administration, socio-cultural-political situation of Delhi under Sultanate.

History of Inida C. AD 1550-1750:

The Mughal is a topic of controversy and attraction for their purse-proud to history lovers. Students will learn from this paper how did mughal polity, economy trade, commerce, society culture became so famous in medieval period. They also learn Akbars policy of religious tolerance. They also learn the history of downfall of the Mughals the end of an era.

Paper-4 (History of India C.AD. 1750 - 1950).

To understanding Modern India this paper is essential. Students from history stream will get knowledge about the penetration, expansion and consolidation of British Rule in India. Indian awakening freedom straggle, cultural changes and socio-religious reforms movements, Revolt of 1857 are described in this paper. Students of History Honors acquire knowledge about communal politics, partition in India in between 1947-1950.

Paper-3 Paper-5 - Rise of Modern west (Mid 15th to mid 18th Centuries).

The students of history honors learn about same significant events of Modern west, luck as Renaissance, Humanism, Reformation, Scientific Revolution, Mercantilism, American war of Independence, The Industrial Revolution. They will get knowledge from the debates which explain the transition of feudalism to Capitalism.

Paper-6 History of Modern Europe C.AD. 1780-1939.

This paper focused on the great French Revolution in 1789. Students came to know about the emergence of Napoleon Bonaparte in Europe and his expansion, consolidation, downfall, Vienna Congress, Metternich, Bismarck and his diplomacy, system of alliances, 1917 Russian Revolution, Fascism and the origin of world war 1 and 2, all these important issues are incorporated in this paper.

Paper-7 The Making of the Contemporary World -

in the second

Students will gather knowledge about the impact of the second world war on the International system like cold war emergence of third world, nonalignment, and bipolar world through this paper. The system of military and economic alliances, decline of European Imperialism, decolonization has been explained in this paper.

Thus the study of History had great value and one may get good jobs in administration, Railway and banking sector etc.

U.G. PROGRAM OUTCOME - BACHELOR OF SCIENCE (B.Sc.) in **BOTANY** For the Academic Session - 2018-19

The Odisha government introduced a uniform syllabus for undergraduate courses in all universities from the 2019-2020 academic session, a common syllabus across all the universities. "Introduction of uniform syllabus for the students in colleges will help them pursuing further higher studies in a competitive and meticulous manner.

B.Sc Botany Course Outcomes: Botany is a basic science and forms the foundation for most of the modern multidisciplinary subjects like, Biotechnology, Molecular Biology which deals with plant life. It facilitates in studying the rapidly developing fields like Molecular Biology, Genetic Engineering, Tissue Culture, Phytomedicine, Biochemistry and Horticulture. Students can pursue academic career as Lectures and Teachers. On completion of the course students will have broad job opportunities in various fields of Botany like Plant Taxonomy, Ethnobiology, Pathology, Palaeobotany and Palynology, Plant cytology, Plant Genetics, Plant Ecology, and as scientists in BSI and Government departments through UPSC exams.

The undergraduate course in Botany under CBCS credit system has been semesterised in 2019-20 having 14 Core Papers and 4 DSE papers.

In Semester I there are two core courses Phycology and Microbiology (CC1) and Biomolecules and Cell Biology (CCII). A brief account on classification, life history and economical importance of different algal and microbial genera and basic cell biology cum biochemistry are taught in these two papers which help the students to develop a clear concept on cryptogamic groups of plant kingdom. Besides, the practical classes the local field excursions enable the students to identify the microbial and algal genera. Students learn various culture techniques and bacterial staining method in practical class.

In *Semester II* there are two core courses Mycology and Phytopathology (CCIII) and Archaegoniate(CC IV). In Phytopathology and micology, students study about life history of different groups of fungus important plant diseases, host pathogen interaction and plant disease management. In archaegoniate paper the students study about Bryophyte, Pteridophyte and Gymnosperm groups of plant kingdom. In this semester students go for a long excursion in a place of higher altitude to observe and identify these groups of plants in their natural habitat.

In *Semester III* there are three core courses. In anatomy of Angiosperms (CC5) paper helps the students to know about Internal structural organisation of plant organs. The students also do practical to study the anatomical details of plant tissue and organs. In Economic Botany paper (CC6) students study about economically rich groups of plant crops viz. cereals, legumes, sugar and starches, spices, beverage, oil and fat, drug yielding plants etc. In Genetics paper (CC7) students get a clear concept on various topics of Genetics specially Mendelian genetics, population genetics, and cytogenetics. In practical classes the students study about mitotic and meiotic chromosomes.

In Semester IV students are offered three core courses. In Cell and Molecular Biology paper (CC8) students come to know about origin and evolution of cells, DNA replication, transcription, translation, gene regulation and recombinant DNA technology. In Practical classes students carry out a number of experiments on Plant Molecular Biology. In Plant ecology and Phytogeography paper (CC9) students study about plant evolution, plant ecology and plant evolution. Long excursion to a phytogeographic region in India is being carried out in this semester. Plant systematics paper (CC10) deals with the Taxonomy of Angiosperms. This is a very important field of Plant Science which deals with Plant nomenclature, System of Classification and Taxonomic families. The students work out on angiosperm specimens in practical class and they also learn to identify plants. A number of local field excursions are in the curriculum during this semester. Students learn to prepare field note book, voucher specimen book and herbarium specimens..

In Semester V students are offered two core and two DSE courses. In Reproductive Biology of Angiosperms (CC11) the students learn about morphology of angiosperm and embryology. In Plant Physiology (CC12) paper students acquire knowledge about various physiological processes viz. Photo morphogenesis, plant growth regulators, seed dormancy etc. In Analytical Techniques in Plant Sciences DSE paper (DSE-I) students acquire knowledge about various methods of instrumentation techniques and statistical tools apply in plant science. Natural resource management (DSE-II) paper students acquire knowledge about management of natural resources and biodiversity conservation.

In Semester VI There are two core courses and two DSE papers in this semester. In plant metabolism paper (CC13) students study about primary and secondary metabolic pathways such

as photosynthesis, respiration, nitrogen and lipid metabolism etc. In Plant Biotechnology (CC14) paper students acquire knowledge about various methods of plant propagation, in-vitro method of plant tissue culture and development of transgenic plants and their application. In Industrial and Environmental Microbiology DSE paper (DSE-III) students acquire knowledge about various techniques of Microbial Genetics, Industrial Microbiology, Bioinformatics, Molecular Biology, Biochemistry, and Microbial Physiology and study the large-scale and profit motivated production of microorganisms or their products for direct use, or as inputs in the manufacture of other goods. And the last (DSE-2D) paper is a project paper, in which students do experiment and compile a dissertation paper under the supervision of guide/ mentor. Which make them expertise in the field of basic research and innovation.

This will open up new avenues and job opportunities for the students. The contents of core course and optional courses in UG/PG curriculum are beneficial for the students to get prepared for NET/SET/GATE and also GRE and other competitive examinations.

COURSE & PROGRAM OUTCOMES OF CHEMISTRY HONOURS (B.SC.) UNDER CBCS

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

After careful analysis of the course, the department of Chemistry has pointed out the following outcomes of the course.

Semester	Course Code	Course Outcomes
		CO-1: To know extra nuclear structure of atom
		CO-2: To understand acid base reactions
		CO-3: To know the basic concepts of redox reactions
	CC-1	CO-4: To learn the basics concepts of organic chemistry specially on chemical bonding and physical properties
		CO-5: To study the estimation of ions or salts by acid-base titration method and
		oxidation-reduction titration method

Course Outcomes

		CO-6: To learn experimentally about the separation of compounds from a solid
SEM-I		binary mixture by using common laboratory reagents
		CO-1: To understand the basic concept of kinetic theory of gases and know how to
		solve numerical problems related to that topic.
		CO-2: To learn the transport processes of liquids and gases.
	CC-2	CO-3: To understand rate laws, rate equations of different types of reactions,
		determine rate constant values, order of reactions, effect of temperature and other
		factors on reaction rate, homogenous catalysis, catalytic effect on reaction rate,
		$C \cap A$. To loop the basic concents of Storacchemistry
		CO 5. To understand about the formation and stability of reaction intermediates and
		their electrophilic and nucleophilic behavior.
		CO-6: To study the kinetics of decomposition of H_2O_2 , acid-catalyzed hydrolysis of
		methyl acetate, viscosity measurement of unknown liquids, measurement of solubility
		of sparingly soluble salts.
		CO-7: To understand experimentally how to determine the boiling points of organic
		Inquid compounds.
		CO-1: To learn stereochemistry of chiral compounds arises due to presence of stereo axis: concept of prostereoisometricm and concept of conformations of stereo
		isomers.
		CO-2: To understand reaction kinetics, reaction thermodynamics and tautomerism of
		organic compounds.
		CO-3: To know the concept, types, reaction mechanism and examples of
	UU-3	elimination, free-radical and nucleohilic substitution reactions.
		CO-4: To learn experimentally how to synthesize, calculate the yield and determine
		the melting point of pure organic compounds in the laboratory.
		CO-1: To learn about the basic concepts and types of chemical bonding, laws, rules and equations for formation of chemical bonds, solubility, hybridization and dipole
SEM-2		moment of molecules.
		CO-2: To study the modern approaches of chemical bonding (Molecular Orbital
		Theory, Metallic Bonding conept, Role of weak intermolecular forces)
		CO-3: To understand about the concept of radioactivity and radioactive compounds,
		nuclear reactions, artificial radioactivity, radio carbon dating, hazards of radiation and
		safety measures.
		CU-4: To know experimentally how to estimate the percentage of chlorine in blackhing powder: vitamin C: arsenic and antimony in a sample by iodimetric titration
		method. Students can also learn how to estimate Cu in brass, Cr and Mn in steel and Fe
		in cement.
		CO-1: To learn in detail about the first and second laws of Chemical
		Thermodynamics and the related terms; to get idea about thermo-chemistry and
		thermodynamic relationships and system of variable compositions.
		CO-2: To gain vast knowledge on chemical equilibrium and electrochemistry.
		CO-3: To learn experimentally how to do the potentiometric and conductometric titrations of different compositions, determine the Ka of weak acid and heat of
	CC-5	neutralization of a strong acid by a strong base.
		CO-1: To study in detail about modern periodic table, physical and chemical
		properties of the elements along a group or period, factors influences those properties,
		relativistic effects and inert pair effect.
		CO-2: To study the chemistry of s and p block elements including noble gases and
	CC-6	their compounds in detail. $CO(2)$ T is the second
		CO-3: To learn about inorganic polymers in detail.

SEM-3	CC-7	 CO-4: To know the meaning of various terms involved in co-ordination chemistry, Werner's theory for complex formation, structural and stereoisomerism of co-ordination complexes. CO-5: To learn the complexometric and gravimetric estimation of different ions, chromatographic separation of (i) Ni (II) and Cu (II) ions, (ii) Fe (III) and Al (III) ions. CO-1: To learn in detail about the synthesis, properties, chemical reactions and reaction mechnisms of alkenes and alkynes CO-2: To understand about different types of electrophilic and nucleophilic aromatic substitution reactions, reaction intermediates and their mechanisms. CO-3:To study the properties and reactions of carbonyl compounds and corresponding reaction mechanisms. CO-4:To learn preparations, reactions and corresponding reaction mechanisms of organometallic compounds. CO-5: To study experimentally the qualitative detection solid and liquid organic compounds.
	SEC-A	 titration method. SEC-1. MATHEMATICS AND STATISTICS FOR CHEMISTS CO-1: Helps to understand functions, differential equations, probability, vectors, matrices and determinants. CO-2: To learn about qualitative and quantitative aspects of analysis and helps to understand how to present a data after analysis. SEC-2. ANALYTICAL CLINICAL BIOCHEMISTRY CO-1: Helps to understand about the preparation, structures, reactions and biological importance of carbohydrates, proteins, enzymes, lipids and lipoproteins. CO-2: To know the biochemistry of different diseases through a diagnostic approach by blood and urine analysis. CO-3: To learn how to isolate proteins and how to perform the qualitative estimation of carbohydrate, proteins and lipids. CO-4: To study the quantitative estimation of carbohydrate, cholesterol, nucleic
	CC-8	 acids, determination of the iodine number of oil and saponification number of oil. CO-1: To understand in detail about the synthesis, separation, properties, identification, chemical reactions and their corresponding mechanism of nitrogen containing compounds. CO-2: Discussion about different kinds of rearrangement reactions. CO-3: Helps to know the logic of organic synthesis CO-4: To study UV-Visible, IR and NMR spectroscopy in detail. CO-5: Helps to know experimentally the qualitative analysis of single solid organic compounds.
SEM-4	CC-9	 CO-1: Helps to understand about the applications of Thermodynamics in Colligative Properties and Phase Equilibrium CO-2: To study the fundamentals of Quantum Mechanics CO-3: Helps to know the Bravais Lattice and Laws of Crystallography, Crystal Planes and Specific Heat of Solid CO-4: To know experimentally how to study phase diagram of a Phenol-Water system, kinetic study of inversion of cane sugar, determination of partition co-efficient

	value, pH of an unknown solution and pH metric titration of an acid against strong base.
CC-10	CO-1: Helps to understand about the structures, stability, colour, magnetism and Orgel diagram of the co-ordination compounds on the basis of modern concepts of chemical bonding.
	CO-2: To study the chemical and physical properties of d and f Block elements and their compounds.
	CO-3: To learn the reaction kinetics and mechanisms of inorganic reactions.
	CO-4: To study experimentally how to synthesize inorganic complexes and determine the λ_{max} values of inorganic complexes.
	CO-5: To calculate the 10Dq value by spectrophotometric method.
	SEC-3. PHARMACEUTICALS CHEMISTRY
SEC D	CO-1: Helps to understand about the drug discovery, design and development of representative drugs of the following classes: Antipyretic, Analgesics, Anti-inflammatory, Anti-bacterial, Antifungal, Antiviral, Antibiotics, Anti-laprosy, Central Nervous System agents, HIV-AIDS related drugs
SEC-D	CO-2: To know about aerobic and anaerobic fermentation, importance of Vitamins and Amino acids, synthesis of Penicillin, Cephalosporin, Chloromycetin, Streptomycin and their role as an antibiotic.
	CO-3: To learn experimentally how to prepare aspirin in the laboratory and how to analyze it.
	CO-4: To learn experimentally how to prepare magnesium bisilicate in the laboratory.
	SEC-4. PESTICIDE CHEMISTRY
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CC-11	 SEC-4. PESTICIDE CHEMISTRY CO-1: Helps to understand about the preparation, structures, properties, reactions, benefits and adverse effects of pesticide compounds CO-2: Helps to understand how to calculate acidity/ alkanility in a given sample of pesticide formulations as per BIS specifications. CO-3: To learn experimentally how to prepare organophosphates, phosphonates and thiophosphates. CO-4: To study how to prepare inorganic complexes in the laboratory. CO-5: To know how to determine the co-ordination compounds by spectrophotometric method CO-1: Helps to understand the fundamental concept, basic terms, derivation and application of Quantum Mechanics CO-2: To know about the necessary laws, rules, terms, expressions and derivations statistical thermodynamics CO-3: To learn laws, rules and equations for numerical analysis of Roots of Equation and Least-Squares Fitting. CO-4: To study about the Computer Programming on Roots of equation, Numerical differentiation and Numerical integration.
CC-11	 SEC-4. PESTICIDE CHEMISTRY CO-1: Helps to understand about the preparation, structures, properties, reactions, benefits and adverse effects of pesticide compounds CO-2: Helps to understand how to calculate acidity/ alkanility in a given sample of pesticide formulations as per BIS specifications. CO-3: To learn experimentally how to prepare organophosphates, phosphonates and thiophosphates. CO-4: To study how to prepare inorganic complexes in the laboratory. CO-5: To know how to determine the co-ordination compounds by spectrophotometric method CO-1: Helps to understand the fundamental concept, basic terms, derivation and application of Quantum Mechanics CO-2: To know about the necessary laws, rules, terms, expressions and derivations statistical thermodynamics CO-3: To learn laws, rules and equations for numerical analysis of Roots of Equation and Least-Squares Fitting. CO-4: To study about the Computer Programming on Roots of equation, Numerical differentiation and Numerical integration. CO-1: To learn in detail about the synthesis, properties, chemical reactions and reaction mechanisms of polynuclear hydrocarbons and their derivatives
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CC-11	 SEC-4. PESTICIDE CHEMISTRY CO-1: Helps to understand about the preparation, structures, properties, reactions, benefits and adverse effects of pesticide compounds CO-2: Helps to understand how to calculate acidity/ alkanility in a given sample of pesticide formulations as per BIS specifications. CO-3: To learn experimentally how to prepare organophosphates, phosphonates and thiophosphates. CO-4: To study how to prepare inorganic complexes in the laboratory. CO-5: To know how to determine the co-ordination compounds by spectrophotometric method CO-1: Helps to understand the fundamental concept, basic terms, derivation and application of Quantum Mechanics CO-2: To know about the necessary laws, rules, terms, expressions and derivations statistical thermodynamics CO-3: To learn laws, rules and equations for numerical analysis of Roots of Equation and Least-Squares Fitting. CO-1: To learn in detail about the synthesis, properties, chemical reactions and reaction mechanisms of polynuclear hydrocarbons and their derivatives. CO-2: To study the chemical reactions, properties and synthesis of heterocyclic compounds.

	CC-12	reactions of alicyclic compounds.
		CO-4: To learn the mechanism, stereochemistry and regioselectivity of pericyclic
SEM-5		reactions.
		CO-5: Helps to understand about the classification, structure, properties, reactions and use of carbohydrate molecules.
		CO-6: Deals with the synthesis, structure, properties, chemical and biological reactions of amino acids, peptides and nucleic acids.
		CO-7: To learn experimentally how to separate molecules by chromatographic
		methods
		CO-8: To study how to analyze the Organic compounds by spectroscopic
		techniques.
		A-1. MOLECULAR MODELLING & DRUG DESIGN
		CO-1: Helps to learn about Molecular Modelling, Force Fields, Energy Minimization and Computer Simulation.
	DSE	CO-2: To study about Molecular Dynamics & Monte Carlo Simulation, Structure Prediction and Drug Design.
	DGE	CO-3: To learn how to optimize C-C bond lengths in different Organic molecules, Visualize the molecular orbitals, electron density and electrostatic potential maps of different molecules, perform a conformational analysis of molecules, relate the acidity of hydrogen halides and basicity of nitrogen containing bases.
		CO-4: To study how to compare the shapes of molecules, build and minimize organic compounds containing various functional groups, compute resonance energy of different molecules and determine the heat of hydration values.
		A-2. APPLICATIONS OF COMPUTERS IN CHEMISTRY
		CO-1: Helps to understand about the basics of computer programming (FORTRAN), creating and application of spreadsheet software (MS Excel)
		CO-2: Helps to know about statistical data analysis.
		CO-3: To learn how to prepare graphs by using spreadsheet, help to determine vapour pressure, rate constant, equilibrium constant, molar extinction coefficient value, concentration of ions at equilibrium and molar enthalpy of vapourisation.
		CO-4: To study about the Acid-Base Titration Curve, Plotting of First and Second derivative Curve for pH metric and Potentiometric titrations, Calculation and Plotting of a Precipitation Titration Curve with MS Excel, Michaelis-Menten Kinetics for Enzyme Catalysis using Linear and Non - Linear Regression.
		B-1. INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE
		CO-1: Helps to understand about the manufacture, properties, compositions, classes and applications of industrially important materials such as ceramics, glasses, cements, fertilizers, surface coating materials and batteries
		CO-2: To know about alloys, manufacture of steel, composition and properties of different types of steels.
		CO-3: To learn about the general principles, properties, classification, industrial use,
		CO-4: Helps to understand about the preparation and explosive properties of organic
		and inorganic explosives and the basic idea of rocket propellant.

		CO-5: To learn how to analyze the composition of cement, composition of percentage of metals in alloy, electroless metallic coatings on ceramic and plastic. CO-6: To know how to determine free acidity in ammonium sulphate fertilizer, estimation of Calcium in Calcium ammonium nitrate fertilizer and phosphoric acid in superphosphate fertilizer.
		B-2. NOVEL INORGANIC SOLIDS
		CO-1: To learn about the synthesis and modification of inorganic solids and their technological importance CO-2: To study the overview of nanostructures and nanomaterials; to know the preparation, classification, control of self-assembly and use of nanomaterials as bio- nanocomposite, nanotube, nanowire and other bio-functional materials.
		CO-3: To learn about the engineering materials specially composite materials for
		CO-4: To know about the manufacturing, properties, classification and application of conducting polymer materials.
		CO-5: To understand how to synthesize hydro-gel by co-precipitation method and silver and gold nanoparticles.
		CO-6: Determination of ions by cation exchange method and total difference of solids in a composite material.
		CO-1: To study the Theoretical Principles in Oualitative Analysis
		CO-2: To learn about Bioinorganic Chemistry and Organometallic Chemistry
		CO-3: To know about the catalytic role of organometallic compounds in different
		types of industrial processes.
SEM-6	CC-13	CO-4: To study experimentally the qualitative detection of known and unknown radicals and insoluble materials in a mixture.
		CO-1: To learn in detail about molecular spectroscopy.
	CC-14	CO-2: To understand about the basic principles and laws of Photochemistry and also get idea about the theory of reaction rate.
		CO-3: To know details about surface energy and surface tension; Classification, Adsorption Isotherms and applications of Adsorption; Classification, rules and properties of Colloids.
		CO-4: To learn about the fundamental concepts, important equations, properties and applications of polarizability and dipole moment.
		CO-5: To know how to determine surface tension of a liquid; Indicator constant of an acid base indicator; pH of an unknown buffer solution and CMC of a micelle experimentally.
		CO-6: To study the kinetics of $K_2S_2O_8$ + KI reaction and Verification of Beer and Lambert's Law for KMnO ₄ and $K_2Cr_2O_7$ solution experimentally.
		A-3. GREEN CHEMISTRY AND CHEMISTRY OF NATURAL PRODUCTS
		CO 1: To loan about groon abamiatry and its reasonity
		CO-2: To study about the principles of group charactery and designing the group
		synthetic routes.
	DCE	CO-3: To know about the examples of green reactions and future trends in green reaction.
	D2F	CO-4: To learn the synthesis, psychological properties, isolation medicinal

importance and other synthetic use of terpenes and alkaloids
CO-5: To learn how to perform green synthesis of a number of organic compounds in the laboratory.
A-4. ANALYTICAL METHODS IN CHEMISTRY
CO-1: To study the fundamental laws of spectroscopy and Selection rules, to know the basic principles of Instrumentation for UV-visible spectroscopy and Infra-red spectroscopy and their use for the determination of composition of inorganic complexes, estimation of metal ions in aqueous solution, quantitative analysis of geometrical isomers and keto-enol tautomerism.
CO-2: To learn in detail about the Flame Atomic Absorption and Emission Spectrometry and its application.
CO-3: To know the basic concepts of thermogravimetry and quantitative estimation of Ca and Mg from their mixture, to learn about the electroanalytical methods and their applications for the determination of equivalence point and pKa values.
CO-4: To learn experimentally about different types of separation techniques such as Solvent extraction technique and Chromatography technique.
CO-5: To learn the methods of separation of stereoisomers, calculation of enantiomeric and diastereomeric excess ratios and determination enantiomeric composition by spectral, chemical and chromatographic data analysis.
CO-6: To study experimentally how to separate a mixture of monosaccharides, a mixture of dyes and active ingredients of plants, flowers and juices by chromatography method.
CO-7: To learn experimentally how to separate a mixture of ions by solvent extraction technique; determination of pH of soil and estimation of Ca, Mg and phosphate ion in soil.
CO-8: To determine the pKa values, COD and BOD by Spectrophotometry method in presence of a indicator.
B-3. POLYMER CHEMISTRY
CO-1: To learn about the history, classification and functionality of polymeric materials.
CO-2: To know about the kinetics of polymerization, details on crystallization and morphology of crystalline polymers, determination of crystalline melting point of a crystalline material and the factors effecting crystalline melting point.
CO-3: To understand the nature and structure of polymers, determination of molecular weight of polymers and thermodynamics of polymer solution.
CO-4: To study the preparation, structure, properties and application of different types of addition and condensation polymers.
CO-5: To know how to prepare polymers by using free radical polymerization, redox polymerization, interfacial polymerization, precipitation polymerization, addition polymerization and condensation polymerization process.
CO-6: To learn experimentally how to characterize and analyze a polymeric compound or material.
B-4. DISSERTATION
CO-1: To know how to do research work and write a review rticle on a particular field/topic as assigned by the teacher

Program Outcomes

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

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

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

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

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

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

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

PO-8: Ethical awareness: A graduate student requires understanding and developing ethical awareness or reasoning which is adequately provided through the course curriculum. Students

can also create an awareness of the impact of chemistry on the environment, society, and also make development outside the scientific community.

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

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

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

Programme Specific Outcomes

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

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

PSO-3: Critical thinking: Chemistry graduates are expected to achieve critical thinking ability to design, carry out, record and analyze the results of chemical reactions. They can have that much potential and confidence that they can overcome many difficulties with the help of their sharp scientific knowledge and logical approaches.

PSO-4: Psychological skills: Chemistry graduates are expected to possess basic psychological skills so that they can deal with individuals and students of various socio-cultural, economic and educational levels. Psychological skills are very important for proper mind setting during

performing, observing and giving conclusion of a particular reaction. It is also important for self-compassion, self-reflection, interpersonal relationships, and emotional management.

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

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

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

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

PSO-9: Digital Literacy: Graduates are expected to be digitally literate for them to enroll and increase their core competency via e-learning resources such as MOOC and other digital tools for lifelong learning.

PSO-10: Social Awareness: As an inhabitant of this green world it is our duty to make our planet clean and suitable for living to all. In this context Chemistry graduates are expected to be more aware about finding green chemical reaction routes for sustainable development. They are expected to maintain good laboratory practices and safety.

Course Outcomes of Chemistry Generic Elective

Semester	Course	Course Outcome
	Code	
		CO-1: To know in detail about Kinetic Theory of Gases; Liquids and Chemical
		kinetics
		CO-2: To learn the basic concept, terms and equations of Atomic Structure;
		Chemical Periodicity and Acids and Bases
		CO-3: To learn about the Fundamentals of Organic Chemistry; Stereochemistry;

[For students having Honours in subjects other than Chemistry]

		Types, Mechanism and Examples of Nucleophilic Substitution Reaction and Elimination Reaction
		CO-4: To learn practically how to do the quantitative estimation of ions in a
SEM-1	CC-1/GE-1	solution by using iodometric titration, permanganate titration and dichromate
		titration.
		CU-5: To learn how to estimation of sodium carbonate and sodium hydrogen
		Mohr's salt by titrating with $KMnO_4$
		CO-6: To study the estimation of oxalic acid by titrating it with KMnO ₄ .
		CO-1: To understand detail about Chemical thermodynamics, Chemical
		equilibrium, Solutions, Phase Equilibrium and Solids.
		CO-2: To learn about synthesis, properties and reactions of Aliphatic
		Hydrocarbons
		CO-3: To understand about Error analysis and Computer Aplications
SEM-2	CC-2/GE-2	CO-4: To know the basic knowledge, types and applications Redox Reactions
		CO-5: To study the kinetics of acid-catalyzed hydrolysis of methyl acetate and
		decomposition of H_2O_2 (Clock Reaction)
		CU-0: To determine the viscosity of unknown liquid (glycerol, sugar) with respect to water surface tension of a liquid using Stalagmometer and the solubility of
		sparingly soluble salt in water
		CO-7: Preparation of buffer solutions and find the pH of an unknown buffer
		solution by colour matching method.
		CO-1: To learn about Chemical bonding and Molecular structure, Comparative study of p-block elements. Transition Elements and Co-ordination Chemistry
		CO-2: To know the basic concept, terms, equations and applications of
		Electrochemistry
SEM-3	CC-3/GE-3	CO-3: To understand about the synthesis, properties, chemical reactions and
		mechanisms of Aromatic Hydrocarbons, Organometallic Compounds and Aryl
		Halides
		CU-4: To study experimentally the qualitative detection of known and unknown radicals in a mixture
		CO-1: To learn in detail about the preparation properties chemical reactions and
		mechanisms of Alcohol, Phenol, Ethers, Aldehydes, Ketones, Carboxylic acids,
		Esters, Amides, Amines, Diazonium salts, Amino-acids and Carbohydrates.
		CO-2: To know in detail about Crystal Field Theory.
		CO-3: To study the fundamental concepts of Quantum Chemistery and
SEM-4	CC-1/GE-4	Spectroscopy.
		CO-4: To learn experimentally the qualitative analysis of single known and
		unknown solid organic compounds and also the identification of pure solid and liquid organic compounds
		nquia organic compounds.
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KARANJIA AUTONOMOUS COLLEGE, KARANJIA

Course Outcome - 2018-19

Department of Odia

B.A(HONS) ODIA COURSE

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Semestar - I, Core-1

Odia Sahitya ra Itihas (Part -1)

Programme specific outcomes of semester -1, core-1

The objective of this paper is to help students the acquire fundamental knowledge about the history of odia literature. This paper mainly based on odia sahitya ra Itihasra bhumika , odia sahityare jugbibhajana prasanga, prak sarala juga ra sahitya, sarala juga, pancha sakha juga o sanatha sahitya ra prusthabhumi .

Course outcomes of core -1

Co-1: To provide knowledge about odia sahityara pramukha itihas granth (only introduction) juga bibhajana abang Namakarana

Co-2: To provide knowledge about odia sahitya ra prak sarala sahitya ra prusthabhumi abong bhumika, prak sarala sahityara baisisthya, charjya gitika O nath sahitya, athrai samajika, dharmbhitika abstha , sahitika o bhashatatika mullyana ityadi.

Co-3: To provide knowledge about sarala sahitya ra samayasima sarala sahityara prusthabhumi , Maulikata, samajika, sanskrutika o sahitika mullayana.

Co-4: To provide knowledge about panchasakha sahityara samayasima, panchsakha sahitya ra sratha, srusti, o baisitha.

B.A(HONS) ODIA COURSE

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Semestar - I, Core-1

Odia Sahitya ra Itihas (Part -1)

Programme specific outcomes of semester -1, core-1

The objective of this paper is to help students the acquire fundamental knowledge about the history of odia literature. This paper mainly based on odia sahitya ra Itihasra bhumika , odia sahityare jugbibhajana prasanga, prak sarala juga ra sahitya, sarala juga, pancha sakha juga o sanatha sahitya ra prusthabhumi .

Course outcomes of core -1

Co-1: To provide knowledge about odia sahityara pramukha itihas granth (only introduction) juga bibhajana abang Namakarana

Co-2: To provide knowledge about odia sahitya ra prak sarala sahitya ra prusthabhumi abong bhumika, prak sarala sahityara baisisthya, charjya gitika O nath sahitya, athrai samajika, dharmbhitika abstha , sahitika o bhashatatika mullyana ityadi.

Co-3: To provide knowledge about sarala sahitya ra samayasima sarala sahityara prusthabhumi , Maulikata, samajika, sanskrutika o sahitika mullayana.

Co-4: To provide knowledge about panchasakha sahityara samayasima, panchsakha sahitya ra sratha, srusti, o baisitha.

Semester -I, Core-2

Madhyajugia odia sahitya

Program specific outcomes of semester-1, core-2

To objective of this paper is to help students to acquire knowledge about madhyajugia odia sahitya, madhyajugia kabya kabita ra angika o attmika baichitra abong madhyajugia odia giti panamapara.

Course outcomes of course -2

Madhyajugia odia sahityara provide knowledge about Co-1: To prustabhumi(samajika, sanskrutika, rajanitika o dharmika)

Co-2: To provide deep knowledge madhyajugiya kabya kabita ra angika baichitra.

Co-3: To provide deep knowledge about madhyajugia kabya kabitara attmika bibhaba

Co-4: To provide knowledge about madhyajugiya odia giti kabita ra prampara o bikashadhara.

Semester-II, Core-3

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Adhunika odia sahitya

Programme specific outcomes of semester-2, Core - 3

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The objective of this paper is to help students to acquire knowledge about adhunika odia literature.

Course outcomes of core 3

Co -1: To provide knowledge about adhunika odia sahitya ra prusthabhumi, o nabajagarana (engraji sikhyara bistara , patrapatrika prakasana , mudra jantra pratista o bhasa andolana)

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Co -2: To provide knowledge about adhunika odia sahityara pramukha shrastha o shrusthi.

Co -3: To provide knowledge about adhunika odia sahitya ra satyabadi dhara , ahi juga ra samayasima prusthabhumi , odia sahitya re satyabadi andolana , satyabadi lekhaka gousthi , baisistha o bikasadhara.

Co -4: To provide knowledge about adhunika odia sahitya ra sabujadhara o pragatibadidhara.

Semester-II, Core -4

Swadhinata parabarti odia sahitya

Programme specific outcomes of semester-2 ,Core - 4

-to objective of this paper is to helps students to acquire knowledge about swadhinata

-parabarti kabita , katha sahitya ,nataka o ekankika ebong odia gadya sahitya.

Course outcome of core - 4

Co -1: To provide knowledge about swadhinata parabarti odia kabyakabita.

Co -2: To provide knowledge about swadhinata parabarti odia katha sahitya

Co -3: To provide knowledge about swadhinata parabarti odia nataka o ekankika.

Co -4: To provide knowledge about swadhinata parabarti odia gadya sahitya ra bikashadhara.

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Course outcomes Core -6

Co -1: To provide knowledge about bhasara sangya, swarupa o prakaraveda

Co -2: To provide knowledge about bhasa uttpati samparkiya bivinna sidhanta

Co -3: To provide knowledge about odia bhasara andolana rupa

Co -4: To provide knowledge about odia bhasa uppare bivinna bhasa ra prabhaba (drabida, astrik, jabanika o engraji)

Semester-III, core -7

Odia byabaharika byakarana

Programme specific outcomes of semester-3, Core - 7

The objective of this paper is helps students to know about linguistics and literature in the form of the correct speaking and writing

Course outcomes of core 7

Co -1: To provide knowledge about odia barna bichara, bakya ra gathana riti o prakaraveda

Co -2: To provide knowledge about karaka bibhakti, krudanta o tadhita

Co -3: To provide knowledge uppasourga, sandhi o samasha

Co -4: To provide knowledge about odia sabda sambhara

Semester IV, core 8

Odia loka sanskruti loka sahitya

Programme specific outcomes of semester-4, Core – 8

The core objective of this paper is to help students to acquire knowledge about our culture, tradition, folk literature relation with society etc.

Course outcomes of core-8

Co -1: To provide knowledge about loka sanskruti o loka sahitya ra sangya, swarupa o prakaraveda

Co -2: To provide knowledge about odia loka gita ra swarupa , prakaraveda o bivinna diga

Co -3: To provide knowledge about odia loka kahani ra swarupa o prakaraveda

Co -4: To provide knowledge about odia loka natakara swarupa o prakaraveda (pala, daskathia, danda nacha, chhou nacha, lilla, dadhi, dalkhai, karama)

Semester IV, core 9

Sahitya tatwa (prachya o paschatya)

Programme specific outcomes of semester-4, Core – 9

The core objective of this paper is to help students to acquire fundamental knowledge about the definition of prachya o paschatya tatwa kabya kabita (rasa, dhoni, riti, bakaruti, alankara, classism, romantism, pratikbada, chitra kalpa)

This paper mainly based on "kabya kabita definition, lakhyana, prayojana, feature and type etc.

Course outcome of core 9

- Co -1: To provide knowledge about rasa o dhoni
- Co -2: To provide knowledge about riti, bakruti o alankara
- Co -3: To provide knowledge about classism, Romantism

Co -4: To provide knowledge about pratikabada, chitrakalpabada

Semester IV, core -10

Odia kabita o prachina ru adhunika

Programme specific outcomes of semester-4, Core – 10

The core objective of this paper is to help students to acquire fundamental knowledge about the relationship between prachina nd ahunika kabya kabita . feature of ancient and modern poetry of odia literature.

Course outcome of core 10

Co -1: To provide knowledge about sarala Mahabharata

Co -2: To provide knowledge about the bhagabata (chabisa guru prasanga)jagannath dash

Co -3: To provide knowledge about dinakrushna dashnka rasha kollala (prathama chhanda) o upendra bhanjanka koti bramhanda sundari (prathama chhanda)

Co -4: To provide knowledge about adhunika kabita

Semester V core -11

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Odia nataka o ekankika

Programme specific outcomes of semester-5, Core – 11

The core objective of this paper is to help students to acquire fundamental knowledge about the drama and one act play of odia literature . this paper mainly based on " odia nataka o ekankika

Course outcomes of core 11

Co -1: To provide knowledge about the rakta mati – kalicharan pattnayak

Co -2: To provide knowledge about "nandikeshori" manoranjan dash and "Tataniranjana" bijaya mishra

Co -3: To provide knowledge about "kokua" bijaya kumar sathpathy, agraduta, cuttack kimba bhukha- manguli charana biswala

Co -4: To provide knowledge about ekankika "smruti bibrata" pranabandhu kara o "chadmabaisi" biswajeet dash

Co -5: To provide knowledge about prakalap prastuti

Semester - V, Core-12

Odia katha sahitya

Programme specific outcomes of semester-5, Core – 12

The core objective of this paper is to help students to acquire knowledge about the novel and short story of odia literature. This paper is mainly based on "odia katha sahitya".

Course outcome of core -12

Co -1: To provide knowledge about odia katha sahitya ra bikasha krama.

Co -2: To provide knowledge about cha mano atho guntha – Fakirmohon senapati

Co -3: To provide knowledge about danapani – gopinath mohanty kimba Nayana Tara- dayanidhi Mishra

Co -4: To provide knowledge about galp sahitya.

Co -5: To provide knowledge about prakalp prastuti

Semester - VI, Core - 13

Odia gadya sahitya

Programme specific outcomes of semester-6, Core – 13

The core objective of this paper is to help students to acquire knowledge about the Biography, auto-biography, Critism, prose etc..

Course outcomes of Core-13

Co -1: To provide knowledge about attmajibani bhramana kahani o samalochana tatwa (sangya, swarup, o prakarveda)

Co -2: To provide knowledge about "mo phutadanga ra kahani" – phatura nanda

Co -3: To provide knowledge about " pachima – Africa re odia dhinki – bhubansewar behera

Co -4: To provide knowledge about odia prabhnadha

Co -5: To provide knowledge about prakalpa prastuti

<u>Semester – VI, Core – 14</u>

Odia bhasha ra byabaharika prayoga

Programme specific outcomes of semester-6, Core –1 4

The core objective of this paper is to help students to acquire knowledge about creativity, personal development, self-independence etc.. this paper mainly based on "odia bhasa ra byabharika prayoga"

Course outcome of core-14

Co -1: To provide knowledge about bhashana kala, dallagata alochana o sakhyatakar

Co -2: To provide knowledge about sambad prastuti, feature rachana o bingyapana prastuti.

Co -3: To provide knowledge about karjyalaya re odia likhana bidhi

Co -4: To provide knowledge about odia bhasa ra computerikarana, software, abong, hardware, odia funds, key-board, word processing , banan byakarana alochana prakirya, odia re internet ra byabahars, odia sawrup website.

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Co -5: To provide knowledge about prakalpa prastuti

Odia(M.I.L) Semester - II

Jogaajoga anubidhi, riti o madhyama Programme specific outcomes of semester-2

The core objective of this paper is to help students to acquire knowledge about Language literature & grammar. This paper mainly based on communicative

Course outcome

Co -1: To provide knowledge about <u>Jogajoga</u> ra paribhasa , anubidhi, parisara o prakarveda

Co -2: To provide knowledge about sakhyatkar, bhasanakalla

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Co -3: To provide knowledge about sambad ra paribhasa, parisara o sambada prastuti

Co -4: To provide knowledge about odia bhasha ra barnamalla, barnasudhi ra nirakaran

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CORE-I: Mathematical Physics-1 2018-19

Course Objective

The emphasis of course is to equip students with the mathematical and critical skills required in solving problems of interest to physicists. The course will also expose students to fundamental computational physics skills enabling them to solve a wide range of physics problems. The skills developed during course will prepare them not only for doing fundamental and applied research but also for a wide variety of careers.

Course Learning Outcomes

After completing this course, student will be able to

- Draw and interpret graphs of various functions.
- Solve first and second order differential equations and apply these to physics problems.
- Understand the concept of gradient of scalar field and divergence and curl of vector fields.
- Perform line, surface and volume integration and apply Green's, Stokes' and Gauss's Theorems to compute these integrals.
- Apply curvilinear coordinates to problems with spherical and cylindrical symmetries.
- In the laboratory course, the students will be able to design code and test simple programs in C++ in the process of solving various problems. The aim of this Lab is not just to teach computer programming but to emphasize its role in solving problems in Physics.
- The course will consist of practical sessions and lectures on the related theoretical aspects of the Laboratory. The recommended group size is not more than 16 students.
- Evaluation to be done not only on the programming but also on the basis of formulating the problem.
- Aim at teaching students to construct the computational problem to be solved.
- Students can use any one operating system: Linux or Microsoft Windows.

At least 12 programs must be attempted from the following covering the entire syllabus.

• The list of programs here is only suggestive. Students should be encouraged to do more practice. Emphasis should be given to assess student's ability to formulate a physics problem as mathematical one and solve by computational methods.

CORE-II: Mechanics

Course Objective

This course reviews the concepts of mechanics learnt at school from a more advanced perspective and goes on to build new concepts. It begins with Newton's Laws of Motion and ends with the Fictitious Forces and Special Theory of Relativity. Students will also appreciate the Collisions in CM Frame, Gravitation, Rotational Motion and Oscillations. The students will be able to apply the concepts learnt to several real world problems.

Course Learning Outcomes

Upon completion of this course, students are expected to

- Understand laws of motion and their application to various dynamical situations.
- Learn the concept of inertial reference frames and Galilean transformations. Also, the concept of conservation of energy, momentum, angular momentum and apply them to basic problems.
- Understand translational and rotational dynamics of a system of particles.
- Apply Kepler's laws to describe the motion of planets and satellite in circular orbit.
- Understand concept of Geosynchronous orbits
- Explain the phenomenon of simple harmonic motion.
- Understand special theory of relativity special relativistic effects and their effects on the mass and energy of a moving object.
- In the laboratory course, the student shall perform experiments related to mechanics: compound pendulum, rotational dynamics (Flywheel), elastic properties (Young Modulus and Modulus of Rigidity), fluid dynamics, estimation of random errors in the observations etc.

CORE-III: Electricity and Magnetism

Course Objective

This course reviews the concepts of electromagnetism learnt at school from a more advanced perspective and goes on to build new concepts. The course covers static and dynamic electric and magnetic fields, and the principles of electromagnetic induction. It also includes analysis of electrical circuits and introduction of network theorems. The students will be able to apply the concepts learnt to several real world problems.

Course Learning Outcomes

At the end of this course the student will be able to

- Demonstrate the application of Coulomb's law for the electric field, and also apply it to systems of point charges as well as line, surface, and volume distributions of charges.
- Demonstrate an understanding of the relation between electric field and potential, exploit the potential to solve a variety of problems, and relate it to the potential energy of a charge distribution.
- Apply Gauss's law of electrostatics to solve a variety of problems.
- Calculate the magnetic forces that act on moving charges and the magnetic fields due to currents (Biot- Savart and Ampere laws)
- Understand the concepts of induction and self-induction, to solve problems using Faraday's and Lenz's laws.
- Understand the basics of electrical circuits and analyze circuits using Network Theorems.
- In the laboratory course the student will get an opportunity to verify network theorems and study different circuits such as RC circuit, LCR circuit. Also, different methods to measure low and high resistance, capacitance, self-inductance, mutual inductance, strength of a magnetic field and its variation in space will be learnt.

CORE-IV: Waves and Optics

• Course Objective

• This course reviews the concepts of waves and optics learnt at school from a more advancedperspective and goes on to build new concepts. It begins with explaining ideas of superposition of harmonic oscillations leading to physics of travelling and standing waves. The course also provides an in depth understanding of wave phenomena of light, namely, interference and diffraction with emphasis on practical applications of the same.

Course Learning Outcomes

On successfully completing the requirements of this course, the students will have the skilland knowledge to:

- Understand Simple harmonic oscillation and superposition principle.
- Understand different types of waves and their velocities: Plane, Spherical, Transverse, and Longitudinal.
- Understand Concept of normal modes in transverse and longitudinal waves: their frequencies and configurations.
- Understand Interference as superposition of waves from coherent sources derived from same parent source.
- Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from aperture, understand Fraunhoffer and Fresnel Diffraction.
- In the laboratory course, student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt first-hand. The motion of coupled oscillators, study of Lissajous figures and behavior of transverse, longitudinal waves can be learnt in this laboratory course.

CORE-V: Mathematical Physics-II

Course Objective

The emphasis of course is to equip students with the mathematical tools required in solving problems interest to physicists and expose them to fundamental computational physics skills thus enabling them to solve a wide range of physics problems. This course will aim at introducing the concepts of Fourier series, special functions, linear partial differential equations by separation of variable method.

Course Learning Outcomes

On successfully completing this course, the students will be able to

- Represent a periodic function by a sum of harmonics using Fourier series and their applications in physical problems such as vibrating strings etc.
- Obtain power series solution of differential equation of second order with variable coefficient using Frobenius method.
- Understand properties and applications of special functions like Legendre polynomials, Bessel functions and their differential equations and apply these to various physical problems such as in quantum mechanics.
- Learn about gamma and beta functions and their applications.
- Solve linear partial differential equations of second order with separation of variable method.
- In the laboratory course, the students will learn the basics of the Scilab software/Python interpreter and apply appropriate numerical method to solve selected physics problems both using user defined and inbuilt functions from Scilab/Python. They will also learn to generate and plot Legendre polynomials and Bessel functions and verify their recurrence relation.
CORE-VI: Thermal Physics

• Course Objective

• This course deals with the relationship between the macroscopic properties of physical systems in equilibrium. It reviews the concepts of thermodynamics learnt at school from a more advanced perspective and develops them further. The primary goal is to understand the fundamental laws of thermodynamics and their applications to various systems and processes. In addition, it will also give exposure to students about the Kinetic theory of gases, transport phenomena involved in ideal gases, phase transitions and behavior of real gases.

Course Learning Outcomes

At the end of the course, students will be able to:

- Comprehend the basic concepts of thermodynamics, the first and the second law of thermodynamics.
- Understand the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.
- Know about reversible and Irreversible processes.
- Learn about Maxwell's relations and use them for solving many problems in Thermodynamics
- Understand the concept and behavior of ideal and real gases.
- Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzmann distribution law, equitation of energies, and mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.
- In the laboratory course, the students are expected to do some basic experiments in thermal Physics, viz., determination of Mechanical Equivalent of Heat (J), coefficient of thermal conductivity of good and bad conductor, temperature coefficient of resistance, variation of thermo-emf of a thermocouple with temperature difference at its two junctions and calibration of a thermocouple.

CC-X: Digital Systems and Applications

Course Objective

This is one of the core papers in physics curriculum which introduces the concept of Boolean algebra and the basic digital electronics. In this course, students will be able to understand the working principle of CRO, Data processing circuits, Arithmetic Circuits, sequential circuits like registers, counters etc. based on flip flops. In addition, students will get an overview of microprocessor architecture and programming.

Course Learning Outcomes

This course lays the foundation for understanding the digital logic circuits and their use in combinational and sequential logic circuit design. It also imparts information about the basic architecture, memory and input/output organization in a microprocessor system. The students also learn the working of CRO.

- Course learning begins with the basic understanding of active and passive components. It then builds the concept of Integrated Chips (IC): its classification and uses.
- Differentiating the Analog and Digital circuits, the concepts of number systems like Binary, BCD, Octal and hexadecimal are developed to elaborate and focus on the digital systems.
- Sequential Circuits: Basic memory elements Flips-Flops, shift registers and 4-bits counter leading to the concept of RAM, ROM and memory organization.
- Timer circuits using IC 555 providing clock pulses to sequential circuits and develop multivibrators.
- Introduces to basic architecture of processing in an Intel 8085 microprocessor and to Assembly Language.
- Also impart understanding of working of CRO and its usage in measurements of voltage, current, frequency and phase measurement.
- In the laboratory students will learn to construct both combinational and sequential circuits by employing NAND as building blocks and demonstrate Adders, Subtractors, Shift Registers, and multivibrators using 555 ICs.

CORE-VIII: Mathematical Physics III

Course Objective

The emphasis of the course is on applications in solving problems of interest to physicists. Students will be examined on the basis of problems, seen and unseen. The course will develop understanding of the basic concepts underlying complex analysis and complex integration and enable student to use Fourier and Laplace Transform to solve real world problems.

Course Learning Outcomes

After completing this course, student will be able to

- Determine continuity, differentiability and analyticity of a complex function, find the derivative of a function and understand the properties of elementary complex functions.
- Work with multi-valued functions (logarithmic, complex power, inverse trigonometric function) and determine branches of these functions
- Evaluate a contour integral using parametrization, fundamental theorem of calculus and Cauchy's integral formula.
- Find the Taylor series of a function and determine its radius of convergence.
- Determine the Laurent series expansion of a function in different regions, find the residues and use the residue theory to evaluate a contour integral and real integral.
- Understand the properties of Fourier and Laplace transforms and use these to solve boundary value problems.
- In the laboratory course, the students will learn the basics of the Scilab software/Python interpreter and apply appropriate numerical method to solve selected physics problems both using user defined and inbuilt functions from Scilab/Python.

CORE-IX: Elements of Modern Physics

Course Objective

The objective of this course is to teach the physical and mathematical foundations necessary for learning various topics in modern physics which are crucial for understanding atoms, molecules, photons, nuclei and elementary particles. These concepts are also important to understand phenomena in laser physics, condensed matter physics and astrophysics.

Course Learning Outcomes

After getting exposure to this course, the following topics would be learnt:

- Main aspects of the inadequacies of classical mechanics as well as understanding of the historical development of quantum mechanics.
- Formulation of Schrodinger equation and the idea of probability interpretation associated with wave-functions.
- The spontaneous and stimulated emission of radiation, optical pumping and population inversion. Three level and four level lasers. Ruby laser and He-Ne laser in details. Basic lasing
- The properties of nuclei like density, size, binding energy, nuclear forces and structure of atomic nucleus, liquid drop model and nuclear shell model and
- mass formula.
- Decay rates and lifetime of radioactive decays like alpha, beta, gamma decay. Neutrino, its properties and its role in theory of beta decay.
- Fission and fusion: Nuclear processes to produce nuclear energy in nuclear reactor and stellar energy in stars.
- In the laboratory course, the students will get opportunity to measure Planck's constant, verify photoelectric effect, and determine e/m of electron, Ionization potential of atoms, study emission and absorption line spectra. They will also find wavelength of Laser sources by single and Double slit experiment, wavelength and angular spread of He-Ne Laser using plane diffraction grating.

CC-VII: Analog Systems and Applications

Course Objective

This course introduces the concept of semiconductor devices and their applications. It also emphasizes on understanding of amplifiers, oscillators, operational amplifier and their applications.

Course Learning Outcomes

At the end of this course, the following concepts will be learnt

- Characteristics and working of pn junction.
- Two terminal devices: Rectifier diodes, Zener diode, photodiode etc.
- NPN and PNP transistors: Characteristics of different configurations, biasing, stabilization and their applications.
- CE and two stages RC coupled transistor amplifier using h-parameter model of thetransistor.
- Designing of different types of oscillators and their stabilities.
- Ideal and practical op-amps: Characteristics and applications.
- In the laboratory course, the students will be able to study characteristics of various diodes and BJT. They will be able to design amplifiers, oscillators and DACs. Also different applications using Op-Amp will be designed.

CC-XI: Quantum Mechanics & Applications

Course Objective

After learning the elements of modern physics, in this course students would be exposed to more advanced concepts in quantum physics and their applications to problems of the sub atomic world.

Course Learning Outcomes

The Students will be able to learn the following from this course:

- Methods to solve time-dependent and time-independent Schrodinger equation.
- Quantum mechanics of simple harmonic oscillator.
- Non-relativistic hydrogen atom: spectrum and Eigen functions.
- Angular momentum: Orbital angular momentum and spin angular momentum.
- Bosons and fermions symmetric and anti-symmetric wave functions.
- Application to atomic systems
- In the laboratory course, with the exposure in computational programming in the computer lab, the student will be in a position to solve Schrodinger equation for ground state energy and wave functions of various simple quantum mechanical one-dimensional and three dimensional potentials.

CC-XII: Solid State Physics

Course Objective

This course introduces the basic concepts and principles required to understand the various properties exhibited by condensed matter, especially solids. It enables the students to appreciate how the interesting and wonderful properties exhibited by matter depend upon its atomic and molecular constituents. The gained knowledge helps to solve problems in solid state physics using relevant mathematical tools. It also communicates the importance of solid state physics in modern society.

Course Learning Outcomes

On successful completion of the module students should be able to

- Elucidate the concept of lattice, crystals and symmetry operations.
- Understand the elementary lattice dynamics and its influence on the properties of materials.
- Describe the main features of the physics of electrons in solids: origin of energy bands, and their influence electronic behavior.
- Explain the origin of dia-, para-, and Ferro-magnetic properties of solids.
- Explain the origin of the dielectric properties exhibited by solids and the concept of polarizability.
- Understand the basics of phase transitions and the preliminary concept and experiments related to superconductivity in solid.
- In the laboratory students will carry out experiments based on the theory that they have learned to measure the magnetic susceptibility, dielectric constant, trace hysteresis loop. They will also employ to four probe methods to measure electrical conductivity and the hall set up to determine the hall coefficient of a semiconductor.

CC-XIII: Electromagnetic Theory

Course Objective

This core course develops further the concepts learnt in the electricity and magnetism course to understand the properties of electromagnetic waves in vacuum and different media.

Course Learning Outcomes

At the end of this course the student will be able to:

- Apply Maxwell's equations to deduce wave equation, electromagnetic field energy, momentum and angular momentum density.
- Understand electromagnetic wave propagation in unbounded media: Vacuum, dielectric medium, conducting medium, plasma.
- Understand electromagnetic wave propagation in bounded media: reflection and transmission coefficients at plane interface in bounded media.
- Understand polarization of Electromagnetic Waves: Linear, Circular and Elliptical Polarization. Production as well as detection of waves in laboratory.
- Learn the features of planar optical wave guide.
- Understand the fundamentals of propagation of electromagnetic waves through optical fibers.
- In the laboratory course, the student get an opportunity to perform experiments with Polarimeter, Babinet Compensator, Ultrasonic grating, simple dipole antenna. Also, to study phenomena of interference, refraction, diffraction and polarization.

CC-XIV: Statistical Mechanics

Course Objective

Statistical Mechanics deals with the derivation of the macroscopic parameters (internal energy, pressure, specific heat etc.) of a physical system consisting of large number of particles (solid, liquid or gas) from knowledge of the underlying microscopic behavior of atoms and molecules that comprises it. The main objective of this course work is to introduce the techniques of Statistical Mechanics which has applications in various fields including Astrophysics, Semiconductors, Plasma Physics, Bio-Physics etc. and in many other directions.

Course Learning Outcomes

By the end of the course, students will be able to:

- Understand the concepts of microstate, macro state, phase space, thermodynamic probability and partition function.
- Understand the use of Thermodynamic probability and Partition function for calculation of thermodynamic variables for physical system (Ideal gas, finite level system).
- Difference between the classical and quantum statistics
- Understand the properties and Laws associated with thermal radiation.
- Apply the Fermi- Dirac distribution to model problems such as electrons in solids and white dwarf stars
- Apply the Bose-Einstein distribution to model problems such as blackbody radiation and Helium gas.
- In the laboratory course, with the exposure in computer programming and computational techniques, the student will be in a position to perform numerical simulations for solving the problems based on Statistical Mechanics.

DSE: II Nuclear and Particle Physics

Course Objective

The objective of the course is to impart the understanding of the sub atomic particles and their properties. It will emphasize to gain knowledge about the different nuclear techniques and their applications in different branches Physics and societal application. The course will focus on the developments of problem based skills.

Course Learning Outcomes

- To be able to understand the basic properties of nuclei as well as knowledge of experimental determination of the same, the concept of binding energy, its various dependent parameters, N-Z curves and their significance
- To appreciate the formulations and contrasts between different nuclear models such as Liquid drop model, Fermi gas model and Shell Model and evidences in support.
- Knowledge of radioactivity and decay laws. A detailed analysis, comparison and energy kinematics of alpha, beta and gamma decays.
- Familiarization with different types of nuclear reactions, Q- values, compound and direct reactions.
- To know about energy losses due to ionizing radiations, energy losses of electrons, gamma ray interactions through matter and neutron interaction with matter. Through the section on accelerators students will acquire knowledge about Accelerator facilities in India along with a comparative study of a range of detectors and accelerators which are building blocks of modern day science.
- It will acquaint students with the nature and magnitude of different forces, particle interactions, families of sub- atomic particles with the different conservation laws, concept of quark model.
- The acquired knowledge can be applied in the areas of nuclear medicine, medical physics, archaeology, geology and other interdisciplinary fields of Physics and Chemistry. It will enhance the special skills required for these fields.

DSE-1(CLASSICAL DYNAMICS)

The main outcome of the course is to get idea about the classical dynamics of system of particles , relativity theory with four vector space.

DSE-3(FORTRAN)

The main outcome is that the students will be able to design code and test simple programs in FORTRAN in the process of solving various problems. The application of FORTRAN is highly seen in solving physics problems.

DSE-IV(PROJECT)

This is a project paper, in which students do a project work based on any experiment and analyse it's data with a theory or take up any theoretical topic and present a report on it under the guidance of a mentor which in a way expose them to the area of new research and innovation.

The content of the course are beneficial for the students in their preparation to persue higher studies as the course is designed in a such a manner that it helps a lot in the preparation of IIT JAM,NET,GATE,BARC ,GRE ,CUCET,CPET and other competitive examination.

Albipa Minhora

DSE-3(2018)(NANOPARTICLES)

As research areas are developing more focused has shifted towards nano particles. The course gives a detail idea about nano structure and the instruments used in the area of condensed matter physics.

DSE-IV(PROJECT)

This is a project paper, in which students do a project work based on any experiment and analyse it's data with a theory or take up any theoretical topic and present a report on it under the guidance of a mentor which in a way expose them to the area of new research and innovation.

The content of the course are beneficial for the students in their preparation to persue higher studies as the course is designed in a such a manner that it helps a lot in the preparation of IIT JAM,NET,GATE,BARC ,GRE ,CUCET,CPET and other competitive examination.

Alhipra Mirbea

Department of Zoology

Karanjia Autonomous College, Karanjia Programme/Course/ Specific Programme outcome For the Session 2018-19

Programme Outcome	This programme is one of the most fundamental units of basic
	sciences studied at undergraduate level. This program helps to
	develop scientific tempers and attitudes, which in turn can prove to
	be beneficial for the society since the scientific developments can
	make a nation or society to grow at a rapid pace. After studying this
	program, students will be more equipped to learn and know about
	different biological systems, their coordination and control as well as
	evolution, behavior and biological roles of animals in ecosystem. This
	program also provides a platform for classical genetics in order to
	understand the distribution and inheritance of different traits among
	the organisms and also the congenital disorders. It also offering the
	opportunity to explore the ecosystem with its different parameters
	and the crisis which are currently operational and that to be faced in
	nearby future. It also gives a platform to acknowledge the advanced
	modern techniques like blotting techniques, PCR, DNA fingerprinting,
	Centrifugation, Spectrophotometer, ELISA etc. which are being used
	for diagnosis of certain biomolecules related with the disease
	conditions. This Program also covers the ancestry of life on earth,
	taxonomy of animals and also anatomical comparison among the
	different groups of animals. After completion of this course, students
	have the option to go for higher studies, i.e. M.Sc/ Integrated MS Ph.D
	and then do research work for the welfare of mankind. After higher
	studies, students can join as scientists or assistant professor or
	assistant teacher and even can look for professional job oriented
	courses such as Indian Civil Services, Indian Forest Services, Odisha
	Civil Services, Odisha Forest Services etc. Science graduates can go to
	serve in industries or may opt for establishing their own industrial
	unit. Practical and theoretical skills gained in this program will be
	helpful in designing different public health strategies for social
	welfare. The programme has been designed to provide in depth
	knowledge of applied subjects ensuring the inculcation of
	employment skills so that students can make a career and become an
	entrepreneur in diverse fields.

Programme Specific	Students enrolled in B.Sc. (Hons.) degree program in Zoology will				
Outcome	study and acquire complete knowledge of disciplinary as well as allied				
	biological sciences. At the end of graduation, they are likely to possess				
	expertise which will provide them competitive advantage in pursuing				
	higher studies from India or abroad; and seek jobs in academia,				
	research or industries. They are able to correctly use biological				
	instrumentation and proper laboratory techniques. Students will be				
	able to communicate biological knowledge in oral and written form.				
	Students will be able to identify the relationship or synchronization				
	between structure and function at all levels; molecular, cellular, and				
	organismal. Students should be able to identify, classify and				
	differentiate diverse chordates and non-chordates based on their				
	morphological anatomical and systemic organization. They will also				
	be able to describe economic ecological and medical significance of				
	various animals in human life This will create a curiosity and				
	awareness among them to explore the animal diversity and take un				
	wild life photography or wild life exploration as a career option. The				
	procedural knowledge about identifying and classifying animals will				
	provide students professional advantages in teaching research and				
	taxonomist jobs in various government organizations; including				
	Zoological Survey of India and National Parks/Sanctuaries Students				
	will be able to apply the scientific work supports their hypotheses				
	Acquired practical skills in histerhology histatistics hisinformatics				
	and molecular biology can be used to pursue career as a scientist in				
	drug development industry in India or abroad. The students will be				
	acquiring basic experimental skills in various techniques in the fields of				
	genetics: molecular hiology: hiotechnology: gualitative and				
	quantitative microscopy: enzymology and analytical biochemistry				
	Students will be able to use the evidence of comparative biology to				
	explain how the theory of evolution offers the only scientific				
	explanation for the unity and diversity of life on earth. They will be				
	able to use specific examples to explicate how descent with				
	modification has shaped animal mornhology physiology life history.				
	and behavior. Students will be able to explain how organisms function				
	at the level of the gene genome cell tissue organ and organ-system				
	Drawing upon this knowledge they will be able to give specific				
	examples of the physiological adaptations development				
	reproduction and behavior of different forms of life Students will be				
	able to explicate the ecological interconnectedness of life on earth by				
	tracing energy and nutrient flows through the environment. They will				
	be able to relate the physical features of the environment to the				
	structure of nonulations communities and ecosystems Students				
	undertaking skill enhancement courses like aquaculture sericulture				
	and anighture will inculcate skills involved in rearing fish bees and silk				
	and apiculture will incultate skins involved in rearing rish, dees and slik				

PHYSIOLOGY: CONTROLLING AND COORDINATING SYSTEMS	Students will learn about basics of histology and tissue staining. They will also understand the physiology of muscles, nerves, reproductive systems and bone. They will learn details of endocrinology with classification of hormones, their biosynthesis, receptors, mode of molecular actions, physiological function, feedback controls and related disorders.
ANATOMY OF VERTEBRATE	Students will have understood the structures of different systems such as, integumentary, skeletal, digestive, respiratory, circulatory, urinogenital, nervous and sensory organs in comparative way among the vertebrate groups.
BIOCHEMISTRY OF METABOLIC PROCESSES	Students will understand the metabolism of carbohydrates, lipids and proteins in details. They will also learn about oxidative phosphorylation and redox reactions. Students will understand the basic and fundamental biochemistry of carbohydrates, proteins, lipids and nucleic acids. They will also understand the nature, mechanism, and kinetics of enzyme action. Some instrumentation such as microscopy, chromatography, electrophoresis, centrifugation, spectrophotometry etc will also be learnt
CELL BIOLOGY	Students will understand the structures, positions and functions of plasma membrane and all cellular organelles in details. They will acquire knowledge about chromosomes and cell divisions, both mitosis and meiosis. They will also know about cell signalling and cancers. They will know how to measure and stain different cell types
PRINCIPLES OF GENETICS	Students will learn the fundamental genetics like Mendelian and Non Mendelian inheritances, linkages, mutations, sex determination of various animals, extrachromosomal inheritances, transposable genetic elements etc.
ECONOMIC ZOOLOGY AND ANIMAL BEHAVIOUR	CHRONOBIOLOGY Students will know in details about patterns of behaviours, survival strategies, social and cooperative behaviours, design of signals and chronobiology
BIOTECHNOLOGY- MICROBES TO ANIMALS	Students will learn the application of technology in biological system to manipulate at gene level, genome level and protein level, the method of transgenesis and gene manipulation. They will also know the cell and tissue culture technology as well as industrial application of microbiology. The students will also know the techniques like PCR, Blotting techniques, DNA fingerprinting, electrophoresis, DNA extraction from sample and more importantly how the biotechnology is playing a vital role in pharmaceuticals, agriculture and husbandry and environment.

DEVELOPMENTAL BIOLOGY	Students will develope knowledge about structures and function of immune cells, immunoglobulins, antigens and their interactions with antibodies. They will know about MHC molecules, cytokines, hyper sensitivity reactions and cellular mode of immunity development. They will know the immune diffusion technique and ELISA.
MOLECULAR BIOLOGY	Students will acquire knowledge about replication, transcription, translation, post transcriptional and post translational modifications, gene regulation, DNA repair mechanisms and various molecular tools and techniques like PCR, southern, northern and western blotting, recombinant DNA technology etc. They will also know the various tools and techniques related to bacterial microbiology. Some aspects of applied microbiology and diseases related to microbiology will also be learnt by the students.
MICROBIOLOGY	Students will acquire the knowledge about the all the microbes and their economic importance. The host- microbe interaction and the epidemiology of animal diseases can also be learnt
IMMUNOLOGY	Students will develop knowledge about structures and function of immune cells, immunoglobulins, antigens and their interactions with antibodies. They will know about MHC molecules, cytokines, hyper sensitivity reactions and cellular mode of immunity development. They will know the immune diffusion technique and ELISA.
EVOLUTIONARY BIOLOGY	Students will know about population genetics, human evolution, various concepts about origin of species, extinctions, phylogenetic tree making. They will also understand few basic of bioinformatics.

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H.O.D. Department of Zoology

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Department of Economics, Karanjia Autonomous College, Karanjia COURSE OUTCOME & PROGRAMME OUTCOME – 2018-19

In Core Paper-I : Introductory Microeconomics course is designed to expose the students to the basic principles of microeconomic theory. The emphasis will be on thinking like an economist and the course will illustrate how microeconomic concepts can be applied to analyze real-life situations.

In Core Paper II: Mathematical Methods For Economics-I, course is the first of a compulsory two-course sequence. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook

In Core Paper III: Introductory Macroeconomics course aims to introduce the students to the basic concepts of Macroeconomics. Macroeconomics deals with the aggregate economy. This course discusses the preliminary concepts associated with the determination and measurement of aggregate macroeconomic variable like savings, investment, GDP, money, inflation, and the balance of payments.

In Core Paper IV : Mathematical Methods For Economics II course is the second part of a compulsory two-course sequence. This part is to be taught in Semester II following the first part in Semester I. The objective of this sequence is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory, macroeconomic theory, statistics and econometrics set out in this Syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

In Core Paper V : Micro Economics-I course is designed to provide a sound training in microeconomic theory to formally analyze the behavior of individual agents. Since students are already familiar with the quantitative techniques in the previous semesters, mathematical tools are used to facilitate understanding of the basic concepts, this course looks at the behavior of the consumer and the producer and also covers the behavior of a competitive firm.

In Core Paper VI: Macro Economics-I course introduces the students to formal modeling of a macro-economy in terms of analytical tools. It discusses various alternative theories of output and employment determination in a closed economy in the short run as well as medium run, and the role of policy in this context. It also introduces the students to various theoretical issues related to an open economy.

In Core Paper VII: Statistical Methods for Economics course on statistical methods for economics. It begins with some basic concepts and terminology that are fundamental to statistical analysis and inference. It is followed by a study and measure of relationship between variables, which are the core of economic analysis. This is followed by a basic discussion on index numbers and time series. The paper finally develops the notion of probability, followed by probability distributions of discrete and continuous random variables and introduces the most frequently used theoretical distribution, the Normal distribution.

In Core Paper VIII: Micro Economics II course is a sequel to Microeconomics I. The emphasis will be on giving conceptual clarity to the student coupled with the use of mathematical tools and reasoning. It covers Market, general equilibrium and welfare, imperfect markets and topics under information economics.

In Core Paper IX: Micro Economics II course is a sequel to Macroeconomics I. In this course, the students are introduced to the long run dynamic issues like growth and technical progress. It also provides the micro-foundations to the various aggregative concepts used in the previous course.

In Core Paper X: Research Methodology course is to develop a research orientation among the students and to acquaint them with fundamentals of research methods. Specifically, the course aims at introducing them to the basic concepts used in research and to scientific social research methods and their approach. It includes discussions on sampling techniques, research designs and techniques of analysis.

In Core Paper XI: Indian Economy helps the students using appropriate analytical frameworks, this course reviews major trends in economic indicators and policy debates in India in the post-Independence period, with particular emphasis on paradigm shifts and turning points. Given the rapid changes taking place in India, the reading list will have to be updated annually.

Development Economics as a Core Paper is the first part of a two-part course on economic development. The course begins with a discussion of alternative conceptions of development and their justification. It then proceeds to aggregate models of growth and cross-national comparisons of the growth experience that can help evaluate these models. The axiomatic basis for inequality measurement is used to develop measures of inequality and connections between growth and inequality are explored. The course ends by linking political institutions to growth and inequality by discussing the role of the state in economic development and the informational and incentive problems that affect state governance.

Indian Economy II examines sector-specific polices and their impact in shaping trends in key economic indicators in India. It highlights major policy debates and evaluates the Indian empirical evidence. Given the rapid changes taking place in the country, the reading list will have to be updated annually.

Development Economics-II is the second part of the economic development sequence. It begins with basic demographic concepts and their evolution during the process of development. The structure of markets and contracts is linked to the particular problems of enforcement experienced in poor countries. The governance of communities and organizations is studied and this is then linked to questions of sustainable growth. The course ends with reflections on the role of globalization and increased international dependence on the process of development.

> H.O.D. Department of Economics

DEPARTMENT OF ENGLISH PROGRAMME SPECIFIC OUTCOME

For the Academic Session - 2018-19

English Literature courses in the Department of English expose students to a wide range of writing from British, American and European traditions. It helps students explore how writers use the creative resources of language-in fiction, poetry, nonfiction prose, and drama-to explore the entire range of human experience. Students are expected to strive, to be imaginative, rhetorically dexterous, and technically proficient and as a result, to gain a deeper insight into life. With the introduction of new syllabus under CBCS from this year, which promotes a new thematic frame work where classical Indian Bhasa literature share space with contemporary literary crosscurrents, UG syllabus at Karanjia autonomous college will help students build skills of analytical and interpretive argument, and become careful and critical readers. Again, students' engagement with various strategies of drafting and revising, style of writing and analytical skills, diagnosing and developing scholarly methodologies, use of language as a means of creative expression, will make them effective thinkers and communicators — qualities which are crucial for choosing careers in our information-intensive society.

Specific learning outcomes for English courses include the following:

1. Reading: Students will gain awareness about the best literary traditions of the world. By learning how others live and handle their lives, one becomes connected with the world in a way we might not otherwise experience. They will discover that they are part of a huge conglomerate of human thought and emotion. All the great texts that a student of English honours will get chance to study will expand their range of experience. They can gain courage and strength by living vicariously through well-developed characters. Through reading students will have an awareness for varies perspectives. This will also expand their range of experience and in the process they will learn to be more empathetic toward the plights of others.

2. Literature, Nation and Tradition: The current syllabus in the UG level will provide students an opportunity to know India's age old literary and cultural tradition through their exposure to Sanskrit texts and modern Indian vernacular literature in translation. How reading literature in English can be an effective means to address the complex issues of identity, nationalism , historical tradition in Indian context, is a new focus area of the present course. 3. Awareness about Culture and History: Students gain an understanding of the relations between culture, history and texts. They learn to use texts as a gateway to various cultural traditions and interpret them in their historical contexts. How a literary text can appear as an ideal platform to locate dominant and marginalized voices of a society, is an important focus of the under-graduate literature programe.

4. Gaining of Critical Insight: An exposure to various social and cultural traditions and through the reading of representative texts from different periods help a student gain a critical insight about the reality as a whole. With the help of their Knowledge of various critical theories it is expected that they will be able to construct their own meaning about the reality and his historical situatedness.

5. Issue of Sexuality and Gender: Literature course teaches a student to believe that one's own sense of identity is not enough to persuade the rest of the world to agree. Human beings are no longer bound by such binary concepts as male-female or masculine-feminine. They will learn that sex is a biological concept based on biological characteristics, whereas gender deals with personal, societal and cultural perceptions of sexuality. Appropriation of literary texts as tools of cultural study will help students to challenge centuries of social tradition and scientific belief which promote such and other types of differentiations.

Cross Fertilization with allied Arts: Students of English Honours should also be able to articulate the relations among culture, history, and texts—for example, ideological and political aspects of representation, economic processes of textual production, dissemination and reception, and cross-fertilization with other arts: architecture, sculpture, music, film, painting, dance, and theatre.

6. Acquisition of Values: Acquisition of values is needed for individual development and social transformation. English literature course at UG level, like any other literary course, helps a student to gain subjective experience of the text's aesthetic value. This helps in developing quality of thinking and imagination and is a step forward to emerge as a better human being. Through their judgment of the aesthetic value of a literary text students will learn to appreciate whatever is good and beautiful in life. Their healthy mind will thus be storehouse of healthy thoughts.

7. Writing skills and Process: Students will be able to recognize and comprehend different varieties of English language and develop a writing style of their own. English honours students should be aware also that textual analysis can be extended with profit to political, journalistic, commercial, technical, and web-based writing. It is expected that their exposure to the ideas of variety of writers and their cultural backgrounds, will have a bearing in their own literary styles. With the development of their writing skills and finesse of style there

will be a possibility of them emerging as perspective writers, editors, content developers, teachers etc.

8. Means of Effective Communication: Study of literature is intertwined with the study of language . Learning various language patterns, sentence structures and dialogue forms can help one in real life in effectively communicating with others. English is the language of science, computers, diplomacy, and tourism. Knowing English increases students' chances of getting a good job in future.

COURSE OUTCOME

The Department of English of Karanjia autonomous college seeks to foster the intellectual development of its students by encouraging study of literature and writing. The Department strives to make its honours programme students familiar with a wide range of works of British writers in particular and World literature in general with a special focus on Indian writings in English. The issues of culture, history, gender, race, ethnicity, politics are addressed and negotiated in the process of imparting knowledge of English literature in its pluralistic forms, to help student develop a critical mindset of their own. The Department wishes that each student who graduates with a BA Honours in English from Karanjia autonomous college, will have an enduring interest in language and literature, an awareness of their historical and cultural legacies, knowledge of complexities of human existence, the political and social upheavals and its bearing on literature, an understanding of the ability of great literature to arouse and challenge people to struggle with insightful questions of human identity and values. With the introduction of CBCS syllabus by University of North Odisha, the Department of English, Karanjia autonomous college is now offering three types of courses: (1) English Honours and Elective English courses in 1st and 2nd semester,

(2) English Honours and Skill Enhancement Course (SEC) in 3rd semester.

(3) CBCS Discipline Specific Core Course and Programme Course.

Course Outcome:

1. BRITISH PROSE, POETRY AND DRAMA 14TH TO 18TH CENTURY.

(AECC and CORE1,2,3)

After Completion of this Course Students will be able to ...

- i. Know the process of beginning and growth of English language
- ii. Know about various innovative ways of using English language in verbal and nonverbal communications.

- iii. Write clearly, effectively, and creatively, and adjust writing style appropriately to the content, the context, and nature of the subject.
- iv. Think about the relation between language and literature.
- v. Know the complete history of british literature from 14th cen. to 17th century.
- vi. Trace the developmental history of English Literature from Old English Period to 19th century
- vii. Show familiarity with major literary works by British writers in the field of Drama and Poetry.
- viii. Be acquainted with major religious, political and social movements from 14th to 19th century and their influence on literature.
- ix. Learn various interpretative techniques to approach literary texts of varied genres.

2. INDIAN WRITING IN ENGLISH AND INDIAN CLASSICAL LITERATURE

(SEC and CORE 4,12)

After Completion of this Course Students will be able to ...

- i. Know about Indian writers and how they enlightened the Indian literature through poems, novels, plays in postcolonial period.
- ii. India's first war of independence and the establishment of colleges to promote Western education and the evolution of Indian writing in English in 20th century.
- iii. How and why Indian literature emerged as a distinct field of study.
- iv. Trace the development of history of English literature from its beginning to the present day.
- v. Interpret the works of great writes of Indian writers in English.
- vi. Demonstrate, through discussion and writing, an understanding of significant cultural and societal issues presented in Indian English literature.
- vii. Know the rich and diverse literary and aesthetic culture of ancient India.
- viii. Know the history and genesis of Indian Classical Literature.

3. BRITISH LITERATURE 19TH AND 20TH CENTURY.

(CORE 5,6,7)

After Completion of this Course Students will be able to ...

i. Students acquainting with the Romantic period and some of its representative writers. The students will be able to sample some seminal works of the Romantic age which gave expression to the key ideas of the period such as return to

nature, subjectivity, desire for personal freedom and the defiance of classicismimposed restrictions on poetic form.

- ii. know the fiction and cultural criticism
- iii. know how 19th century witness to major socio-political developments like
 industrialization, technological advancements and large scale mobilization of
 people from the rural to the urban centers.
- iv. Know the Marx's concept of class struggle, Freud's theory .
- 4. AMERICAN and EUROPEAN CLASSICAL LITERATURE(CORE-8,9)

After Completion of this Course Students will be able to ...

- i. Know the history of American literature : genesis and evolution and the defining myths of American Literature.
- Know the history of ancient Greece (Classical Antiquity: ancient Greece, the rise and decline of the Roman Empire; Geographical space: cultural history of the Greco-Roman world centered on the Mediterranean Sea)

5. WOMEN'S WRITING (CORE-10)

After Completion of this Course Students will be able to ...

- i. Learn how and on what grounds women's writings can be considered as a separate genre.
- ii. Read and understand canonical texts written by Women writers across different ages.
- iii. Differentiate between sex and gender and how the later is a social construction.
- iv. Be aware about the issues and concerns of the women writers of the developed, developing and under-developed countries.

6. MODERN EUROPEAN DRAMA (CORE- 11)

After Completion of this Course Students will be able to ...

- i. Know the Politics, social change and the stage of Europe.
- ii. Know the European Drama: Realism and Beyond
- iii. know Tragedy and Heroism in Modern European Drama
- iv. know The Theatre of the Absurd

7. POSTCOLONIAL LITERATURES (CORE-13)

After Completion of this Course Students will be able to ...

Course Outcome 2018-19 UG Mathematics (Major) Programme Outcomes

Students are able to construct and develop logical arguments for mathematical proofs. Students acquire good knowledge to solve problems in advance areas of Mathematics like Analysis, Algebra, Geometry, Differential Equations, Number Theory, Discrete Mathematics etc.

1. Students are able to apply mathematical ideas to solve real world problems. They are motivated to go for internships during the summer and puja breaks in different research institutes to sharpen their skills.Nowadays they are attending many Webinars and Workshops in online mode to enhance their

2.For their higher studies some special entrance preparation classes and mock interviews are arranged in the department to facilitate them to appear in those examinations.

3. Students develop skills in Programming Languages and software like C++, MATLAB to solve ordinary and partial differential equation and numerical analysis which helps them to be fit for applying for both industry and research.

4. Encourage the students to develop a range of generic skills helpful in employment, internships

5.Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of mathematics and statistics.

Calculus:

This course will enable the students to:

i) Calculate the limit and examine the continuity of a function at a point.

iii) Understand the consequences of various mean value theorems for differentiable functions.

iii) Sketch curves in Cartesian and polar coordinate systems.

iv)Concept of Integration with its geometrical Interpretation

v) Apply derivative tests in optimization problems appearing in physical sciences, life sciences and a host of other disciplines.

Discrete Mathematics

This course will enable the students to:

i) Learn about partially ordered sets, lattices and their types.

ii) Understand Boolean algebra and Boolean functions, logic gates, switching circuits and their

iii) Solve real-life problems using Graph Theory, Koiensberg bridge problem.

iv) Assimilate various graph theoretic concepts and familiarize with their applications.

Ordinary Differential Equations :

This course will enable the students to:

i) Understand the genesis of ordinary differential equations.

ii) Learn various techniques of getting exact solutions of solvable first order differential equations and linear differential equations of higher order.

iii) Know Picard's method of obtaining successive approximations of solutions of first order differential equations, passing through a given point in the plane and Power series method for higher order linear equations, especially in cases when there is no method available to solve such equations.

iv) Grasp the concept of a general solution of a linear differential equation of an arbitrary order and also learn a few methods to obtain the general solution of such equations.

v) Formulate basic mathematical models in the form of ordinary differential equations to suggest possible solutions of the day to day problems arising in physical, chemical and biological disciplines.

Real Analysis:

This course will enable the students to:

i) Understand many properties of the real line R and learn to define sequence in terms of functions from \mathbb{R} to a subset of \mathbb{R} .

ii) Recognize bounded, convergent, divergent, Cauchy and monotonic

sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence. iii) Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.

iv) Learn some of the properties of Riemann integrable functions, and the applications of the fundamental theorems of integration.

Group Theory

The course will enable the students to:

i) Recognize the mathematical objects called groups a new start to Abstract Mathematics .

ii) Link the fundamental concepts of groups and symmetries of geometrical objects which they can relate to Chemistry in future.

iii) Explain the significance of the notions of cosets, normal subgroups, and factor groups.

iv) Analyze consequences of Lagrange's theorem.

v) Learn about structure preserving maps between groups and their consequences.

Partial Differential Equations

This course will enable the students to:

i) Apply a range of techniques to solve first & second order partial differential equations.

ii) Model physical phenomena using partial differential equations such as the heat and wave equations.

iii)Then analyse the heat equation solution by using MATLAB. They can simulate also.

iv)A glimpse of Finite Difference Method to Numerical Solution by using Scheme to Heat equation ,Wave equation, Poisson equation

Numerical Analysis

This course will enable the students to:

i) Obtain numerical solutions of algebraic and transcendental equations.

ii) Find numerical solutions of system of linear equations and check the accuracy of the solutions. iii) Learn about various interpolating and extrapolating methods.

iv) Solve initial and boundary value problems in differential equations using numerical methods. v) Apply various numerical methods in real life problems.

Ring Theory

This course will enable the students to:

i) Understand the basic concepts of rings and the abstract definition

ii) Recognize and use the chinese remainder theorem

iii) Know the fundamental concepts in ring theory such as the concepts of ideals, quotient rings, integral domains, and fields.

v) Learn in detail about polynomial rings, fundamental properties of Rings, Isomorphism Theorem

Metric Spaces

This course will enable the students to:

i) Learn basic facts about the cardinality of a set.

ii) Understand several standard concepts of metric spaces and their properties like openness,

closedness, completeness, Bolzano-Weierstrass property, compactness, and connectedness.

iii) Identify the continuity of a function defined on metric spaces

iv)Analyze the all the definiton of converegence , continuity , differentiation in Metric Space a

Linear Programming

This course will enable the students to:

i) Analyze and solve linear programming models of real life situations.

ii) Provide graphical solutions of linear programming problems with two

variables, and illustrate the concept of convex set and extreme points.

iii) Understand the theory of the simplex method.

iv) Know about the relationships between the primal and dual problems, and to understand sensitivity analysis.

v) Learn about the applications to transportation, assignment and two-person zero-sum game problems.

Multivariable Calculus

This course will enable the students to:

i) Learn conceptual variations while advancing from one variable to several variables in calculus.

ii) Apply multivariable calculus in optimization problems. I

ii) Inter-relationship amongst the line integral, double and triple integral formulations.

iv) Applications of multivariable calculus tools in physics, economics, optimization, and understanding the architecture of curves and surfaces in plane and space etc.

v) Realize importance of Green, Gauss and Stokes' theorems in other branches of mathematics.

Complex Analysis

This course will enable the students to:

i) Visualize complex numbers as points of $\mathbb{R}\square$ and stereographic projection of complex plane on the Riemann sphere.

ii) Understand the significance of differentiability and analyticity of complex functions leading to the Cauchy Riemann equations.

iii) Learn the role of Cauchy Goursat theorem and Cauchy integral formula in evaluation of contour integrals.

iv) Apply Liouville's theorem in fundamental theorem of algebra.

v) Understand the convergence, term by term integration and differentiation of a power series. vi) Learn Taylor and Laurent series expansions of analytic functions, classify the nature of singularity, poles and residues and application of Cauchy Residue theorem.

Linear Algebra

This course will enable the students to:

i) Understand the concepts of vector spaces, subspaces, bases, dimension and their properties.

ii) Relate matrices and linear transformations, compute eigen values and eigen vectors of linear transformations.

iii) Learn properties of inner product spaces and determine orthogonality in inner product spaces.

iv) Realise importance of adjoint of a linear transformation and its canonical form.

Differential Geometry:

This course will enable the students to:

i)Understand the space curve in three dimensional

ii) concept of curvature, torsion and binormal help to understand the curve is how much curved and deviated from plane

iii)Serret-Frenet formula which is very much useful in Geometry and Physes

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KARANJIA AUTONOMOUS COLLEGE, KARANJIA, DIST-MAYURBHANJ, ODISHA

PROGRAMME SPECIFIC OUTCOME OF POLITICAL SCIENCE - 2018-19

FIRST SEMESTER

CORE PAPER-I: UNDERSTANDING POLITICAL THEORY

Introduction: This course is divided into two sections. Section 'A' introduces the students to the idea of political theory, its history and approaches and an assessment of its critical and contemporary trends. Section 'B' is designed to reconcile political theory and practices through reflections on the ideas and practices related to democracy.

CORE PAPER-II: CONSTITUTIONAL GOVERNMENT AND DEMOCRACY IN INDIA

Introduction: This course acquaints students with the Constitutional design of state structures and institutions, and their actual working overtime. The Indian Constitution accommodates conflicting impulses (of liberty and justice, territorial decentralization and a strong union, for instance) within itself. The course traces the embodiment of some of these conflicts in constitutional provisions, and shows how these have played out in political practice. It further encourages a study of state institutions in their mutual interaction, and in interaction with the larger extra-constitutional environment.

GENERIC ELECTIVE PAPER-I(A1): FEMINISM: THEORY AND PRACTICE

Introduction: The aim of the course is to introduce students to contemporary debates on feminism and the history of feminist struggles. The course begins with a discussion on construction of gender and an understanding of complexity of patriarchy and goes on to analyze theoretical debates within feminism. It offers a gendered analysis of Indian society, economy and polity with a view tounderstanding the structures of gender inequalities. And the last section aims to understand the issues with which contemporary Indian women's movements are engaged with.

SECOND SEMESTER

CORE PAPER-III: POLITICAL THEORY-CONCEPTS AND DEBATES

Introduction: This course is divided into two sections. Section A helps the student familiarize with the basic normative concepts of political theory. Each concept is related to a crucial political issue that requires analysis with the aid of our conceptual understanding. This exercise is designed to encourage critical and reflective analysis and interpretation of social practices through the relevant conceptual toolkit. Section B introduces the students to the important debates in the subject. These debates prompt us to consider that there is no settled way of understanding concepts and that in the light of new insights and challenges, besides newer ways of perceiving and interpreting the world around us, we inaugurate new modes of Political debates.

CORE PAPER-IV: POLITICAL PROCESS IN INDIA

Introduction: Actual politics in India diverges quite significantly from constitutional legal rules. An understanding of the political process thus calls for a different mode of analysis - that offered by political sociology. This course maps the working of 'modern' institutions, premised on the existence of an individuated society, in a context marked by communitarian solidarities, and their mutual transformation thereby. It also familiarizes students with the working of the Indian state, paying attention to the contradictory dynamics of modern state power.

GENERIC ELECTIVE PAPER-I(B1): FEMINISM: THEORY AND PRACTICE

Introduction: The aim of the course is to introduce students to contemporary debates on feminism and the history of feminist struggles. The course begins with a discussion on construction of gender and an understanding of complexity of patriarchy and goes on to analyze theoretical debates within feminism. It offers a gendered analysis of Indian society, economy and polity with a view tounderstanding the structures of gender inequalities. And the last section, aims to understand the issues with which contemporary Indian women's movements are engaged with.

THIRD SEMESTER

CORE PAPER-V: INTRODUCTION TO COMPARATIVE GOVERNMENT AND POLITICS

Introduction: This is a foundational course in comparative politics. The purpose is to familiarize students with the basic concepts and approaches to the study of comparative politics. More specifically the course will focus on examining politics in a historical framework while engaging withvarious themes of comparative analysis in developed and developing countries.

CORE PAPER-VI: INTRODUCTION TO PUBLICADMINISTRATION

Introduction: The course provides an introduction to the discipline of public administration. This paper encompasses public administration in its historical context with an emphasis on the various classical and contemporary administrative theories. The course also explores some of the recent trends, including feminism and ecological conservation and how the call for greater democratizationis restructuring public administration. The course will also attempt to provide the students a comprehensive understanding on contemporary administrative developments.

CORE PAPER-VII: PERSPECTIVES ON INTERNATIONAL RELATIONS

Introduction: This paper seeks to equip students with the basic intellectual tools for understanding International Relations. It introduces students to some of the most important theoretical approaches for studying international relations. The course begins by historically contextualizing the evolution of the international state system before discussing the agencystructure problem through the levels-of- analysis approach. After having set the parameters of the debate, students are introduced to different theories in International Relations. It provides a fairly comprehensive overview of the major political developments and events starting from the twentieth century. Students are expected to learn about the key milestones in world history and equip them with the tools to understand and analyze the same from different perspectives. A key objective of the course is to make students aware of the implicit Euro-centricism of International Relations by highlighting certain specific perspectives from the Global South.

CORE PAPER-XIII: CONTEMPORARY POLITICAL PHILOSOPHY

Introduction: Philosophy and politics are closely intertwined. Students will be exposed to the manner in which the questions of politics have been posed in terms that have implications for larger questions of thought and existence. Contemporary political philosophy and debates are introduced to the students here.

CORE PAPER-XIV: MODERN INDIAN POLITICAL THOUGHT

Introduction: Based on the study of individual thinkers, the course introduces a wide span of thinkers and themes that defines the modernity of Indian political thought. The objective is to study general themes that have been produced by thinkers from varied social and temporal contexts. Selected extracts from original texts are also given to discuss in the class. The list of Reference booksis meant for teachers as well as the more interested students.

DISCIPLINE SPECIFIC ELECTIVE PAPER-III: INDIA'S FOREIGN POLICY IN A CHANGING WORLD

Introduction: This course's objective is to teach students the domestic sources and the structural constraints on the genesis, evolution and practice of India's foreign policy. The endeavour is to highlight integral linkages between the 'domestic' and the 'international' aspects of India's foreign policy by stressing on the shifts in its domestic identity and the corresponding changes at the international level. Students will be instructed on India's shifting identity as a postcolonial state to the contemporary dynamics of India attempting to carve its identity as an 'aspiring power'. India's evolving relations with the superpowers during the Cold War and after, bargaining strategy and positioning in international politics facilitate an understanding of the changing positions and development of India's role as a global player since independence.

DISCIPLINE SPECIFIC ELECTIVE PAPER-IV: WOMEN, POWER AND POLITICS

Introduction: This course opens up the question of women's agency, taking it beyond 'women's empowerment' and focusing on women as radical social agents. It attempts to question the complicity of social structures and relations in gender inequality. This is extended to cover new forms of precarious work and labour under the new economy. Special attention will be paid to feminism as an approach and outlook.

HOD, Pol. Science Karanjia Autonomous College, Karanjia Mayurbhanj.

FIFTH SEMESTER

CORE PAPER-XI: WESTERN POLITICAL PHILOSOPHY

Introduction: This course goes back to Greek antiquity and familiarizes students with the manner in which the political questions were first posed. Machiavelli comes as an interlude inaugurating modern politics followed by Hobbes and Locke, Rousseau, Marx. This is a basic foundation coursefor students.

CORE PAPER-XII: INDIAN POLITICAL THOUGHT (ANCIENT AND MEDIEVAL)

Introduction: This course introduces the specific elements of Indian Political Thought spanning overtwo millennia. The basic focus of study is on individual thinkers whose ideas are however framed by specific themes. The course as a whole is meant to provide a sense of the broad streams of Indian thought while encouraging a specific knowledge of individual thinkers and texts. Selected extracts from some original texts are also given to discuss in class. The list of Reference books is meant for teachers as well as the more interested students.

DISCIPLINE SPECIFIC ELECTIVE PAPER-I: INTRODUCTION TO HUMAN RIGHTS

Introduction: This course attempts to build an understanding of human rights among students through a study of specific issues in a comparative perspective. It is important for students to see howdebates on human rights have taken distinct forms historically and in the contemporary world. The course seeks to anchor all issues in the Indian context, and pulls out another country to form a broadercomparative frame.

DISCIPLINE SPECIFIC ELECTIVE PAPER-II: DEVELOPMENT PROCESS AND SOCIAL MOVEMENTS IN CONTEMPORARY INDIA

(Project)

Introduction: Under the influence of globalization, development processes in India have undergone transformation to produce spaces of advantage and disadvantage and new geographies of power. The high social reproduction costs and dispossession of vulnerable social groups involved in such a development strategy condition new theatres of contestation and struggles. A variety of protest movements emerged to interrogate and challenge this development paradigm that evidently also weakens the democratic space so very vital to the formulation of critical consensus. This course proposes to introduce students to the conditions, contexts and forms of political contestation over development paradigms and their bearing on the retrieval of democratic voice of citizens.

GENERIC ELECTIVE PAPER-II(A2): GOVERNANCE: ISSUES AND CHALLENGES

Objectives: This paper deals with concepts and different dimensions of governance highlighting the major debates in the contemporary times. There is a need to understand the importance of the conceptof governance in the context of a globalizing world, environment, administration, development. The essence of governance is explored through the various good governance initiatives introduced in India.

FOURTH SEMESTER

CORE PAPER-VIII: POLITICAL PROCESSES AND INSTITUTIONS IN COMPARATIVE PERSPECTIVE

Introduction: In this course students will be trained in the application of comparative methods to the study of politics. The course is comparative in both what we study and how we study. In the process the course aims to introduce undergraduate students to some of the range of issues, literature, and methods that cover comparative political.

CORE PAPER-IX: PUBLIC POLICY AND ADMINISTRATION IN INDIA

Introduction: The paper seeks to provide an introduction to the interface between public policy and administration in India. The essence of public policy lies in its effectiveness in translating the governing philosophy into programs and policies and making it a part of the community living. It deals with issues of decentralization, financial management, citizens and administration and social welfare from a non-western perspective.

CORE PAPER-X: GLOBAL POLITICS

Introduction: This course introduces students to the key debates on the meaning and nature of globalization by addressing its political, economic, social, cultural and technological dimensions. In keeping with the most important debates within the globalization discourse, it imparts an understanding of the working of the world economy, its anchors and resistances offered by global social movements while analyzing the changing nature of relationship between the state and trans- national actors and networks. The course also offers insights into key contemporary global issues such as the proliferation of nuclear weapons, ecological issues, international terrorism, and human security before concluding with a debate on the phenomenon of global governance.

GENERIC ELECTIVE PAPER-II(B2): GOVERNANCE: ISSUES AND CHALLENGES

Objectives: This paper deals with concepts and different dimensions of governance highlighting the major debates in the contemporary times. There is a need to understand the importance of the conceptof governance in the context of a globalizing world, environment, administration, development. The essence of governance is explored through the various good governance initiatives introduced in India.

FIRST UNIVERSITY EXAMINATION M.I.L. (SANTALI) FIRST YEAR ARTS

PAPER-I F.M.- 100

1. Prabandha

a. Taka Dare
b. Abo Saontare Tirla Koak Thaon
c. Bartakil Ar. Bartakilan renka' La, Kti
d. Santali Hor. Seren
e. N'utum Chhatyar
Sri Udaya Nath Majhi
Sri Babula Murmu, "Adibasi"
Sri Baidya Nath Marandi
Mahadev Hansdah
Sri Gangadhar Hansdah

Text Book :

Santali Onolmala

Edited by : Rupchand Hansdah & Jadumani Besra Published by : All India Santali Writers' Association.

2. Poetry

- a. Oka cho happen
- b. Sengel hobor katen daran kana
- c. Mulin mone landayme
- d. Hudin Chene Gidra
- e. Am Ar In
- f. Eklare
- g. Lade Sarjcm
- h. Sa.ga.y
- i. Bhador renak' mid N'ida

Text Book :

Onorhen Mohok (2nd Edition)

Edited by : Rupchand Hansdah & Jadumani Besra Published by : All India Santali Writers' Association.

3. Short Stories :

- a. Athem
- b. Mid bita. Hasa
- c. Ha.Kim
- d. Bazar Nisa
- e. Homor Halang
- f. Pharak

Text Book : Jiyon Gada

Edited by : Rupchand Hansdah & Jadumani Besra Published by : All India Santali Writers' Association.

Narayan Soren, "Toresutam" Thakur Prasad Murmu Doman Hansdah Sadhu Ramchand Murmu Sarada Prasad Kisku Rupchand Hansdah Arjun Chandra Hembram Dr. Damayanti Beshra Jadumani Beshra

Rupchand Hembram Dr. Krishna Chandra Tudu Dr. Basudeo Beshra Parau Murmu Ratan Chandra Tudu Jadumani Beshra

: Rup . : Arju

- 4, Essay Writing : (Unseen)
- 5. Grammar :
 - a. Structure of Sentences
 - b. Word formation with Prefix, Infix and Sufix
 - c. Men Katha Ar Bhenta Katha (Proverbs, Metaphors)

Text Book :

- 1. Ronor
- 2. Materials for Santali Grammar
- 3. Bhenta Katha
- 4. Gabe Arang

Prepared by :

Sri Rupchand Hansdah Sri Jadumani Beshra Dr. Damayanti Beshra Pandit Raghunath Murmu Rev. P.O. Bodding Siron Murmu Boyha Biswanath Tudu

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(12)

SECOND UNIVERSITY EXAMINATION M.I.L. (SANTALI) SECOND YEAR ARTS

F.M.- 100

Time - 3 hours

PAPER-II

1. Prabandha

- a. Hapramkowak Katha (1st Chapter)
- b. Isror (one chapter)
- c. Santali Parsi Unureum
- d. Onorben Okasen

Text Book :

- ; Rev. P.O. Bodding
- : Sadhu Chran Murmu Ramchand
- : Dr. Stenshila Hembram
- Rupchand Hansdah

Santali Onolmala

Edited by : Rupchand Hansdah & Jadumani Besra Published by: All India Santali Writers' Association.

2. Poetry

- a. Atang tin' ben Johar : D
- b. Delang Ruar Dular ato Arak'
- c. Toraok' Ansh
- d. Soros Sirjon
- e. Sari Hor
- f. Mit Udao Mone

- Dr. Doman Sahu, "Samir"
- Aditya Mitra, "Santali"
- Gomasta Prasad Soren
- Bhojrai Hembram
- Jagannath Murmu
- Chaitanya Prasad Majhi

Text Book :

Onorhen Mohok (2nd Edition)

Edited by : Rupchand Hansdah & Jadumani Besra

Published by : All India Santali Writers' Association.

3. History of Santali Literature

(Missionaries and Post Misonaries period upto 1946)

Reference Book :

Santali Sahitya Renak' Itihas : By Prof. Sanatan Hansdah

Essay Writing : (Unseen)

(based on Santal Social, cultural, literature and other related

Grammar :

- a. Sentence Structure, specially animatic and non animatic
- b. Formation of words with prefix, Infix and Sufix, Saddhi
- c. Menkatha Ar Bhentakatha (proverbs etc.)

(13)
Reference Book :	SECOND UNIVERSI
1. Ronor	: Pandit Raghunath Murmu
2. Materials for Santali Grammer	: Rev. P.O. Bodding
3 Gabe Arang	Boyha Biswanath Tudu
4 Hor Ror Tevang Bhentar-Ror Ar. M	enkatha- Siron Murmu
4. Horitorioyang	 Hapramkowak Staths (1st Chapter)
Prepared by	D. Infort (one chapter)
1. Dr. Damayanti Beshra	d. Coothen Official and a contract of the
2. Sri Rupchand Hansdah	A Book
3. Sri Jadumani Beshra	
Mark Distribution	Ented by Droimsta
1 Prabandha	Published by All India Securit Issues
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	: 5
b. Explanation	20 marks
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2. Poetry	d. Soras Sirjan
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b. Explanation	and i 5 an
Total	20 marks
2 History and Santali Literature	Onorhen'strans (2nd Editer)
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a. Long Question	
b. Objective	20 marks
Total	20 marks
4 Essay Writing	. 20 mano
5. Grammer	Santai Sahtya Renak Rhiše
a. Objective	10 marks
Total	: 100 marks
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