॥ विद्या विनयन शोभते॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

ARTS, COMMERCE AND SCIENCE COLLEGE, NEW PANVEL (Autonomous)

Re-accredited 'A+' Grade by NAAC (Third Cycle- 3.61 CGPA)

'College with Potential for Excellence' Status Awarded by University Grants Commission

'Best College Award' by University of Mumbai

Programme Outcomes and Course Outcomes

Internal Quality Assurance Cell (IQAC)

Faculty of Arts

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: English

B.A. (English)

PO		
Sr. No.	**Outcome for B.A. Program After completion of B.A. program students will acquire**	**Graduate Attribute**
PO1	Demonstrate a blend of conventional discipline knowledge and its applications to the modern world. Execute strong theoretical and practical understanding generated from the chosen programme and equip the students with a strong academic perspective.	Disciplinary Knowledge
PO2	Exhibit the skill of critical thinking and use higher order cognitive skills to approach problems situated in their social environment, propose feasible solutions and help in its implementation. The students will be able to comprehend, learn, process and apply knowledge in day to day life.	Critical Thinking, Cognitive skills and Problem Solving
PO3	Ability to analyse and evaluate different concepts of problems of society and make students able to develop oral and written communication skills in literature.	Analytical Skills and Effective Communication
PO4	Equip with strong work attitudes and Employment skills that will enable them to work independently as well as collaboratively. Seeks opportunity for research and higher academic achievements in the chosen field and allied subjects.	Competencies for employment and Research
PO5	Able to work collaboratively and effectively with diverse groups towards personal and common goals. Develop leadership qualities among the learners.	Individuality and Teamwork

PO6	Demonstrate empathetic social concern and equity centred national development; ability to act with an informed awareness of moral and ethical issues and commit to professional ethics as well as to accomplish their duties and responsibilities as citizens successfully.	Effective Citizenship and Ethics
PO7	Express oneself clearly and precisely to build good interpersonal relationships in personal and professional life.	Social competence
PO8	Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of, and need for environmental conservation and sustainability through action.	Environment sustainability
PO9	Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.	Self-directed and Life-long learning
PO10	Help students to share gifts, pursue justice and demonstrate through communicative solutions, concern for the poor and marginalised	Community engagement

Programme Specific Outcomes	
PSO1	Demonstrate amalgamation of Conventional and Modern Literature with theoretical and practical understanding of the selected Literary texts.
PSO2	Ability to analyse various problems present in effective communication skills and enhance students' communicative competence.
PSO3	Able to work collectively and individually for achieving common goals with the help of Human Values and Leadership Qualities.
PSO4	Demonstrate ethical and moral values through Literature for carving out better citizens for the nation.
PSO5	Express confidently and accurately with a command over language in personal and professional life.

CO	
Semester – I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Introduction to English Poetry	
CO1	To classify prominent genres of poetry in English.
CO2	To identify reflection of human values in English poetry and drama.
CO3	To examine various themes reflected in poetry.
CO4	To create an awareness about the relationship between man and nature.
Course (Paper) Name and No :- Introduction to English Short Story	
CO1	To identify elements of short story.
CO2	To discover moral and social values in the story.
CO3	To analyse characterisation in the story.
CO4	To examine the various themes in story.
Course (Paper) Name and No :- Communication Skills in English (FYBA)	
CO1	To understand the importance of communication Skills of English.
CO2	To develop four basic amongst the learners.
Course (Paper) Name and No :- Communication Skills in English (FYBCOM)	
CO1	To explain the process of communication in business world.
CO2	To analyze verbal and non-verbal methods of communication in corporate world with illustrations.
CO3	To perceive importance of channels of communication.
CO4	To identify mechanism of conducting successful meeting.
Course (Paper) Name and No :- Communication Skills in English (FYBMS)	
CO1	To explain the nature and significance of communication in business world.
CO2	To analyse verbal and non-verbal methods of communication in corporate world with illustrations.
CO3	To perceive importance of presentation in today's competitive and corporate world.
CO4	To recognise the importance of listening skills.
Course (Paper) Name and No :- Communication Skills in English (FYBAF)	
CO1	To explain the nature and significance of communication in business world.
CO2	To analyse verbal and non-verbal methods of communication in corporate world with illustrations.
CO3	To perceive importance of presentation in today's competitive and corporate world.
CO4	To recognise the importance of listening skills.

Course (Paper) Name and No :- Verbal Communication (SEC)	
CO1	To explain nature and features of oral communication.
CO2	To develop the skill of situational conversation.
Course (Paper) Name and No :- Voice Modulation (VSC)	
CO1	To explain prominent aspects of voice modulation for effective communication.
CO2	To apply features of effective presentation skills.
CO3	To analyse vowels and consonant sounds in English.
CO4	To perceive nature of story presentation.
Course (Paper) Name and No :- Science and Literature (OE – FYBSC)	
CO1	To analyze elements of Elements of Science Fiction Stories.
CO2	To explain themes reflected in short stories.
CO3	To distinguish between Scientific and Literary Features reflected in the stories.
CO4	To compare and contrast nature of experimentation in Science and Literature.
Course (Paper) Name and No :- Film Appreciation (OE- FYBCOM)	
CO1	To explain History of Indian Cinema and its elements.
CO2	To analyse various cinematic attributes reflected in the films.
CO3	To compare the challenges and opportunities of a business protagonist reflected in the film with real business scenario.
CO4	To develop the skill of film appreciation for better understanding of nuances of business and human life.
Course (Paper) Name and No :- Effective Communication Skills	
CO1	To apply various types of sentences in Communication.
CO2	To distinguish between Verbal and Non Verbal elements of Communication.
CO3	To perceive the significance of Presentation Skills.
CO4	To justify importance of Communication and Soft Skills.
Course (Paper) Name and No :- Communication Skills in French	
CO1	To apply the basics of French language in real life situation.
CO2	To examine various characteristics of French language.
CO3	To explain everyday life situation in French.
CO4	To improve communication skills in French for better employment opportunities.
Course (Paper) Name and No :- Communication Skills in German	
CO1	To identify cultural contexts in German and facilitate effective communication.
CO2	To examine structures, grammatical rules and norms in the language.
CO3	To compare and contrast the culture and language fostering cross-cultural awareness.
CO4	To develop effective communication skills in German and engage in real-life situations.

Semester – II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Introduction to English Drama I	
CO1	To classify prominent genres of drama in English.
CO2	To identify reflection of human values in English drama.
CO3	To analyse various themes reflected in the play.
CO4	To create an awareness about gender equality and supremacy of nature through the plays.
Course (Paper) Name and No :- Introduction to English Fiction II	
CO1	To identify elements of novel.
CO2	To discover moral and social values in the novel.
CO3	To analyse the relationship between nature and literature.
CO4	To examine the various themes in fiction.
Course (Paper) Name and No :- Communication Skills in English (FYBA)	
CO1	To make students to comprehend the functionality of English Language.
CO2	To construct the positive approach about English language.
Course (Paper) Name and No :- Communication Skills in English (FYBCOM)	
CO1	To explain the nature and significance of communication in business world.
CO2	To analyse importance of group discussion.
CO3	To perceive importance of presentation and interview skills in today's competitive and corporate worlds.
CO4	To design different types of commercial letters successfully.
Course (Paper) Name and No :- Communication Skills in English (FYMS)	
CO1	To explain the nature and significance of meetings in business world.
CO2	To analyse methods of public relations in business organization.
CO3	To perceive importance of interview skills in today's competitive and corporate world.
CO4	To design different types of commercial letters successfully.
Course (Paper) Name and No :- Communication Skills in English (FYBAF)	
CO1	To explain the nature and significance of meetings in business world.
CO2	To analyse methods of public relations in business organization.
CO3	To perceive importance of interview skills in today's competitive and corporate world.
CO4	To design different types of commercial letters successfully.

Course (Paper) Name and No :- Verbal Communication (SEC)	
CO1	To perceive importance of reading skill in communication.
CO2	To improve the paradigms of written communication.
Course (Paper) Name and No :- Voice Modulation (VSC)	
CO1	To explain the nature of sentence accent.
CO2	To recognize importance of meter in poetry.
CO3	To analyse importance of word accent and tongue twisters in communication.
CO4	To perceive mother tongue influence in voice modulation.
Course (Paper) Name and No :- Science and Literature (OE – FYBSC)	
CO1	To identify forms of Science Fiction.
CO2	To explain themes reflected in Scientific Novels.
CO3	To illustrate characterisation in Science Fiction.
CO4	To develop scientific creativity for betterment of society.
Course (Paper) Name and No :- Film Appreciation (OE- FYBCOM)	
CO1	To explain Different Genres of Films.
CO2	To analyse various thematic attributes reflected in the films.
CO3	To identify commercial elements reflected in the films.
CO4	To develop the skill of film appreciation in the context of Business.
Course (Paper) Name and No: - Effective Communication Skills	
CO1	To explain nature and importance of interview skills.
CO2	To identify importance of Group Discussion.
CO3	To perceive the nature and importance of Business Correspondence.
CO4	To examine role of language in Advertisement.
Course (Paper) Name and No :- Communication Skills in French	
CO1	To apply the basics of French language in real life situation.
CO2	To examine various characteristics of French language.
CO3	To explain everyday life situation in French.
CO4	To improve communication skills in French for better employment opportunities.
Course (Paper) Name and No :- Communication Skills in German	
CO1	To identify cultural contexts in German and facilitate effective communication.
CO2	To examine structures, grammatical rules and norms in the language.
CO3	To compare and contrast the culture and language fostering cross-cultural awareness.
CO4	To develop effective communication skills in German and engage in real-life situations.

Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Indian Literature II	
CO1	To appreciate literary beauty depicted in the essays.
CO2	To learn the pluralistic dimensions of Indian Literature in English.
CO3	To understand importance of Indian culture represented in English.
CO4	To enable the learners to delve into the specialty of Indian short story.
Course (Paper) Name and No :- American Literature III	
CO1	To interpret literary terms in American Literature.
CO2	To discover thematic concerns reflected in prominent American short story.
CO3	To perceive gender equality through prominent stories pertaining to American literature.
CO4	To examine nature of racial conflicts in African American novel.
Semester IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Indian Literature II	
CO1	To explain various elements of essay in Indian literature.
CO2	To learn different dimensions of Indian Literature in English.
CO3	To identify importance of Indian culture represented in English.
CO4	To enable the learners to delve into the specialty of Indian drama.
Course (Paper) Name and No :- American Literature III	
CO1	To interpret literary terms in American Literature.
CO2	To discover thematic concerns reflected in prominent American poetry.
CO3	To perceive salient feature of African American poetry.
CO4	To analyse nature of American dream in life and literature.

Semester - V	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- 16th to 18th Century English Literature IV	
CO1	To illustrate features of Elizabethan epoch and growth of drama.
CO2	To distinguish between to be or not to be in the context of Elizabethan drama.
CO3	To Interpret prominent genres of poetry in English developed during 16th century.
CO4	To examine human values reflected in Elizabethan literature.
Course (Paper) Name and No :- Literary Criticism V	
CO1	To explain literary movements with suitable illustrations through literary text.
CO2	To identify the relationship between imitation and literature.
CO3	To analyse nature and functions of literary criticism.
CO4	To examine nature of meter in poetry.
Course (Paper) Name and No :- Grammar and Art of Writing VI	
CO1	To identify nature of vowels and consonants in English language.
CO2	To recognize correct use phrases in English language.
CO3	To analyse various elements of discourse in English language.
CO4	To examine the mechanism of writing skills.
Course (Paper) Name and No :- 19th Century English Literature VII	
CO1	To explain features of Romanticism.
CO2	To interpret reflection of nature in 19th century poetry.
CO3	To analyse the relationship between nature and literature.
CO4	To justify the nature of love and marriage in 19th century fiction.
Course (Paper) Name and No :- 20th Century British Literature VIII	
CO1	To explain features of modernism in 20th Century British Literature.
CO2	To identify themes reflected in absurd drama.
CO3	To understand the complex nature different genres of the 20th century British Literature.
CO4	To appreciate various genres of British Literature.
Course (Paper) Name and No :- Literature of Protest IX	
CO1	To interpret politics of protest literature.
CO2	To understand protest literature.
CO3	To explain the concept of race and discrimination.
CO4	To understand the historicity of protest literature.

Semester - VI	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- 16th to 18th Century English Literature IV	
CO1	To illustrate features of Restoration epoch and growth of drama.
CO2	To distinguish between one's honours versus love represented in historical drama.
CO3	To Interpret prominent genres of poetry in English developed during 18th century.
CO4	To solve conflicts experienced by the protagonist and its application in real life.
Course (Paper) Name and No :- Literary Criticism V	
CO1	To identify the difference between Classicism and Romanticism.
CO2	To experiment with New criticism as a critical approach.
CO3	To analyse nature, features and growth of feminism and its application to literature.
CO4	To develop the technique of appreciation of a poem on the basis of practical criticism.
Course (Paper) Name and No :- Grammar and Art of Writing VI	
CO1	To identify nature of clause in English language.
CO2	To construct correct grammatical sentences in English language.
CO3	To analyse various rhetorical devices in English language.
CO4	To design advertisement through effective use of language.
Course (Paper) Name and No :- 19th Century English Literature VII	
CO1	To explain features of Victorian Period.
CO2	To interpret reflection of values in Victorian period.
CO3	To analyse influence of industrialization in human life.
CO4	To examine sufferings of orphans during Victorian period.
Course (Paper) Name and No :- 20th Century British Literature VIII	
CO1	To explain features of science fiction.
CO2	To identify thematic concerns reflected in 20th century British Literature.
CO3	To understand the different genres of the 20th century British Literature.
CO4	To appreciate various genres of British Literature.
Course (Paper) Name and No :- Literature of Protest IX	
CO1	To relate and interpret cross cultural texts.
CO2	To understand various themes of resistance, justice and social change.
CO3	To explain the concept of race and discrimination.
CO4	To examine historical and social context in which protest literature was created.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel

(Autonomous)

M.A. (English)

PO		
Sr. No.	**Outcome for M.A. Program** **After completion of M.A. program students will acquire**	**Graduate Attribute**
PO1	Amalgamations of theoretical and practical understanding generated from the chosen programme and develop the students with academic perspective.	Disciplinary Knowledge
PO2	Demonstrate effective communication skills pertaining to different domains of the courses.	Communication Skills
PO3	Application of analytical thoughts, arguments, evidences and relevant assumptions for development of scientific approach.	Critical Thinking
PO4	Solving of different kinds of non-familiar problems and apply ones learning to real life situations.	Problem Solving
PO5	Identification of relevance along with logical flaws in the arguments for synthesis of the data of variety of sources.	Analytical reasoning
PO6	Development of sense of enquiry and research capabilities and acumen related problems of research.	Research-related skills
PO7	Critical sensibility about live experiences with self-awareness and its reflection in self and society.	Reflective thinking
PO8	Demonstration of moral and ethical values in one's life.	Moral and ethical awareness
PO9	Capability for building a team to achieve desired goals and objectives.	Leadership qualities
PO10	Acquisition of knowledge and skills for participating in learning activities throughout the life.	Lifelong learning

PSOs	
PSO1	Demonstrate amalgamation of Conventional and Modern Literature with theoretical and practical understanding of the selected Literary texts.
PSO2	Exhibit critical thinking and its applications through genres of Literature .The students will be able to understand, learn and apply its knowledge in day-to-day situations.
PSO3	Equip the students with employability skills and empower them with research skills to complete research projects in Literature and provide an opportunity for On-Job Training.
PSO4	Understand the relationship between man and environment depicted in Literature for its sustainability and development.
PSO5	Acquire the skill of learning English as a continuous process in Life

COs	
Semester I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Literary Theory and Criticism	
CO1	To recognise the nature of mimesis in literature.
CO2	To identify romantic critical theory in the context of literature.
CO3	To examine features of Rasa theory and its application to literary works.
CO4	To evaluate the nature of formulism as a critical approach.
Course (Paper) Name and No :- Fiction	
CO1	To explain various genres of novel.
CO2	To identify elements of satire in literature and life.
CO3	To analyse evil consequences of experimentation in literature and life.
CO4	To justify status of women characters in fiction.
Course (Paper) Name and No :- Drama	
CO1	To identify elements of Greek and Indian drama.
CO2	To examine the difference between life in nature and courtly life.
CO3	To analyse status of women represented in literature and life.
CO4	To evaluate nature of Aristocratic people and mannerism in society.

Course (Paper) Name and No :- Linguistic and Stylistic Analysis of Text	
CO1	To explain figurative use of language in English.
CO2	To identify importance of cohesion in literary discourse.
CO3	To explain the techniques of discourse analysis.
Course (Paper) Name and No :- English Language Teaching	
CO1	To discover nature of language acquisition theories.
CO2	To examine various approaches to English language teaching.
CO3	To perceive the role of English Language Laboratory in effective teaching.
CO4	To develop four basic skills in English language teaching.
Course (Paper) Name and No :- Research Methodology	
CO1	To examine various basic key concept in research.
CO2	To distinguish between primary and secondary data collection in the process of research.
CO3	To perceive the importance of research methodology in literary research.
CO4	To develop chapterization and documentation in the process of research.
Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Literary Theory and Criticism	
CO1	To identify nature and features of structuralism as an approach.
CO2	To identify feministic ideology represented in literature.
CO3	To distinguish features of Reader Response Theory and its application to literary works.
CO4	To evaluate the formation of eco-criticism and its essence in literature as well as in real life.
Course (Paper) Name and No :- Fiction	
CO1	To explain characteristics of psychological novel.
CO2	To identify the conflict between good and evil in literature.
CO3	To analyse various themes represented in the novel.
CO4	To justify nature of racial and gender discrimination in fiction.
Course (Paper) Name and No :- Drama	
CO1	To identify various genres of drama.
CO2	To examine supremacy of nature in drama and life.
CO3	To analyse features of theatre of absurd reflected in drama.
CO4	To justify role of mythology in literature.

Course (Paper) Name and No :- Linguistic and Stylistic Analysis of Text	
CO1	To illustrate the sound system of English language.
CO2	To identify place and manner of articulation of Vowels and Consonants.
CO3	To inspect salient traits in narratology and its application.
Course (Paper) Name and No :- English Language Teaching	
CO1	To discover nature of language acquisition theories.
CO2	To analyse nature of different methods of English language teaching.
CO3	To examine the process of syllabus designing in English Language Teaching.
CO4	To design the material pertaining to English Language Teaching.
Course (Paper) Name and No :- On Job Training	
CO1	To identify various challenges while teaching English language.
CO2	To analyse the process of Lesson Planning while English Language Teaching.
CO3	To justify the role of English Language Laboratory in teaching English.
CO4	To develop teaching aids in the process of English Language Teaching.
Semester - III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Poetry from Chaucer to Present	
CO1	To recognize the relationship between nature and poetry.
CO2	To develop the skill of appreciation of different poetic forms amongst the students.
CO3	To perceive the contribution of representative poets of the age or movement.
CO4	To analyse moral and social values reflected in English poetry.
Course (Paper) Name and No :- Gender Perspectives in Literature	
CO1	To perceive the importance of gender equality in the real life.
CO2	To recognize the relationship society and gender formation.
CO3	To evaluate prominent literary text on the basis of gender perspectives.
CO4	To justify the status and identity of women in literature as well as society.
Course (Paper) Name and No :- Twentieth Century American Literature	
CO1	To identify various thematic concerns reflected in the realm of American Literature.
CO2	To justify the importance of equality and freedom in the society.
CO3	To recognize the style of modern and postmodern American writers.
CO4	To evaluate the importance of multiculturalism depicted in the texts.

Course (Paper) Name and No :- Shakespeare	
CO1	To discover various thematic concerns reflected in the masterpieces of Shakespeare.
CO2	To identify effective use of iambic pentameter in the works of Shakespeare.
CO3	To distinguish amongst the tragedies, comedies and historical plays of William Shakespeare.
CO4	To pursue the contribution of William Shakespeare as a Sonneteer.
Semester - IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Indian Writing in Translation	
CO1	To perceive various thematic concerns reflected in Indian Writing in Translation.
CO2	To examine the nature of Indian ethos reflected in the various Indian languages.
CO3	To evaluate the contribution of prominent writers in the realm of Indian languages.
CO4	To appraise the challenges involved in Translation of Literary text.
Course (Paper) Name and No :- Research Methodology	
CO1	To examine the importance of research in the process of learning.
CO2	To analyse the interpretative and analytical skills during the process of research.
CO3	To perceive the process of research systematically and successfully.
CO4	To develop various conventions of documentation in the process of research.
Course (Paper) Name and No :- Political Reading of Literature	
CO1	To analyse various nuances of power politics present in the literary texts.
CO2	To examine the dominant ideology reflected in the realm of literature.
CO3	To perceive the mechanism of power politics and its implementation.
CO4	To evaluate the power politics present in the literary works as well as real life.
Course (Paper) Name and No :- Project	
CO1	To analyse various nuances of power politics present in the literary texts.
CO2	To examine the dominant ideology reflected in the realm of literature.
CO3	To perceive the mechanism of power politics and its implementation.
CO4	To evaluate the power politics present in the literary works as well as real life.

II विद्या विनयेन शोभते II

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Economics

B.A. (Economics)

PO		
Sr. No.	**Outcome for B.A. Program After completion of B.A. program students will acquire**	**Graduate Attribute**
PO1	Demonstrate a blend of conventional discipline knowledge and its applications to the modern world. Execute strong theoretical and practical understanding generated from the chosen programme and equip the students with a strong academic perspective.	Disciplinary Knowledge
PO2	Exhibit the skill of critical thinking and use higher order cognitive skills to approach problems situated in their social environment, propose feasible solutions and help in its implementation. The students will be able to comprehend, learn, process and apply knowledge in day to day life.	Critical Thinking, Cognitive skills and Problem Solving
PO3	Ability to analyse and evaluate different concepts of problems of society and make students able to develop oral and written communication skills in literature.	Analytical Skills and Effective Communication
PO4	Equip with strong work attitudes and Employment skills that will enable them to work independently as well as collaboratively. Seeks opportunity for research and higher academic achievements in the chosen field and allied subjects.	Competencies for employment and Research
PO5	Able to work collaboratively and effectively with diverse groups towards personal and common goals. Develop leadership qualities among the learners.	Individuality and Teamwork
PO6	Demonstrate empathetic social concern and equity centred national development; ability to act with an informed awareness of moral and ethical issues and commit to professional ethics as well as to accomplish their duties and responsibilities as citizens successfully.	Effective Citizenship and Ethics

PO7	Express oneself clearly and precisely to build good interpersonal relationships in personal and professional life.	Social competence
PO8	Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of, and need for environmental conservation and sustainability through action.	Environment sustainability
PO9	Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.	Self-directed and Life-long learning
PO10	Help students to share gifts, pursue justice and demonstrate through communicative solutions, concern for the poor and marginalised	Community engagement

Programme Specific Outcomes	
PSO1	Demonstrate progressive knowledge of Economics, finance, taxation, business, Indian economy, Demography, Statistical methods.
PSO2	Develop managerial career skills applying both quantitative and qualitative knowledge to their future careers business, industry and officers in different sectors of the economy
PSO3	Develop proficiency with the ability to engage in competitive exams like MPSC, UPSC, IES, ISS, Research analyst's, Bank POs and other courses.

CO	
Semester - I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Microeconomics - I	
CO1	Study basic concepts of micro economics.
CO2	Relate the cardinal and ordinal approaches.
CO3	Examine the market demand and market supply.
CO4	Compare types of market structure.
Course (Paper) Name and No :- Indian Economy - II	
CO1	Memorize the Basic concepts of Indian Economy
CO2	Review the Planning Commission and NITI Ayog.
CO3	Exercise the measures of Poverty and Unemployment
Course (Paper) Name and No :- Economics of Insurance- III	
CO1	Identify and define basic terms and concepts of insurance
CO2	Observe the importance of insurance for an individual and the economy
CO3	Judge the concept of risk and its types, and the process of risk management.
Course (Paper) Name and No :- Basic Techniques in Research - IV	
CO1	Memorize Basics of research Methodology.
CO2	Explain cost and revenue and interrelationship.
CO3	Develop theories of factor pricing.
Course (Paper) Name and No :- Basic Economics - V	
CO 1	Study the basic Concepts of Micro
CO 2	Visualize the basic Concepts of Macro
Semester - II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Microeconomics - I	
CO1	Identify the various concepts of Production Function.
CO2	Distinguish the concepts of Cost and Revenue
CO3	Determine the theories of Factor Distribution
CO4	Explain the methods of capital budgeting.

Course (Paper) Name and No :- Indian Economy - II	
CO1	Relate the infrastructure and Development.
CO2	Explain the different concepts of agriculture.
CO3	Develop the view towards new policies of industrial sector.
Course (Paper) Name and No :- Money and Banking - III	
CO1	Memorize various measures of Money Supply.
CO2	Observe the importance of insurance for an individual and the economy,
CO3	Adapt various ways of banking.
Course (Paper) Name and No :- Basic Techniques in Research - IV	
CO1	Relate types of production and producers equilibrium.
CO2	Explain cost and revenue and interrelationship.
CO3	Develop theories of factor pricing.
Course (Paper) Name and No :- Basic Economics - V	
CO1	Capture various measures of Money Supply.
CO2	Correlate the public expenditure and Public Debt.
Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Demography - I	
CO1	Show the nature of Indian Population
CO2	Relate the theories of population.
CO3	Assess the sources of demographic data in India
CO4	Choose the appropriate methods of calculation
Course (Paper) Name and No :- Macroeconomics - II	
CO1	Define the concepts of Macro Economics and National Income.
CO2	Interpret the theories of consumption and investment.
CO3	Distinguish between supply of money and demand for money.
CO4	Compare the banking structure in India.
Course (Paper) Name and No :- Public Finance - III	
CO1	Find out the difference between public finance and Private finance.
CO2	Compare Budget and Taxation.
CO3	Distinguish between public Expenditure and debt.
CO4	Interpret the Indian Public Finance.

Semester - IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Demography - I	
CO1	Explain the concept of fertility, Nuptiality, Mortality and Life Table.
CO2	Choose the theories of Migration.
CO3	Examine urbanization and problems of urbanization in India.
CO4	Evaluate the population Policy.
Course (Paper) Name and No :- Macroeconomics - II	
CO1	Find the inflation in Indian economy
CO2	Relate the monetary and fiscal policy in India
CO3	utilize post Keynesian Theories of Economics
CO4	Examine the relationship between domestic economy and External sectors
Course (Paper) Name and No :- Indian Economy - III	
CO1	Define the various concepts of Indian economy.
CO2	Explain the agriculture policies.
CO3	Identify the various programmes for Industrial Development.
CO4	Examine the role and nature of service sector in India.
Semester - V	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Advanced Micro Economics - IV	
CO1	Define the concepts of general equilibrium and welfare economics.
CO2	Explain the futures of monopoly and monopolistic competition structure.
CO3	Identify the various models of imperfect competition.
CO4	Importance of information Economics.
Course (Paper) Name and No :- Economics Of Growth And Development - V	
CO1	Relate the meaning of growth and development
CO2	Explain the theories of economic development
CO3	Identify the structural issues in development process
CO4	Adapt appropriate technology for the economic development

Course (Paper) Name and No :- Economics Of Agriculture And Co-Operation - VI	
CO1	Explain the Agricultural Productivity
CO2	Classify the Agricultural credit
CO3	Justify the agricultural marketing
CO4	Discuss agriculture price and Policy
Course (Paper) Name and No :- Industrial And Labour Economics - VI	
CO1	Find the profile of different industrial sectors.
CO2	Relate the Industrial location and problem of regional Imbalance.
CO3	Relationships between industrial productivity and Industrial sickness.
CO4	Evaluate the various policies.
Course (Paper) Name and No :- Research Methodology - VII	
CO1	Choose research methods
CO2	Outline the research problems
CO3	Make use of types of data
CO4	Take part in representation and analysis of data
Course (Paper) Name and No :- Environmental Economics - VIII	
CO1	Define the meaning, nature, scope and significance of Environmental Economics.
CO2	Outline the Environmental policies.
CO3	Identify the various methods of measuring benefits of environmental improvements.
CO4	Discuss the global environmental issues.
Course (Paper) Name and No :- History Of Economic Thought - IX	
CO1	Compare the classical theories.
CO2	Utilize Neo-classical theories of economics.
CO3	Evaluate Keynesian Ideas for developing countries.
CO4	Discuss the post Keynesian Theories.
Semester - VI	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Advanced Macroeconomics - IV	
CO1	Tell the post Keynesian theories of economics
CO2	Summarize the trade cycles.
CO3	Compare exchange rates and balance of payments
CO4	Determine International Monetary System

Course (Paper) Name and No :- International Economics - V	
CO1	Classify the trade theories
CO2	Identify the difference between balance payments and balance of trade
CO3	Examine the foreign exchange market
CO4	Judge international economic institutions and economic Integration
Course (Paper) Name and No :- Economics Of Agriculture And Co-Operation - VI	
CO1	Find out the meaning, scope and nature of co-operation
CO2	Explain co-operative finance in India
CO3	Categorize agricultural Co-operatives
CO4	Evaluate Co-operative organization in India
Course (Paper) Name and No :- Industrial And Labour Economics - VI	
CO1	Define Indian labour market.
CO2	Summarise the role and problems of trade unions.
CO3	Design the various method s of industrial relations.
CO4	Prioritize the various welfare schemes.
Course (Paper) Name and No :- Research Methodology - VII	
CO1	Choose the statistical methods in research
CO2	Examine the various index numbers
CO3	Decide the formulation of hypothesis and testing
CO4	Improve the skills of report writing
Course (Paper) Name and No :- Environmental Economics - VIII	
CO1	Relate the environmental degradation and measures for it.
CO2	Build Environmental accounting methods.
CO3	Assess the sustainable development in India.
CO4	Adapt Environmental policy in India.
Course (Paper) Name and No :- History Of Economic Thought - IX	
CO1	Compare Indian economic thoughts.
CO2	Analyse the Economic thought of Mahatma Phule and Mahatma Gandhi.
CO3	Importance of Economic thought of Dr. B.R. Ambedkar, G.K. Gokhale and Dr. Manmohan Singh.
CO4	Discuss the Nobel prize winners in Economics.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel

(Autonomous)

Department: Economics

M.A. (Economics)

PO		
Sr. No.	**Outcome for M.A. Program** **After completion of M.A. program students will acquire**	**Graduate Attribute**
PO1	Amalgamations of theoretical and practical understanding generated from the chosen programme and develop the students with academic perspective.	Disciplinary Knowledge
PO2	Demonstrate effective communication skills pertaining to different domains of the courses.	Communication Skills
PO3	Application of analytical thoughts, arguments, evidences and relevant assumptions for development of scientific approach.	Critical Thinking
PO4	Solving of different kinds of non-familiar problems and apply ones learning to real life situations.	Problem Solving
PO5	Identification of relevance along with logical flaws in the arguments for synthesis of the data of variety of sources.	Analytical reasoning
PO6	Development of sense of enquiry and research capabilities and acumen related problems of research.	Research-related skills
PO7	Critical sensibility about live experiences with self-awareness and its reflection in self and society.	Reflective thinking
PO8	Demonstration of moral and ethical values in one's life.	Moral and ethical awareness
PO9	Capability for building a team to achieve desired goals and objectives.	Leadership qualities
PO10	Acquisition of knowledge and skills for participating in learning activities throughout the life.	Lifelong learning

PSOs	
PSO1	Demonstrate advanced knowledge of Research Methodology, Agricultural Economics, Public Finance, Environmental Policies, Industrial Relations, and Statistical and Mathematical methods.
PSO2	Develop Research skills like- methods of data collection, sampling methods, interpretation, Report writing, by applying both quantitative and qualitative knowledge.
PSO3	Develop proficiency of research analysts, industrial consultancy, environment policy applications, own business at the same time ability to engage in competitive exams like MPSC, UPSC, IES, ISS, Labour Officers, Research analyst's, Bank POs and other courses.

COs	
Semester I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Micro Economics - I	
CO1	Relate the utility with consumer behaviour.
CO2	Explain production, cost and supply function.
CO3	Make use of price and output determination under perfect competition.
CO4	Examine the monopoly and its aspects.
Course (Paper) Name and No :- Macroeconomics – II	
CO1	Relate economic mechanism with their regular life.
CO2	Illustrate the concept of national income.
CO3	Identify the mechanism of the open economy.
CO4	Assess the functions of the money and capital market.
Course (Paper) Name and No :- Economics of Development – III	
CO1	Demonstrate the role of social and economic indices of growth and development.
CO2	Judge various modern theories of growth and distribution.
CO3	Define various market concepts.
CO4	Examine the various aspects of Foreign trade.
Course (Paper) Name and No :- Banking and Financial Institutions - IV	
CO1	Learn basic concepts.
CO2	Take review of Indian banking system.

Course (Paper) Name and No :- Mathematical Techniques For Economics - V	
CO1	Construct the economic functions.
CO2	Apply derivatives in economics and Understand Unconstrained optimization techniques in economics
CO3	Understand constrained optimization techniques in economics
CO4	Apply matrix in economics.
Course (Paper) Name and No :- Research Methodology - VI	
CO1	Memorize the basics of Research Methodology.
CO2	Outline design of research.
CO3	Investigate the statistical methods.
CO4	Generate the Report of the research.
Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Microeconomics - I	
CO1	Outline the game theory in detail.
CO2	Create an understanding of strategic behaviour under oligopoly and monopoly market.
CO3	Simplify the information economics for their practical life.
CO4	Define various alternative theories of the firms.
Course (Paper) Name and No :- Macroeconomics – II	
CO1	Examine the price setting mechanism in an economy.
CO2	Understand the importance of Neo-Classical economics.
CO3	Elaborate the Keynesian economics in detail.
CO4	Summaries Macroeconomic policies.
Course (Paper) Name and No :- Public Economics – III	
CO1	Define mechanism of taxation in India.
CO2	Illustrate local, state and central government expenditure.
CO3	Evaluate tax regulation, distribution, implication and tax evasion.
CO4	Examine India's federal structure, Decentralization and Government reforms.
Course (Paper) Name and No :- Banking and Financial Institutions - IV	
CO1	Relate different financial institutions.
CO2	Adapt the international financial ideas.

Course (Paper) Name and No :- Statistical and Econometric Methods – V	
CO1	Understand the basic statistics concepts.
CO2	Construct the hypothesis and select suitable test for data analysis.
CO3	Estimate and Interpret the regression coefficient.
CO4	Understand the problems of heteroscedasticity, autocorrelation and multicollinearity in regression model.
Course (Paper) Name and No :- On Job Training – VI	
CO1	Memorize the basic values of work culture.
CO2	Outline design of working pattern.
CO3	Investigate the basics of working system.
CO4	Generate the report of the project.
Semester - III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Economics of Agricultural Production and Rural Markets - I	
CO1	Outline Economics of agricultural production and productivity in India.
CO2	Elaborate the Rural credit markets in India.
CO3	Define labour markets for economic development in India.
CO4	Identify Land and Lease market in detail.
Course (Paper) Name and No :- Economics of Labour Markets - II	
CO1	Assess the nature of labour market.
CO2	Explain the demand and supply of labours.
CO3	Classify the various dimensions of wages in labour market.
CO4	Identify social upliftment of labours in India.
Course (Paper) Name and No :- Trade Unions and Industrial Relations in India - III	
CO1	Outline origin and roles of Trade Unions.
CO2	Discuss various approaches for the development of Industrial sector.
CO3	Evaluate responsibilities by workers in India.
CO4	Analyse the various laws related to industries and social development.

Course (Paper) Name and No :- Environmental Economics - IV	
CO1	Outline role of environment in economic growth.
CO2	Explain different aspects related to environmental development.
CO3	Identify the issues related to environmental field.
CO4	Elaborate various environmental policies, agreements and case studies.
Semester - IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Economics of Human Development - I	
CO1	Illustrate various concepts related to human development.
CO2	Define multiple dimensions of human development.
CO3	Measure various aspects related to human development indices.
CO4	Identify different aspects of human development.
Course (Paper) Name and No :- Industrial Economics - II	
CO1	Define market structure with the reference to the firms.
CO2	Explain overall development of industrial development with the help of technical know-how.
CO3	Examine the financial tools in industrial development.
CO4	Elaborate performance and growth of Indian Industrial sector.
Course (Paper) Name and No :- Agricultural Development and Policy - III	
CO1	Explain various theories of agricultural development.
CO2	Analyse various initiatives by public sector time to time for agricultural development.
CO3	Create awareness on contemporary debates in the area of agricultural products and market.
CO4	Explain trends about agricultural development and its implications.
Course (Paper) Name and No :- Dissertation in Economics - IV	
CO1	Explain the basics of Research Methodology.
CO2	Compare the methods of data collection, analysis of data and presentation.
CO3	Decide the advance methods of analysis and Index.
CO4	Compile the testing of hypothesis and report writing.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel

(Autonomous)

Department: Hindi

B.A. (Hindi)

POs		
Sr. No.	Outcome for B.A. Program After completion of B.A. program students will acquire	Graduate Attribute
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyse, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyse and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

PSOs	
PSO1	It helps them to learn, understand, speak phonetically and write grammatical Hindi.
PSO2	Execute strong theoretical and practical understanding generated from the chosen programme and equip the students with a strong academic perspective.
PSO3	Students gained knowledge about the various forms of prose.
PSO4	Concept of Hindi from past to present and making the society more closely through literature.
PSO5	Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge.
PSO6	Getting acquainted with social transactions, social relations, social formations, social control, social values and culture.
PSO7	Ability to analyse and evaluate different concepts of problems of society and make students able to develop oral and written communication skills in literature.

COs	
Semester I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-Literature of Hindi Medieval Poetry I	
CO1	Reading poems and stories can inspire in them the feeling of pure love, intimacy, revolution against inconsistencies, living life truthfully, reverence and faith in the values of life, equality among all religions and Indianness.
CO2	By reading the stories, we will be able to demonstrate knowledge of the tragedy of metropolitan life, busy life, loneliness, pain, selfish attitude, tendency of commercialism and disregard for folk arts.
CO3	Develop basic skills in practical Hindi and its business application
CO4	student will be able to use linguistic knowledge of qualities required for jobs available in Hindi, i.e. letter writing related to various subjects, format of Right to Information, verbal and syntactical inaccuracy, use of meaning of idioms and proverbs, composition of emotional words, prefixes and suffixes etc.

Course (Paper) Name and No.-Hindi Fiction Literature (Story) I	
CO1	By studying stories, you will get the strength to do a critical study on how to find happiness and solutions in the culture and civilization of metropolitan cities.
CO2	Will be able to explain the mechanical civilization, moral values and feeling of loneliness of metropolitan cities.
CO3	The impact of modernity and mechanization on the common man is so much that his family does not value him, he lives as a burden on the family for his name, the ability to think, reflect and evaluate on these subjects will be developed in the students.
CO4	The ability to brainstorm with a critical view of religion, sect discrimination, casteism, high-low, worship, superstition, pretence and ostentation prevailing in the society will develop.
Course (Paper) Name and No.- Functional Hindi I	
CO1	Explain the concept to student identify the difference between condensation and expansion.
CO2	Apply the process of translation student will be able to get employment in various field.
Course (Paper) Name and No.- Communication Skills in Hindi I	
CO1	Explain the concept and importance of communication student will be able to make their communication effective.
CO2	Apply the concepts of introductory Hindi grammar and linguistics.
Course (Paper) Name and No.- Practical Hindi I	
CO1	Utilise knowledge of Hindi student will be able to use language knowledge in letter writing related to various subjects i.e. Editorials, business, application complaint and government letter.
CO2	Discuss on various skills such as speech and stage anchoring.

Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-Modern Hindi Poetry Literature II	
CO1	By reading poems, we will be able to present ideal life philosophy and sense of wisdom, foresight, education, and knowledge-science, social and cultural coordination.
CO2	Students can increase their linguistic knowledge through translation skills related to subjects of different fields, knowledge of words, sentence differentiation, gender and the art of word change.
CO3	By reading stories, human values like equality, compassion, intimacy, sensitivity, dedication will be developed, due to which individuals will be able to improve the condition of society and country.
CO4	Students will develop love for their country and language; they can develop a sense of enthusiasm, joy, faith, effort, and devotion to duty.
Course (Paper) Name and No.-Hindi Fiction Literature (Novels) II	
CO1	Study of the novel will enable students to see the good and bad in human life.
CO2	Due to the novel, we will be able to explain human assurance towards art, culture, philosophy and internal and external human nature, action and enjoyment.
CO3	Study of various genres of Hindi literature will give an understanding of the will to live a life despite adverse circumstances, Indian bureaucratic system, remoteness of farmers, wastage of government schemes, duties of Indian brave soldiers etc.
CO4	Understanding the meaning of Indian natural and man-made disasters, health system, consequences of illiteracy, knowledge of world culture, importance of language of love, condition of Indian Dalits, human and family life disintegrating in Hindu-Muslim riots and its solutions. The vision to discover will be created.
Course (Paper) Name and No.- Functional Hindi II	
CO1	To help student understand the development of social media and their advantage and dis advantage.
CO2	Discussing on PPT construction video shooting and editing, students will be able to make it well.
Course (Paper) Name and No.- Communication Skills in Hindi II	
CO1	Explain the origin and evolution of traditional and Modern Mass Media.
CO2	Utilise knowledge of Hindi in creative writing such as commentary, Bio-data and Anchoring.

Course (Paper) Name and No.- Practical Hindi & Translation II	
CO1	Explain the nature of translation and its importance in present time.
CO2	Apply the concept of translation student will be get the employment in various filed.
Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Medieval & Modern Poetry II	
CO1	Explain uniqueness in the writing styles used by medieval poets.
CO2	Relate and summarise the prevailing social scenarios expressed in medieval and modern poetry.
CO3	Distinguish the uniqueness in the language of poetry of Medieval and Modern era. e.g.- Braj Bhasha, Avadhi, Khadi Boli, etc.
CO4	Categorise the poetry of Medieval era e.g. Saints - Sufi and Ram - Krishna Bhakti poetry.
Course (Paper) Name and No.- Modern Prose III	
CO1	By studying the novel, the students will understand the exploitation of farmers in the Indian society, the destitute condition of the Dalits, the atrocities of the landlords, oppression, exploitation, mutual jealousy and hatred, the changing state of the society, the selfish attitude of the leaders, the communism of the farmers. The ability to understand the feeling of innate faith in others will increase.
CO2	By studying the novel, students will be able to understand the contemporary political and imperialist policies, the ongoing exploitation and oppression of the common people in the Indian society, the contribution of the people in attaining independence, how the Indian rupees are being wasted.
CO3	By studying Hindi stories, students will be able to understand 'Raghukul tradition has always been there, life is lost but words are not lost', steadfast love, protector, renunciation and sacrifice, Indian rotten social system, Dalit identity, women's identity, hollowness of middle-class society and conflict of generations. Will be able to solve.
CO4	By studying Hindi stories, students will be able to examine the points of view of Dalit aesthetic thinking being formed between Indian aesthetic thinking, Western aesthetic thinking, and Marxist aesthetic thinking.

Semester IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Medieval & Modern Poetry II	
CO1	Explain uniqueness in the writing styles used in Ghazal written by Dushyant Kumar.
CO2	Outline the prevailing key social and political issues of India covered in the Ghazals of Dushyant Kumar.
CO3	Analyse the poems of different poets of Modern era and their writing styles.
CO4	Categorise the poems of Modern era in different categories like Pryogvadi, Dalit vimarsh etc.
Course (Paper) Name and No.- Modern Prose III	
CO1	By studying the drama, the student will be able to explain the contemporary conflict on the basis of historical tragedy, the protection of the artist's self-respect, the inspiration to oppose atrocities, the struggle between master craftsmen and artisans.
CO2	This genre of drama will be able to enhance the agitated emotions of human mind, various tools of theatricality, Indian culture, history, contemporariness and ability to strengthen the faith in human truth.
CO3	By studying the one-act literary genre, students will be able to understand the show-off culture of modern society and its distortion, the duality of tradition and modernity, the importance of reality rather than artificiality in life, and respect for each other's feelings.
CO4	By studying the one-man literary genre, students will be able to criticize the social aspects like mental distress, deception in the name of religion, human inconsistencies, economic inequality, suffering of the working class, worthlessness, women's suffering, broken relationships, importance of the head in a joint family, etc.

Semester V	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- History of Hindi Literature IV	
CO1	Through the course of History of Hindi Literature, students will be able to assess the tradition of writing history, the naming and time limits of different periods and the contemporary circumstances.
CO2	Love for the works, poets, tendencies of Nath literature of the heroic period and heroic and courageous feelings will increase among the students.
CO3	By studying the literature of Ritikaal and Bhakti period, students will be able to develop the philosophy of morality, inspiration for action and present their voice before the society against the inequalities prevalent in the society.
CO4	Through the literature of Bhakti period, the discrimination based on caste and religion will be destroyed, the importance of Guru will be known, his various branches and characteristics will be known, there will be love for the ideal thoughts and moral values contained in it and pure conduct will be explained.
Course (Paper) Name and No.- Post Independence Hindi Literature V	
CO1	Explain various social messages and values expressed in drama – Khajurao Ka Shilpi and Rashmirathi
CO2	Identify the human characteristics displayed by various characters in these drama and poetry
CO3	Analyse and categorise the writing styles of post-independence writers and their thought process
CO4	Critically evaluate and explain the post-independence literature
Course (Paper) Name and No.- Information Technology VI	
CO1	By studying this course, students will be able to understand the development of information technology and its challenges, problems, solutions and its use in Hindi.
CO2	Will be able to criticize the positive and negative effects of information technology on Indian social life, its contribution in the field of education, its impact on rural economy, changes in Indian social life.
CO3	Student will learn the importance of working in Hindi on computer, advertising in Hindi on the internet, mail, blogs, e-magazines and various employment opportunities.
CO4	You will get the power to understand cybercrime, security challenges, importance of cyber education and constitutional provisions.

Course (Paper) Name and No.- Lit. Crit. / Prosody & Rhet VII	
CO1	By studying the course of poetics, students will have knowledge of all the three languages from the popular definitions of poetry in Sanskrit, Hindi and English and will understand the purpose, motive and elements of poetry, due to which the ability of imagination and language style will be developed in the students.
CO2	By studying various literary verses, we will be able to develop the art of creating poetry in verses according to the subject matter and context.
CO3	Students will develop the skills of criticism and review by studying various poetic genres of literature, due to which they will become excellent critics in the future.
CO4	Will be able to get acquainted with the definition, types, purposes of art and the interrelationship between art and literature.
Course (Paper) Name and No.- Linguistics, Hindi Language & GrammerVIII	
CO1	Describe various concepts of language and linguistics
CO2	Apply the concepts of introductory Hindi grammar and linguistics
CO3	Classify the sound of alphabets from the pronunciation's aspect
CO4	Discuss the reasons behind changing pattern seen in language over period of time
Course (Paper) Name and No.- Mass Media IX	
CO1	Explain the origin and evolution of traditional and Modern Mass Media.
CO2	Describe various operational aspects of Mass Media.
CO3	Utilise knowledge of Hindi in creative writing such as scripts, interviews, news writing etc.
CO4	Distinguish various traditional and modern platforms of mass media and their relevance, features and applications along with impact.
Semester VI	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Modern History of Hindi Literature IV	
CO1	Study of various works and writers of modern times will develop literary writing ability in students and they will be able to write according to their era and context.
CO2	Will be able to do a comparative analysis of the characteristics of the modern period in the context of the socio-cultural and political situation of that period.
CO3	By studying Hindi literature, students will be able to explain the reasons for the emergence of the modern period.
CO4	Will be able to present the importance and basis of the names given to each poetic genre and prose genre of Hindi literature.

Course (Paper) Name and No.- Post Independence Hindi Literature V	
CO1	Explain the linkage between Mahabharata era and current scenario.
CO2	Explain the life journey of revolutionary freedom fighter Birsa Munda and his stand against the British rule in India.
CO3	Analyse and categorise the writing styles of post-independence writers Dharamveer Bharti and Iqbal Durrani.
CO4	Critically evaluate the novel Gandhi Se Pehle Gandhi and poetry drama Andha Yug.
Course (Paper) Name and No.- Social Media VI	
CO1	By studying social media, readers will be able to understand its development, advantages, disadvantages and its various differences.
CO2	By studying this course, students will develop sensitivity towards the diverse areas of India influenced by social media, its prevalent language, relationships within society and culture and free expression.
CO3	By studying social media, students will be able to get acquainted with social media and law, the changing Indian environment, its achievements, usefulness and the universality of Hindi language script through Unicode.
CO4	By studying social media, students will be able to understand the spread of Hindi, its uses, its problems, challenges, limitations and its Indian society and culture.
Course (Paper) Name and No.- Literary Criticism: Prosody & Rhetoric's VII	
CO1	By studying this course, students will get an introduction to the meaning, nature, definition of Shabdshakti and its various types.
CO2	By introducing students to the meaning, nature of Rasa, its various parts and types, their ability to enjoy literary taste will increase.
CO3	By studying literary prose genres like novel, story, essay, drama, autobiography, sketch, memoir and biography, students will become familiar with the topics contained in them and will be able to develop the ability to write, act and review them.
CO4	On the one hand, their knowledge will increase with the definitions and example explanations of various figures of speech, while on the other hand, their ability to use figurative language style will also develop, on the basis of which students will be able to create poetic compositions in the figurative language style in the future.

Course (Paper) Name and No.- Linguistics Hindi Language & Hindi Grammar VIII	
CO1	Explain the origin and evolution of Hindi Language.
CO2	Classify different forms of Hindi Language.
CO3	Apply different forms of Hindi language and correct grammar.
CO4	Identify characteristics and distinguish various ancient and medieval period languages i.e. Sanskrit, Pali, Prakrut, Apabhramsa.
Course (Paper) Name and No.- Mass Media IX	
CO1	Explain the use of language in various areas of Mass Media like Newspapers, Radio, Television and Cinema.
CO2	Identify various types of Advertisement platforms.
CO3	Explain various applicable SOPs/Guidelines governing the Advertisement vertical conduct.
CO4	Discuss various aspects of documentary and short film making.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Hindi

M.A. (Hindi)

POs		
Sr. No.	Outcome for M.A. Program After completion of M.A. program students will acquire	Graduate Attribute
PO1	Amalgamations of theoretical and practical understanding generated from the chosen programme and develop the students with academic perspective.	Disciplinary Knowledge
PO2	Demonstrate effective communication skills pertaining to different domains of the courses.	Communication Skills
PO3	Application of analytical thoughts, arguments, evidences and relevant assumptions for development of scientific approach.	Critical Thinking
PO4	Solving of different kinds of non-familiar problems and apply ones learning to real life situations.	Problem Solving
PO5	Identification of relevance along with logical flaws in the arguments for synthesis of the data of variety of sources.	Analytical reasoning
PO6	Development of sense of enquiry and research capabilities and acumen related problems of research.	Research-related skills
PO7	Critical sensibility about live experiences with self-awareness and its reflection in self and society.	Reflective thinking
PO8	Demonstration of moral and ethical values in one's life.	Moral and ethical awareness
PO9	Capability for building a team to achieve desired goals and objectives.	Leadership qualities
PO10	Acquisition of knowledge and skills for participating in learning activities throughout the life.	Lifelong learning

PSOs	
PSO1	Understanding the relation between society and literature and analyse the role played by Hindi literature in past and present.
PSO2	Understanding the strategy of converting worship into the movement of struggle for cultural freedom.
PSO3	Developing skill of writing official letters in functional Hindi.
PSO4	Developing philosophy of life inspiring by the vision of eminent writers.
PSO5	Gaining socio cultural consciousness.

COs	
Semester I	
Course (Paper) Name and No.- History of Hindi Literature I	
After Completion of the course the learner will be able to;	
CO1	From the course of History of Hindi Literature, students will be able to understand the writing tradition from historical perspective and the problems of its writing and the nomenclature and time limit of different periods and contemporary circumstances.
CO2	The literature of Bhakti period will destroy the discrimination based on caste, caste, religion, importance of Guru, knowledge of his various branches and characteristics, love for the ideal thoughts and moral values contained in it and a feeling of pure conduct will be created.
CO3	By studying the literature of Ritika period and Bhakti period, students will get an understanding of the philosophy of policy, motivation to do work, court culture, the perspective of kings and emperors towards the society and to critically analyse the inequalities prevailing in the society.
CO4	Will be able to explain the traditions, trends and relevance of ancient and devotional literature.

Course (Paper) Name and No.-Modern Prose - I	
CO1	Students got acquainted with the life and personality and works of Munshi Premchand.
CO2	Students got acquainted with the condition of Indian farmers through Godaan written by Munshi Premchand.
CO3	Through the play Madhavi written by Bhishma Sahani, the students became aware of the hollowness of the so-called efforts and beliefs, which highlighted the long-standing discrepancies in women's life.
CO4	Labour and Love' has an important place in the essays written by Sardar Purna Singh. In this, farmers and laborers have been described as the true representatives of God and the importance of labor has been propounded. Life of a ploughman: Ploughmen and sheep herders are gentlemen by nature. Students came to know about all these.
Course (Paper) Name and No.- Linguistics & Hindi Language - V	
CO1	Explain definations, characterstics and forms of language and lingusitics.
CO2	Analyse the unique features, applications and different forms of phonetics and reasons impacting the changes in phonetics
CO3	Categorisation of Hindi vowels and consonants based on pronunciations
CO4	Explain the characteristics of ancient, medieval and modern Hindi language
Course (Paper) Name and No.-Ancient & Medieval Poetry - I	
CO1	Saint Kabirdas's life of struggle, fearless life, description of high and low, rich and poor, caste-based differences, social reformer, rebellious nature, stereotypes, bad practices, evils, feminine form of women, true words, pure Inspired by the qualities like conduct etc., students will also be able to overcome the shortcomings prevailing in the present society.
CO2	By studying Mallik Muhammad Jayasi's work 'Padmavat', students will get inspiration from love and beauty and try to create similar creations themselves.
CO3	Will be able to understand the bravery, patience, courage and the ability to raise voice against injustice and oppression inherent in the characters portrayed in the composition 'Padmaavat' and will be able to know the history and imagination.
CO4	By studying ‘Ramcharitmanas’ of Goswami Tulsidas, students will be able to review the present day society through the concept of ‘Vasudaiva Kutumbakam’.
Course (Paper) Name and No.-Identity Discourse & Hindi Literature	
CO1	Students became familiar with the narrative material and also became aware of its form, types and elements.
CO2	Through the story Salaam written by Om Prakash Valmiki, students became aware of the basic meaning of this story like realizing the dream of creating a caste and casteless society, converting insensitivity into sensitivity and ending any kind of discrimination prevalent in the society.
CO3	Through the story of Nirmala Putul, students came to know about the oppression of tribals, their sorrows and sufferings etc.

CO4	Students will learn about various aspects of the story of the Dalit child's suffering, his struggle and will be able to analyze the environment in which a Dalit child bears the burden of his life on his own shoulders after the death of his father.
Course (Paper) Name and No.-Research Methodology Process	
CO1	It can help student as a researcher they can follow a specific plan to throughout their research.
CO2	The methodology design process helps researchers select the correct methods for the objectives.
CO3	Student identify the most appropriate research design, sampling technique, and data collection and analysis methods.
CO4	With these techniques student can be learned and applied to most fields of study and could include time management, goal setting, reading techniques, mnemonics, glossary techniques and a positive attitude.
Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-History of Hindi Literature - II	
CO1	In the history of the modern period of Hindi literature, we will be able to understand the political, social, religious, cultural, literary environment and Satyagraha against foreign power, national unity and nationwide political consciousness and the humanism of the prominent poet of this era, Rabindranath Tagore.
CO2	The writers of the modern era of Hindi literature have taken the help of Western ideas to establish their ideas and will be able to compare the social exclusion of individual expression and individual protest, reflecting the trends of the times.
CO3	Student will be able to criticize how in the modern period of Hindi literature, the first Indian freedom struggle got freed from the intoxicating influence of traditional luxury and how a new beginning was made in the field of religion, literature, art and philosophy during this period.
CO4	Student will be able to understand the period of various major prose genres of Hindi literature, the importance of the names given to their development, and the contemporary creators and basis.
Course (Paper) Name and No.-Modern Prose - II	
CO1	Students will be able to understand the personality and character of Kaushalya Baisantri.
CO2	Students can understand novel Dohra Abhishaap written by Kaushalya Baisantri by its elements, plot, dialogue plan, time period, environment, purpose, language style etc.
CO3	Kafan Story written by Munshi Premchan The basic sentiment of this story is related to the feudal-capitalist environment and economic disparity in which man is forced to give up even the essential qualities of humanity in a natural way. The student became aware of all this.
CO4	Chif ki Dawat written by Bhisham Sahni increased the understanding of the opportunism of a middle-class person, the disintegration of family relations in his ambition etc.

Course (Paper) Name and No.-Linguistics & Hindi Language - II	
CO1	Explain defination, evolution and various forms of Morphology , Syntax and Semantics.
CO2	Apply the knowledge of grammar in constructing appropriate word forms.
CO3	Analyse the characteristics, origin and evolution of Devanagari script.
CO4	Reframe words according to correct use of grammar.
Course (Paper) Name and No.-Ancient & Medieval Poetry - II	
CO1	Students will be able to get acquainted with the personality and work of Saint Surdas.
CO2	Student medieval love. We will acquire knowledge about literary human feelings like Vatsalya, Sakhya etc. and will imbibe the ability to review them.
CO3	Students will be able to get acquainted with the ideal thoughts of Chhatrapati Shivaji Maharaj through the poetry of poet Bhushan.
CO4	Students will be able to acquire the ability to review the contemporary society, religion, customs and traditions by becoming familiar with the loving spirit of Saint Mirabai.
Course (Paper) Name and No.-Hindi Cinema & Its Studies	
CO1	Cinema also provides ideological strength to the society. We see cinema as the most popular art medium. Films are living documents of society and time. Films based on characters or events are made with the aim of bringing about social change. Students learned about all these.
CO2	Students came to know about the beginning of Indian cinema, India's first silent film, the plays of writer Bharatendu Harishchandra, the efforts of the great filmmaker Dadasaheb Phalke Phalke laid the foundation of the Indian film industry, etc.
CO3	From the study of the course, students will be given the definition of cinema which is - Film, also called movie or motion picture, is a series of still images on film which are projected in rapid sequence on a screen using light. Got knowledge.
CO4	By studying this course, students acquired knowledge related to who was the father of cinema, when was it born, etc.
Course (Paper) Name and No.-On Job Training	
CO1	Students were able to demonstrate apprenticeship in their specific task or role in a practical environment
CO2	The emphasis placed on students' real-world application of skills within a real work environment proved valuable.
CO3	Trainees learn by doing actual work related to their job or by learning from a senior with more experience.
CO4	The point of the training is to actually show users how the system can help them do their jobs.

Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-Modern Poetry - IX	
CO1	Students will be able to critically evaluate the expression of the inconsistent life of the Indian farmer, the realistic depiction of the social exploiters, the emphasis on the socialist system, the creation of revolutionary women characters and the establishment of an ideal society.
CO2	By studying the play 'Aadhe-Adhure', students will understand the inconsistencies of the middle class family, relations between men and women, inhuman conditions and mutual understanding.
CO3	Will be able to review the social, mental and economic conditions of the modern middle class family.
CO4	By studying Ashoka's full essay collection, students will be able to acquire the vision to critically study Indian history, history and culture and historical discoveries.
Course (Paper) Name and No.-Poetics & Literary Criticism - XI	
CO1	By studying the course of poetics, students will have knowledge of all the three languages from the popular definitions of poetry in Sanskrit, Hindi and English and will understand the purpose, motive and elements of poetry, due to which the ability of imagination and language style will be developed in the students.
CO2	By studying various literary verses, we will be able to develop the art of creating poetry in verses according to the subject matter and context.
CO3	Students will develop the skills of criticism and review by studying various poetic genres of literature, due to which they will become excellent critics in the future.
CO4	Will be able to get acquainted with the definition, types, purposes of art and the interrelationship between art and literature.
Course (Paper) Name and No.-Special Study: Hindi Poetry of Marathi Saints - XIII	
CO1	Students will be able to get acquainted with Hindi poetry of Marathi saints and Marathi saints.
CO2	By studying the poetry of Marathi saints, students will be able to compare the culture of Maharashtra and the culture of Hindi speaking regions.
CO3	By studying the poetry of Saint Tukaram and Saint Namdev, students will be able to become familiar with the humanistic message.
CO4	Students will be able to review the thoughts of Hindi speaking saints by studying the personality and works of saints of Maharashtra.
Course (Paper) Name and No.-Functional Hindi - XV	
CO1	Explain the context, characteristics and applications of Functional Hindi.
CO2	Make use of various forms of Functional Hindi like Creative language, Official Language, etc.
CO3	Examine the many forms and process of translation to learn about the attributes that a translator must possess.
CO4	Explain the importance of advertisements in today's world with respect to its meaning, objective and types

Semester IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-Modern Poetry - X	
CO1	Students will be able to imbibe Buddhist philosophy, unity of inner and outer world, identity of soul and God, individual and totality, literature, music, art and the process of taste.
CO2	By studying Dhumil's poems, students will be able to become familiar with the poems and understand the basic meaning of the poems.
CO3	Will be able to become familiar with the meanings, euphemisms, language and composition process that emerge in the poems.
CO4	By studying Dalit poems, students will be able to become familiar with the tragic life of Indian Dalits and the selfishness and conspiracy behind them against fate, God and destiny.
Course (Paper) Name and No.-Poetics & Literary Criticism - XII	
CO1	By studying this course, students will get an introduction to the meaning, nature, definition of Shabdshakti and its various types.
CO2	By introducing students to the meaning, nature of Rasa, its various parts and types, their ability to enjoy literary taste will increase.
CO3	By studying literary prose genres like novel, story, essay, drama, autobiography, sketch, memoir and biography, students will become familiar with the topics contained in them and will be able to develop the ability to write, act and review them.
CO4	On the one hand, their knowledge will increase with the definitions and example explanations of various figures of speech, while on the other hand, their ability to use figurative language style will also develop, on the basis of which students will be able to create poetic compositions in the figurative language style in the future.
Course (Paper) Name and No.-Mass Media - XIV	
CO1	Explain what the term "mass media" means, what it entails, and how it works.
CO2	Identify the different characteristics of languages used by the media, such as film, radio and television language.
CO3	Evaluate that social media has a significant influence in the evolution of society
CO4	Discuss many types of media writing, such as news writing, feature writing, radio play writing, and so on.
Course (Paper) Name and No.-Project	
CO1	Students will become familiar with research methodology and its elements.
CO2	Students can understand the meaning, definition and characteristics of research.
CO3	Student will be able to write a good dissertation after getting information about research methodology, importance of research, main steps of research, inspiration for research, objectives of research, research approach, research process, various stages of research process, determination of topic, etc.
CO4	Student Will be able to familiarize themselves with the research outline, material collection, dissertation writing, method of bibliography, etc. and review the components of the research.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Geography

B.A. (Geography)

POs		
Sr. No.	**Outcome for B.A. Program** **After completion of B.A. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

PSOs	
PSO1	Understand, coherently and effectively about various genres of Geography.
PSO2	Understanding the diverse concepts in the field of Geography.
PSO3	Understand global and regional patterns of cultural, political and economic Institutions, and their effects on exploitation of natural resources and landscapes.
PSO4	Understand need for protection and conservation of natural resources
PSO5	Develop basic skills in practical Geography and its industrial applications.

CO	
Semester - I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Introduction to Physical Geography	
CO1	Understand comprehensibly the nature, scope, approaches, branches and concepts in Physical Geography.
CO2	Understanding the concepts of movements of the earth and weathering.
CO3	Understand and analyse the Structure and Composition of the Atmosphere.
CO4	Able to draw and explain the diagrams of physical features.
Course (Paper) Name and No :- Introduction to Human Geography	
CO1	Understand comprehensibly the nature, scope, approaches, branches and concepts in Human Geography.
CO2	Understanding the concept, types and patterns of rural and urban settlements.
CO3	Understand and analyse the trends and patterns of world population change, density, distribution and growth. Evaluate the problems of population.
CO4	Understand and analyse the concept, causes, types, trends and consequences of migration.
Course (Paper) Name and No :- Tools and Technique in Geography-I	
CO1	Develop practical skill and use of map scale and projection.
CO2	Understanding the basic concepts of projection and able to construct the projections.
CO3	Able to resize the maps, calculate of area and to depict the contour landforms.
Course (Paper) Name and No :- Value Education Course (VEC) - Environmental Studies-I	
CO1	Understand comprehensibly the concept of environment and ecosystem.
CO2	Discuss the Man-Environmental Interaction.
CO3	Understand the need the biodiversity and its conservation.
CO4	Understanding and analysing the causes, effects and measures of pollution.

Semester - II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Geography of Tourism	
CO1	Understand about nature, scope and components of tourism.
CO2	Analyse the new trends in tourism and impact of tourism.
CO3	Explain the role of infrastructure and technology in tourism development.
CO4	Explain planning of tourism and role of tourism organizations. Explain the potential of tourism in Maharashtra.
Course (Paper) Name and No :- Geography of Resources	
CO1	Understand the concept, factors, importance and classification of resources.
CO2	Explain the conservation measures of natural resources.
CO3	Explain the distribution, consumption of water and forest resources and evaluate the problems and Conservation methods of water, forest resources.
CO4	Explain the distribution, consumption of soil and mineral resources and evaluate problems the conservation methods of soil and mineral resources.
Course (Paper) Name and No :- Tools and Technique in Geography-I	
CO1	Understand the concepts of topographical maps and able to interpret it.
CO2	Able to explain the use of weather instruments and draw the diagrams.
CO3	Understand the concepts of Indian Daily Weather Reports and able to interpret it.
CO4	Able to construct graphs and diagrams.
Course (Paper) Name and No :- Value Education Course (VEC) - Environmental Studies-II	
CO1	Gain a comprehensive knowledge of climate change, its science and response measures.
CO2	Understand the sources of waste and waste management.
CO3	Develop a critical understanding of the complexity of environmental management.
CO4	Explain sustainable development, its goals, targets, challenges and global strategies for sustainable development.
CO5	Learn about the major international treaties and our country's stand on and Responses to the major international agreements.

Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Introduction to Climatology	
CO1	Understand the nature, scope, branches and concepts of climatology as well as the structure of atmosphere.
CO2	Understand the weather phenomena, winds and upper air circulation.
CO3	Understand the concept of humidity, condensation, precipitation and analyse the distribution of rainfall.
CO4	Understand the cyclones, Indian monsoon and evaluate the climate change issues.
CO5	Read and interpret the weather map and to construct the climatic diagrams.
Course (Paper) Name and No :- Physical Geography of India	
CO1	Understand the physiographic divisions of India and its importance.
CO2	Understand and analyse the drainage system in India.
CO3	Explain the types of seasons, soil and forest in India and to evaluate the conservation methods.
CO4	Classify and explain the minerals and energy resources in India.
CO5	Mark the geographical features in the map of India and construct the map scale.
Semester - IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Introduction to Oceanography	
CO1	Explain the origin, nature, scope and branches of Oceanography.
CO2	Explain the structure of ocean floor, composition, temperature and salinity of ocean water.
CO3	Understand the tide formation and ocean currents. Evaluate the effects of ocean currents.
CO4	Explain the oceanic phenomenon and the marine ecosystem.
CO5	Mark the geographical features in the map and to read and interpret the navigation charts bathymetrical maps.
Course (Paper) Name and No :- Agriculture Geography of India	
CO1	Understand the nature, scope and approaches of Agriculture Geography. Explain the importance salient features of agriculture in India.
CO2	Explain the factors, types, major crops and problems of agriculture in India.
CO3	Understand the components and impacts of green revolution in India and to evaluate the present scenario of green revolution.
CO4	Explain the development of recent trends of agriculture in India.
CO5	Interpret the thematic maps and construct the statistical diagrams and graphs.

Semester - V	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Geography of Settlements	
CO1	Understand the importance, nature and scope of Settlement Geography and types of settlements.
CO2	Explain the origin, growth and classification of rural settlements.
CO3	Explain and evaluate the distribution, density and variations in rural settlement patterns and morphology in India.
CO4	Explain the origin, growth and classification of urban settlements and examine the models of urban settlement.
CO5	Understand the process, problems of urbanization and examine the impacts of urbanization in Indian cities.
Course (Paper) Name and No :- Geography of Maharashtra	
CO1	Understand the location, administrative setup and geographical personality of Maharashtra.
CO2	Explain the drainage and climate in Maharashtra.
CO3	Interpret the population growth, distribution and structure of population and analyze the population data.
CO4	Explain the agriculture, fisheries and livestock resources in Maharashtra and to evaluate the recent issues and policies of them.
CO5	Understand the growth and development of industries, trade and transport in Maharashtra and to evaluate the recent issues and policies of them.
Course (Paper) Name and No :- Tools and Techniques in Geography for Spatial Analysis-I (Practical)	
CO1	Demonstrate an understanding the basic concepts of projection and able to construct the projections.
CO2	Explain the basic elements of map and able to delineate the water shade on toposheet and longitudinal profile of river.
CO3	Explain the basics of topographical maps and interpret the different topographical maps.
CO4	Prepare the thematic maps by conventional methods.
CO5	Construct the graphs, maps and power point presentations and able to use SPSS software.
Course (Paper) Name and No :- Regional Planning and Development	
CO1	Understand the concept, nature and problems associated with Regional Planning.
CO2	Explain the concept, types of region and demarcate the planning regions.
CO3	Understand the concept and indicators of development and to explain the strategies and regional disparities in development.
CO4	Explain the planning and planning regions of India.
CO5	Explain the micro level planning in rural area, backward area and metropolitan planning.

Course (Paper) Name and No :- Geography of Resources	
CO1	Understand the concept, factors, importance and classification of resources.
CO2	Explain the resource consumption pattern and conservation measures of natural resources.
CO3	Explain the distribution, consumption of water and forest resources and evaluate the problems and Conservation methods of water, forest resources.
CO4	Explain the distribution, consumption of soil and mineral resources and evaluate problems the conservation methods of soil and mineral resources.
CO5	Understand the concept and distribution of human resources in the world.
Course (Paper) Name and No :- Geospatial Technology	
CO1	Demonstrate an understanding the concept, components of Geospatial Technology.
CO2	Explain the concepts of DEM and able to analyse and interpret the aerial photographs and satellite imageries.
CO3	Explain the concepts and types of GPS and able to use the applications GPS as well as capable to survey through GPS.
CO4	Use of image/map in GIS software's and Geo-referencing.
CO5	Create the maps by using GIS software's.
Semester - VI	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Environmental Geography	
CO1	Understand the nature, scope, importance and man-environment relationship in Environmental Geography.
CO2	Explain the Structure, functions and types of ecosystem.
CO3	Understand the concept, types, distribution and hotspots of biodiversity. Evaluate the threats and conservation methods of biodiversity.
CO4	Evaluate the environmental problems with their causes, effect and solutions.
CO5	Understand the concept of Environmental management and Sustainable Development and motivate the student to apply the eco-friendly life style.
Course (Paper) Name and No :- Geography of Tourism and Recreation	
CO1	Understand about nature, scope and components of tourism.
CO2	Analyze the new trends in tourism and impact of tourism.
CO3	Explain the role of infrastructure and technology in tourism development.
CO4	Explain planning of tourism and role of tourism organizations.
CO5	Explain the potential of tourism in Maharashtra and evaluate the tourism policy of Maharashtra.

Course (Paper) Name and No :- Tools and Techniques in Geography for Spatial Analysis-II (Practical)	
CO1	Demonstrate an understanding the types of data and able to draw the graphs.
CO2	Solve the examples of measures of central tendency, dispersion and deviation.
CO3	Solve the examples of correlation, regression and hypothesis testing.
CO4	Calculate the point, line and area sampling.
CO5	Collect the data and prepare the research report.
Course (Paper) Name and No :- Economic Geography	
CO1	Explain the nature, scope branches and approaches of Economic Geography.
CO2	Explain and classify human economic activities.
CO3	Explain the mineral resources and industrial development and evaluate the Weber's industrial location theory.
CO4	Explain the importance and pattern of transport, international trade and trade organizations.
CO5	Explain the levels of economic development and evaluate the impact of globalization, Special Economic Zones and related issues in India.
Course (Paper) Name and No :- Social Geography	
CO1	Explain the nature, scope, branches of Social Geography and concept of socio-cultural regions.
CO2	Explain the race, religion, language and tribes in the world and distinguish between them.
CO3	Explain the race, religion, language and tribes in India and distinguish between them.
CO4	Evaluate the contemporary social issues in India.
CO5	Analyse and evaluate the social welfare policies of government of India.
Course (Paper) Name and No :- Research Methodology in Geography	
CO1	Explain the concepts, types and stapes in the research methodology, formulation of research and research design.
CO2	Use the methods of data collection and able to process the data.
CO3	Analyze the data by using MS Excel and SPSS software's and able to formulate the hypothesis.
CO4	Use of spatial and non-spatial data in analysis by using GIS software's.
CO5	Explain the basics of research report writing and prepare the research report.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: History

B.A. (History)

PO		
Sr. No.	**Outcome for B.A. Program After completion of B.A. program students will acquire**	**Graduate Attribute**
PO1	Demonstrate a blend of conventional discipline knowledge and its applications to the modern world. Execute strong theoretical and practical understanding generated from the chosen programme and equip the students with a strong academic perspective.	Disciplinary Knowledge
PO2	Exhibit the skill of critical thinking and use higher order cognitive skills to approach problems situated in their social environment, propose feasible solutions and help in its implementation. The students will be able to comprehend, learn, process and apply knowledge in day to day life.	Critical Thinking, Cognitive skills and Problem Solving
PO3	Ability to analyse and evaluate different concepts of problems of society and make students able to develop oral and written communication skills in literature.	Analytical Skills and Effective Communication
PO4	Equip with strong work attitudes and Employment skills that will enable them to work independently as well as collaboratively. Seeks opportunity for research and higher academic achievements in the chosen field and allied subjects.	Competencies for employment and Research
PO5	Able to work collaboratively and effectively with diverse groups towards personal and common goals. Develop leadership qualities among the learners.	Individuality and Teamwork
PO6	Demonstrate empathetic social concern and equity centred national development; ability to act with an informed awareness of moral and ethical issues and commit to professional ethics as well as to accomplish their duties and responsibilities as citizens successfully.	Effective Citizenship and Ethics
PO7	Express oneself clearly and precisely to build good interpersonal relationships in personal and professional life.	Social competence
PO8	Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of, and need for environmental conservation and sustainability through action.	Environment sustainability
PO9	Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.	Self-directed and Life-long learning
PO10	Help students to share gifts, pursue justice and demonstrate through communicative solutions, concern for the poor and marginalised	Community engagement

PSOs	
PSO1	Acquire a broad and in-depth understanding of various historical periods, with a focus on India and its regions
PSO2	Develop specialized knowledge of regional and global histories, with the ability to analyse significant historical events and movements
PSO3	Gain methodological skills necessary for historical research and practical applications in fields such as tourism, museology, and archival science
PSO4	Cultivate an appreciation for the cultural and architectural heritage of India and its significance in the broader historical context
PSO5	Be prepared for careers in academia, research, heritage management, tourism, and related fields, with a strong foundation in historical knowledge and research methodologies

CO	
Semester - I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No:- History of Modern India (1857 C.E. to 1947C.E.)- Major I	
CO1	Illustrate the importance of revolt of 1857 and its significance to create awareness about the freedom.
CO2	Adopt the process of healthy nationalism and secularism by studying work of social reformers and freedom fighters.
CO3	Outline the whole process of freedom struggle
CO4	Explain the process of rise of modern India
Course (Paper) Name and No :- History of Ancient India (Earliest Times to 1000 AD) Major II	
CO1	Assess the reliability and limitations of archaeological and literary sources in the study of ancient India.
CO2	Illustrate the layout of a typical Indus Valley civilization, highlighting its town planning features.
CO3	Compare the early and later Vedic periods in terms of social and economic life.
CO4	Demonstrate the influence of Persian and Greek invasions on Indian culture and administration.

Course (Paper) Name and No :- Introduction to Historical Tourism in Raigad District VSC-I	
CO1	Explain the meaning, historical perspective, concept, scope, and significance of tourism.
CO2	Identify and describe various forms of tourism in Raigad District, including beaches, sanctuaries, built heritage, and temples.
Semester - II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No:- History of Modern India (1857 C.E. to 1947C.E.) Major III	
CO1	Illustrate the seeds of Nationalism where sown in socio-religious reform movements.
CO2	Analyze the role of western education and News Papers in freedom struggle in India.
CO3	Learners will comprehend about the impact of the British Rule on Indian Economy.
CO4	Study the development of Subaltern factors in the History of Modern India.
Course (Paper) Name and No :- History of Ancient India (Earliest Times to 1000 AD) Major IV	
CO1	Compare and contrast the political, social, and economic conditions under the Mauryan and post-Mauryan dynasties such as the Sungas, Kushanas, and Satavahanas.
CO2	Describe the administrative system of the Gupta Age and its impact on the Indian subcontinent.
CO3	Examine the political fragmentation and regional developments during the Post-Gupta period.
CO4	Explain the administrative and cultural developments under these dynasties.
Course (Paper) Name and No :- Art and Architecture in Maharashtra VSC II	
CO1	Describe the characteristics and significance of Ajanta, Ellora, and Maratha paintings (Shaniwar Wada and Wai).
CO2	Identify and explain the distinctive features of sculptures related to Buddhism, Jainism, and Hinduism, with specific references to Karla Caves and Kailas Temple at Ellora.
Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Landmarks in World History (1300 CE to 1945 CE) II	
CO1	Analyze the impact of the Renaissance, geographical discoveries, and Reformation on the modern age.
CO2	Evaluate the causes, events, and outcomes of the American, French, and Industrial Revolutions.
CO3	Examine the formation of nation-states in Europe, nationalist movements in Italy and Germany, and imperialist expansion in Asia.
CO4	Understand the key events of World War I, the Russian Revolution, and the establishment of the League of Nations.

Course (Paper) Name and No :- Ancient India from Earliest Times to 1000 AD III	
CO1	Assess the reliability and limitations of archaeological and literary sources in the study of ancient India.
CO2	Illustrate the layout of a typical Indus Valley civilization, highlighting its town planning features.
CO3	Compare the early and later Vedic periods in terms of social and economic life.
CO4	Demonstrate the influence of Persian and Greek invasions on Indian culture and administration.
Semester - IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Landmarks in World History (1300 CE to 1945 CE) II	
CO1	Illustrate the impact of reforms introduced by Kemal Pasha in Turkey and Reza Shah in Iran on their respective societies.
CO2	Examine the similarities and differences between Fascism, Nazism, and Japanese Militarism.
CO3	Evaluate the effectiveness of post-war peace efforts, including the establishment of the United Nations.
CO4	Compare the nationalist movements in China, the Arab world, and Indonesia, focusing on their goals, methods, and outcomes.
Course (Paper) Name and No :- Ancient India from Earliest Times to 1000 AD III	
CO1	Compare and contrast the political, social, and economic conditions under the Mauryan and post-Mauryan dynasties such as the Sungas, Kushanas, and Satavahanas.
CO2	Describe the administrative system of the Gupta Age and its impact on the Indian subcontinent.
CO3	Examine the political fragmentation and regional developments during the Post-Gupta period.
CO4	Explain the administrative and cultural developments under these dynasties.
Semester - V	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- History of Medieval India(1000 CE-1526CE) IV	
CO1	Analyze the military strategies used by the Delhi Sultans to expand their territory.
CO2	Critique the efficiency and effectiveness of the Delhi Sultanate's administrative policies.
CO3	Evaluate the contributions of the Vijayanagar and Bahamani Kingdoms to Indian history.
CO4	Analyze the role of religion in shaping the social and cultural life during the Delhi Sultanate period.

Course (Paper) Name and No :- History of Modern Maharashtra (1818 CE-1960) V	
CO1	Illustrate the changes in administrative structures introduced by the British in Maharashtra.
CO2	Investigate the impact of social reform movements on various sections of society in Maharashtra.
CO3	Assess the contribution of Maharashtra to the national movement for independence.
CO4	Evaluate the long-term effects of the emergence of new forces on the socio-political landscape of Maharashtra.
Course (Paper) Name and No :- Introduction to Archaeology VI	
CO1	Compare different archaeological methods and their applications in various contexts.
CO2	Evaluate the impact of environmental and social factors on the development of early human civilizations.
CO3	Analyze the content of inscriptions to derive historical information.
CO4	Examine the significance of coinage in the study of ancient economies.
Course (Paper) Name and No :- History of Marathas (1630CE-1707CE) VII	
CO1	Compare and contrast the early Maratha political structure with contemporary regional powers.
CO2	Demonstrate the role of forts and naval power in Maratha expansion.
CO3	Judge the effectiveness of the measures taken to consolidate Maratha power.
CO4	Assess the strengths and weaknesses of the Maratha administrative structure.
Course (Paper) Name and No :- History of Contemporary World VIII	
CO1	Assess the significance of key events and decisions that shaped the Cold War era.
CO2	Examine the factors that led to the disintegration of the U.S.S.R. and the unification of Germany.
CO3	Assess the effectiveness and legacy of movements such as Civil Rights, Feminism, and Decolonization.
CO4	Evaluate the influence of technological, cultural, and economic trends on international relations.
Course (Paper) Name and No :- Research Methodology and Sources of History IX	
CO1	Assess the importance of historical inquiry in understanding human progress.
CO2	Compare the significance of different sources in historical research.
CO3	Analyze the strengths and limitations of different historical research methods.
CO4	Critique the historiographical debates surrounding the sources of Indian history.

Semester - VI	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- History of Medieval India (1526CE-1707CE) IV	
CO1	Compare the reigns of different Mughal emperors to understand their governance styles and policies.
CO2	Illustrate how the administrative policies of the Mughals influenced governance in later Indian empires.
CO3	Assess the social changes and religious developments that occurred under Mughal rule.
CO4	Evaluate the lasting impact of Mughal cultural achievements on subsequent Indian history.
Course (Paper) Name and No :- History of Contemporary India (1947CE-2000CE) V	
CO1	Explain the significance of Nehru's policies in shaping post-independence India.
CO2	Analyse the impact of policies implemented by subsequent governments after Nehru.
CO3	Assess the role of technology and media in transforming Indian society and politics.
CO4	Evaluate the trends in Indian democracy and governance in the context of global changes.
Course (Paper) Name and No :- Introduction to Museology and Archival Science - VI	
CO1	Analyze the challenges faced by museums in the modern era.
CO2	Evaluate the effectiveness of museum outreach programs.
CO3	Assess the role of archives in maintaining historical records and supporting research.
CO4	Examine the ethical and legal issues related to archival management.
Course (Paper) Name and No :- History of Marathas (1707CE- 1818CE) VII	
CO1	Investigate the role of key leaders in the Maratha expansion.
CO2	Demonstrate the role of the Peshwas in consolidating Maratha power.
CO3	Critically evaluate the leadership during the post-Panipat period.
CO4	Assess the long-term effects of administrative and socio-cultural changes.
Course (Paper) Name and No :- History of Asia (1945 CE- 2000CE) VIII	
CO1	Assess the success and challenges of policies implemented by Chinese leaders such as Mao Zedong and Deng Xiaoping.
CO2	Analyze the factors that contributed to Japan's rapid economic growth and modernization.
CO3	Examine the factors that influenced the political and economic landscape of Southeast Asia.
CO4	Evaluate the effectiveness of peace efforts and resolutions in the region.
Course (Paper) Name and No :- Research Methodology and Sources of History IX	
CO1	Distinguish between different techniques of presenting historical research.
CO2	Evaluate the contributions of new trends to the field of history.
CO3	Evaluate the strengths and weaknesses of different historical approaches.
CO4	Analyze the evolution of historiographical debates in India.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Marathi

POs		
Sr. No.	Outcome for B.A. Program After completion of B.A. program students will acquire	Graduate Attribute
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes.	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

COs	
Semester I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- मध्ययुगीन मराठी गद्य वाङ्मय	
CO1	विद्यार्थ्यांना मराठी गद्यलेखनाची परंपरा समजेल.
CO2	विद्यार्थ्यांना मराठी साहित्याचा इतिहास समजेल.
CO3	विद्यार्थ्यांना मध्ययुगीन लेखन परंपरा समजेल.
CO4	विद्यार्थ्यांना साहित्यातून सामाजिक समानता लक्षात येईल.
Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- मध्ययुगीन मराठी पद्य वाङ्मय	
CO1	विद्यार्थ्यांना मराठी पद्य लेखनाचा इतिहास समजेल.
CO2	विद्यार्थ्यांना अभंग, ओवी, पदे, भारूड, फटका या लेखनाचे महत्त्व समजेल.
CO3	विद्यार्थ्यांना संत साहित्यातील सामाजिक समता समजेल.
CO4	विद्याश्चर्थ्यांना संत साहित्यातून त्यांची चळवळ, निष्ठा, आमियता लक्षात येईल.
	विद्यार्थ्यांना संत साहित्यातून सामाजिक प्रबोधनाचा इतिहास समजेल-
Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- नेमलेल्या साहित्य कृतीचा अभ्यास -कादंबरी - II	
CO1	कादंबरी या साहित्य प्रकारची तोंड-ओळख होईल.
CO2	विद्यार्थ्यांच्या वाङ्मयीन अभिरुचीचा विकास होईल.
CO3	मराठी साहित्य अभ्यासातून जीवनविषयक समज विकसित होईल.
CO4	साहित्य आणि समाज यातील परस्पर संबंध समजून घेता येईल.
Course (Paper) Name and No.-III भाषा आणि भाषा अभ्यास	
CO1	भाषा म्हणजे काय व तिचे मानवी जीवनातील कार्य व महत्त्व समजून येईल.
CO2	भाषेची यथोचित आकलन व वापर करण्याची क्षमता विकसित होईल.
CO3	भाषेची निर्मितीप्रक्रिया समजण्यास मदत होईल.
CO4	भाषेच्या वापराचे ज्ञान मिळेल.
Semester IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-नेमलेल्या साहित्य कृतीचा अभ्यास -आत्मकथन-II	

CO1	चरित्र,आत्मचरित्र,आत्मकथन या साहित्यप्रकाराच्या तात्विक घटकांचे व अंतर्गत फरकाचे ज्ञान होईल.
CO2	आधुनिक मराठी साहित्यातील निवडक चरित्र,आत्मचरित्र,आत्मकथा यांचा आकलन,आस्वाद आणि मूल्यमापन करण्याची क्षमता विद्यार्थ्यांमध्ये निर्माण होईल.
CO3	चरित्र,आत्मचरित्र,आत्मकथन यातील वास्तव आणि कल्पित यातला फरक समजेल.
CO4	चरित्र,आत्मचरित्र,आत्मकथन यातून माणसाचे जीवन संघर्ष समजून येईल.
Course (Paper) Name and No.- मराठी बोलीचा अभ्यास - आगरी बोली-III	
CO1	स्थानिक बोलीभाषेची माहिती होईल.
CO2	बोलीभाषेतील साहित्य,संस्कृतीची अभिरुची निर्माण होईल.
CO3	वेगवेगळ्या बोली भाषेतील अंतर्गत फरक समजून येईल.
CO4	बोलीभाषा आणि प्रमाण भाषा यातील फरक समजण्यास मदत होईल.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Political Science

POs		
Sr. No.	Outcome for B.A. Program After completion of B.A. program students will acquire	Graduate Attribute
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

COs	
Semester I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Introduction to Indian Political Thinkers (I.K.S.)	
After Completion of the course the learner will be able to;	
CO1	Explain the thoughts on Equality.
CO2	Analyze Thoughts on Extremism, Truth, Nonviolence, Socialism and communalism.
Course (Paper) Name and No.- Indian Constitution, Governance and Polity- I (Open Elective)	
CO1	Describe various provisions of Indian Constitution.
CO2	Explain Governance and Constitutional machineries in our country.
Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Indian Constitution and Pillars of Democracy (Minor)	
CO1	Describe basics of Indian Constitution.
CO2	Analyse pillars of Indian democracy.
Course (Paper) Name and No.- Indian Constitution, Governance and Polity- II (Open Elective)	
CO1	Describe the structure, organization and functioning of State.
CO2	Illustrate Evolution and Functioning of Local Self Government.
Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Principles and Concepts of Political Theory (Paper II)	
CO1	Define Political Theory and its Traditional-Contemporary approaches.
CO2	Describe Concept of State and its various theories and meaning of Civil Society and Market.
CO3	Inspect internal relationships between Power, Authority and Legitimacy.
CO4	Estimate the concept of law, political obligation and resistance against social evils.
Course (Paper) Name and No.- Public Administration (Paper III)	
CO1	Recall Meaning, Nature, Scope and Evolution of Public Administration.
CO2	Explain Various Theories of Administration i.e., Scientific Management, Bureaucratic, Human Relations Theory.
CO3	Analyse Basic Principles and Theories of Public/ Private Organization.
CO4	Discuss Contemporary Techniques and Practices in Administration.

Course (Paper) Name and No.- Introduction to Indian Constitution: from the perspective of rights and duties (Extra Credit Course)	
CO1	Describe basic philosophy of Indian Constitution.
CO2	Explain relationship between constitutional provisions of Fundamental Rights and Duties of citizen.
Semester IV	
After completing the course, Student will able to:	
Course (Paper) Name and No.- Political Values and Ideologies (Paper II)	
CO1	Outline Nature, Theory and Classification of Rights.
CO2	Explain Basic Political Values i.e., Liberty, Equality and Justice.
CO3	Examine Theory and Principles of Democracy and its effective implementation in the lives of people.
CO4	Construct their Political Opinion by studying philosophical perspectives of Marxism, Fascism and Feminism.
Course (Paper) Name and No.- Indian Administration (Paper III)	
CO1	Illustrate Evolution of Indian Administration, its Salient Features and Role of District Collector in effective implementation of Government Policies, Schemes for Community Transformation.
CO2	Explain various tools designed for Personnel Administration.
CO3	Analyse Budgetary Process, Parliamentary Committees and Functioning of Comptroller and Auditor General of India.
CO4	Discuss Contemporary Issues in Indian Administration and its Redressal Mechanism.
Course (Paper) Name and No.- Indian Political Process (Extra Credit Course)	
CO1	Explain party system in India along with its all aspects.
CO2	Evaluate the election machinery and laws existing in our country.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Rural Development

POs		
Sr. No.	Outcome for B.A. Program After completion of B.A. program students will acquire	Graduate Attribute
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions.	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches.	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes.	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

COs	
Semester I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-IKS-Indian Knowledge System	
CO1	Describe the overview of Ancient Indian society by studying various dimensions of it.
CO2	Discuss the emergence of Ancient Indian Rural Administration.
Course (Paper) Name and No.-SEC –Agro-Tourism Management	
CO1	Describe the background and concept of Tourism.
CO2	Explain the Importance and scope of Agro-Tourism.
Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-DSC-Minor –Elements of Rural Development	
CO1	Describe the Historical background, Structure and features of Panchayat Raj System and Revenue Administration.
CO2	Explain the concept and role Agriculture in Indian Economy and Agro processing industries.
Course (Paper) Name and No.-SEC-Land Record Management	
CO1	Describe the background and concept of Land Record.
CO2	Explain the Importance and Methods of Land Record.
Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-Rural Society II	
CO1	Describe the concept, Reasons and components of Indian Rural Society, Problems of Weaker Section, Rural Social Institution and Social Change.
CO2	Identify the problems of Indian Rural Society, Rural social Institution, Modernization and Westernization.
CO3	Analyse the concept related to social change, changes in Society, Impact Rural Community on Urban Community.
CO4	Explain the concept related to Social change, Reasons, Barriers in social change, Rural Social Institutions and Indian Rural Society.

Course (Paper) Name and No.-Rural Administration III	
CO1	Describe the Basic concept ,objectives ,Components ,Background of District Admiration, Revenue Administration ,Law and Order, Judicial Machinery and Planning for Rural Development
CO2	Examine the role of District and Revenue Administration, NGOS in Rural Planning, Law and Order and Judicial Machinery in Rural Administration.
CO3	Explain the Structure, Functions, Scope and Types of District and Revenue Administration, planning, Law and order and Judicial Machinery.
CO4	Discuss on Law and Order, Loknyayalaya, District Planning, Revenue and District Admiration.
Semester IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-Development Strategies II	
CO1	Describe the Basic concept, objectives, Components, Importance, Functions of Agricultural Development, sources of Rural Employment and Tourism Development.
CO2	Identify the Areas of Rural Upliftment, problems in Tourism Industry, Agro processing Industry and Rural Marketing and Finance.
CO3	Examine the role of National Agricultural policy and food security,KVK and Agricultural University ,Agro based Industries ,Commerce and Trade and areas of Rural upliftment .
CO4	Explain the Sources of Rural Employment, Areas of Rural Uplifment, importance Agriculture Development and tourism development.
Course (Paper) Name and No.-Laws Related to Rural Development III	
CO1	Describe the Historical Background, Role of laws related to Rural Development.
CO2	Examine the role of Panchayat Act, Land Reforms and Law related Rural and Tribal Area.
CO3	Explain the Panchayat Raj Act in Maharashtra, Land Reforms and Laws related to Tribal and Rural Area.
CO4	Discuss the panchayat raj act in Maharashtra, Tribal and Rural Act, Land Reforms Legislation.

Faculty of Commerce

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Commerce

B.Com. (Commerce)

POs		
Sr. No.	Outcome for B.Com. Program After completion of B.Com. program students will acquire	Graduate Attribute
PO1	A capability to demonstrate comprehensive knowledge of Accountancy, Commerce and Management	Disciplinary knowledge
PO2	An ability to express thoughts and ideas effectively in writing and oral related to business communication	Communication Skills
PO3	An ability to recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.	Critical thinking
PO4	An ability to think rationally, analyze situations and solve problems adequately.	Problem solving
PO5	An ability to create a sense of inquiry and capability for asking relevant and appropriate questions related to Accountancy, Commerce and Management.	Research-related skills
PO6	An ability to work effectively and respectfully in different groups in the society and able to facilitate cooperative efforts as a member of a team.	Cooperation/ Team work
PO7	An ability to critically analyze, interpret data and draw conclusions with open mind in the field of Accountancy, Commerce and Management.	Scientific reasoning
PO8	An ability to use ICT effectively to access, evaluate and analysis of data in the field of accountancy, commerce and management.	Information/digital literacy
PO9	An ability to work independently for a project and manage a project through to completion in the field of accountancy, commerce and management.	Self-directed learning
PO10	An ability to demonstrate commerce, management values and beliefs to the multiple cultural and global groups.	Multicultural competence
PO11	An ability to elicit views of others, mediate disagreements and help reach conclusions in group settings.	Social Interaction

CO	
Semester - I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Commerce - I	
CO1	To Explain the concept of Business, Objectives of Business, Business Environment, and International Environment.
CO2	To Discover Project Planning, Promotion of Business Unit and statutory Requirement in promoting Business Unit.
CO3	To Develop Competencies of Entrepreneurship.
CO4	To Elaborate Various Strategies of Business.
Course (Paper) Name and No:- Event Management- I	
CO1	To summarize the concept of Event Management.
CO2	To understand the practical aspects of Event Planning & Designing an Event.
CO3	To understand the risk associated with Events.
Course (Paper) Name and No:- Business Organisations	
CO1	To summarize the concept of business.
CO2	To classify business organizations.
CO3	To understand the service sector & E-commerce.
Semester - II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No:- Commerce - II	
CO1	Explain the Concept of service, Marketing Mix for Services, service marketing, and service strategies.
CO2	Summarize Retailing, its format and Retail scenario.
CO3	Compare Recent Trends and Conventional Trends in Service Sector namely ITES sector, Banking Sector, Insurance Sector and Logistics.
CO4	Evaluate E-Commerce, Concept of World Wide Web its Types and Models.
Course (Paper) Name and No:- Event Management - II	
CO1	Outline the introduction of event management feasibility, event marketing, and legal compliance.
CO2	Understand Event Management Logistics, Safety, and Security.
Course (Paper) Name and No:- Management Foundation	
CO1	To summarize the concept of Management.
CO2	To understand entrepreneurship & start-up ventures.

Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Commerce- III	
CO1	Explain evolution of Management thought and Modern Management Approach.
CO2	Apply Concept of Planning, MBO, Decision Making.
CO3	Analyze the concept of Organising, Departmentation, and delegation of Authority.
CO4	Develop Leadership traits, Motivation and controlling activities.
Course (Paper) Name and No: - Business Law I	
CO1	Understand the Indian contract act and the importance of the contract act.
CO2	Analyze the various dimensions of special contracts under the contract act.
CO3	Aware about the Sale of Goods act – 1930.
CO4	Learn about various negotiable instruments used in transactions and the components of the Information Technology Act 2000.
Course (Paper) Name and No: - Advertising I	
CO1	Explain Integrated Marketing Communication, advertising & classification of advertising.
CO2	Analyze advertising agency, agency & client & career in advertising.
CO3	Identify economic & social aspects of advertising.
CO4	Know the Importance of Brand building, special purpose advertising & trends in advertising.
Semester IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No :- Commerce- IV	
CO1	Illustrate the Concept of Production Management, Production system and Inventory Management.
CO2	Infer Dimension of quality, Quality circle and Service Quality Management.
CO3	Analyze Functioning of Indian Financial Market, SEBI, Stock Exchange and Credit Rating Agencies.
CO4	Compare Recent Trends in Finance like Mutual Fund, Commodity Market, Derivative Market, Start-up venture, Micro Finance and Managing Finance during Pandemic.
Course (Paper) Name and No: - Business Law II	
CO1	Understand the concepts of the Indian Companies Act- 2013.
CO2	Interpret the concepts of the Indian Partnership Act – 1932.
CO3	To get detailed insights into the Consumer Protection Act, 1986 & Competition Act, 2002.
CO4	Explore the concepts of Intellectual property rights.

Course (Paper) Name and No: - Advertising II	
CO1	Classify the various media in advertising.
CO2	Explain the advertising budget, advertising campaign & media planning.
CO3	Analyze the fundamentals of creativity, creativity aspects & creativity through endorsement.
CO4	Know the Importance of execution & evaluating of advertising.
Semester - V	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No:- Commerce - V	
CO1	Enable the student to comprehend the concepts of marketing.
CO2	Familiar with the basic elements of marketing mix.
CO3	Evaluate the key marketing dimensions for decision making.
CO4	Understanding the importance of Rural marketing, ethics and challenges faced in marketing.
Course (Paper) Name and No:- Export Marketing - I	
CO1	Understand the basic functions of product planning and pricing decision for export marketing.
CO2	To get insights into export distribution and promotion in Export Marketing.
CO3	To review the current scenario obtaining export finance.
CO4	To understand export procedure and documentation to be followed in exports**.**
Course (Paper) Name and No:- Marketing Research I	
CO1	Comprehend the concepts of marketing research.
CO2	Enable the student to undertake marketing research.
CO3	Evaluate the various sources of data collection.
CO4	Familiar with data processing, analysis and reporting.
Semester - VI	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No:- Commerce - VI	
CO1	Develop the understanding of the concepts of Human Resource Management.
CO2	Be familiar with the various aspects of Human Resource Development.
CO3	Develop an understanding of the importance of Human relations.
CO4	Evaluate the trends in Human Recourse Management.

Course (Paper) Name and No:- Export Marketing - II	
CO1	Understand the basic functions of product planning and pricing decision for export marketing.
CO2	To get insights into export distribution and promotion in Export Marketing.
CO3	To review the current scenario obtaining export finance.
CO4	To understand export procedure and documentation to be followed in exports**.**
Course (Paper) Name and No:- Marketing Research II	
CO1	Understand the concepts of application of marketing research.
CO2	Enable the student to gain knowledge about various aspects of application of marketing research.
CO3	Evaluate the in house and professional marketing research agencies.
CO4	Familiar with prominent marketing research agencies.

II ivaVa ivanayaona SaaoBato II

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Accountancy

B.COM

POs		
Sr. No.	**Outcome for B.Com. Program After completion of B.Com. program students will acquire**	**Graduate Attribute**
PO1	An ability to demonstrate comprehensive advanced knowledge of accountancy, commerce, Taxation and Management.	Disciplinary knowledge
PO2	An ability to demonstrate confidently with the help of various appropriate media Communicate with others using appropriate media and present complex information in a clear and concise manner to different groups.	Communication Skills
PO3	An ability to use modern tools to create, select, and apply appropriate techniques, resources, and modern statistical tools & software.	Critical thinking
PO4	An ability to apply the research knowledge to solve critical problems relate to industry and Commerce.	Problem solving
PO5	An ability to create research related skills in the field of management and taxations.	Research-related skills
PO6	An ability to develop participative skill with high class demonstration of team work by efficiently working as a member of a team.	Cooperation/Team work
PO7	An ability to critically analyze, interpret data and draw conclusions with open mind in the field of Advanced accountancy, Taxation and E- Commerce and Management.	Scientific reasoning
PO8	An ability to use ICT effectively to access, evaluate and analysis of data in the field of Advanced accountancy, Taxation and Costing.	Information/digital literacy
PO9	An ability to work independently for a project and manage a project through to completion in the field of commerce and management.	Self-directed learning
PO10	An ability to demonstrate advanced accountancy and E-Commerce values and beliefs to the multiple cultural and global groups.	Multicultural competence
PO11	An ability to elicit views of others, mediate disagreements and help reach conclusions in group settings.	Social Interaction

COs	
Semester - I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.: Accountancy and Financial Management – I	
CO1	Define the accounting standards.
CO2	Solve Sole trading manufacturing concern final account.
CO3	Solve departmental final account.
CO4	Compare Bank Balance and Cash Balance.
Course (Paper) Name and No.: Fundamentals of Accounting - I	
CO1	Define Accountancy, various concepts of Accountancy, and the Accounting Cycle.
CO2	Criticize the Income Statement and its tools of analysis.
Course (Paper) Name and No.: Personal Financial Planning-I	
CO1	Associate Personal Financial Planning factors.
CO2	Decide Life Insurance Avenues in personal Financial Planning.
Course (Paper) Name and No.: Accountancy and Financial Management – II	
CO1	Define the conversion method in incomplete records of accounting.
CO2	Find del-creder commission in consignment accounts.
CO3	Construct the Branch Profit or Loss.
CO4	Build new company in tally ERP 9.
Semester - II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.: Fundamentals of Accounting - II	
CO 1	Interpret the Balance Sheet and its tools of analysis.
CO 2	Estimate Income Statement Ratios, Balance Sheet Ratios and Combined Ratios.
Course (Paper) Name and No.: Personal Financial Planning-II	
CO1	Associate Personal Tax planning factors.
CO2	Decide Investment Avenues in personal Financial Planning.

Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.: Accountancy and Financial Management – III	
CO1	Find Purchase consideration in amalgamation of Firms.
CO2	Solve the partnership final A/c , with respect to admission, retirement and death from partnership firm.
CO3	Inspect the accounting treatment for Piecemeal Distribution of Cash.
CO4	Construct the hire purchase Table and journalised the transactions.
Course (Paper) Name and No.: Financial Accounting & Auditing – V	
CO1	Analyze various ration like balance sheet ratio and Revenue statement ratio.
CO2	Interpret financial statement of company.
CO3	Compose cash flow statement.
CO4	Formulate Capital Budgeting.
Semester - IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.: Accountancy and Financial Management – IV	
CO1	Define the basic of issue, of shares and debentures.
CO2	Summarized the concept of accounting software.
CO3	Analyze the company income statement between pre and post period on the basis of incorporation.
CO4	Determine the company laws conditions and relate to redemption of Preference Shares.
Course (Paper) Name and No.: Financial Accounting & Auditing – VI	
CO1	Explain concept of Auditing.
CO2	Outline Audit plan, procedure and Documentation.
CO3	Interpret audit techniques, internal audit, and internal control.
CO4	Evaluate audit techniques like vouching & verification.
Semester - V	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.: Financial Accounting & Auditing – VII	
CO1	Find the capital Reserve in internal Reconstruction.
CO2	Build Investment Account of a particular person and ethical behaviour and its implications for accountants.
CO3	Testing the applicability of Buy Back conditions.
CO4	Categorize the assets and liabilities in vertical format.

Course (Paper) Name and No.: Financial Accounting and Auditing - VIII (Cost Accounting)	
CO1	Explain the concept of Cost Accounting, cost centre, Cost Unit, Elements of Cost, Coding System.
CO2	Apply the concept of Material cost, Stock Levels, Inventory control, EOQ and Stock Turnover Ratio.
CO3	Solve Practical Problems on Labour Cost and Overheads.
CO4	Construct Cost Sheet and Reconciliation of Cost and Financial Statement.
Course (Paper) Name and No.: Direct and Indirect Tax -I	
CO1	Summarise the basic concept, of Income Tax and Residential Status.
CO2	Apply Various deduction from Total Income.
CO3	Assess the income from Salaries, house property, capital Gain and Business Income.
CO4	Solve the Computation of Total Income for Individual and filling ITR-1 Form.
Semester - VI	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.: Financial Accounting & Auditing –IX	
CO1	Solve problems on foreign currency.
CO2	Determine the net profit or Loss and Assets and Liabilities of Limited Liability Partnership Firm.
CO3	Compose the table of Net liability in Underwriting of Shares and Debentures.
CO4	Solve Purchase Consideration for amalgamation, absorption and external reconstruction.
Course (Paper) Name and No.: Financial Accounting and Auditing – X (Cost Accounting)	
CO1	Apply the concept of Budgetary control for preparing Cash budget.
CO2	Solve Problems on Process Costing.
CO3	Evaluate Concept of Contract Costing and Marginal Costing.
CO4	Compare the Actual cost with Standard cost and able to do variance Analysis.
Course (Paper) Name and No.: Direct and Indirect Tax-II	
CO1	Find the taxable and non-taxable supplies.
CO2	Outline the basic concept of Indirect Taxes.
CO3	(Goods and Service tax).
CO4	Determine the Time, Place and Value of Supply.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Business Economics

B.Com. (Business Economics)

POs		
Sr. No.	Outcome for B.Com. Program After completion of B.Com. program students will acquire;	Graduate Attribute
PO1	A capability to demonstrate comprehensive knowledge of Accountancy, Commerce and Management	Disciplinary knowledge
PO2	An ability to express thoughts and ideas effectively in writing and oral related to business communication	Communication Skills
PO3	An ability to recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.	Critical thinking
PO4	An ability to think rationally, analyze situations and solve problems adequately.	Problem solving
PO5	An ability to create a sense of inquiry and capability for asking relevant and appropriate questions related to Accountancy, Commerce and Management.	Research-related skills
PO6	An ability to work effectively and respectfully in different groups in the society and able to facilitate cooperative efforts as a member of a team.	Cooperation/ Team work
PO7	An ability to critically analyze, interpret data and draw conclusions with open mind in the field of Accountancy, Commerce and Management.	Scientific reasoning
PO8	An ability to use ICT effectively to access, evaluate and analysis of data in the field of accountancy, commerce and management.	Information/digital literacy
PO9	An ability to work independently for a project and manage a project through to completion in the field of accountancy, commerce and management.	Self-directed learning
PO10	An ability to demonstrate commerce, management values and beliefs to the multiple cultural and global groups.	Multicultural competence
PO11	An ability to elicit views of others, mediate disagreements and help reach conclusions in group settings	Social Interaction

COs	
Semester I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- IKS- History of Economic Thought in India- I	
CO1	Find out the economic thought and its sources in India.
CO2	Define the economic thoughts of Kautilya.
CO3	Describe the economic thoughts of Buddhism in India.
CO4	Clarify the thoughts of various thinkers of pre-independent period.
Course (Paper) Name and No.- IKS- History of Economic Thought in India- I	
CO1	Find out the economic thought and its sources in India.
CO2	Define the economic thoughts of Kautilya.
CO3	Describe the economic thoughts of Buddhism in India.
CO4	Clarify the thoughts of various thinkers of pre-independent period.
Course (Paper) Name and No.- IKS - History of Economic Thought in India- I	
CO1	Find out the economic thought and its sources in India.
CO2	Define the economic thoughts of Kautilya.
CO3	Describe the economic thoughts of Buddhism in India.
CO4	Clarify the thoughts of various thinkers of pre-independent period.
Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Business Economics- I (Minor)	
CO1	Define the basic tools of business economics.
CO2	Illustrate the consumers behaviour related to demand, supply and demand forecasting.
CO3	Make use of various production techniques to understand the functioning of productive firms.
CO4	Analyse various concepts of costs of the firms.

Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Business Economics- III	
CO1	Define the basic concepts of macroeconomics and national income.
CO2	Explain the Keynesian theories related to macroeconomics.
CO3	Illustrate the different post of Keynesian developments in macroeconomics.
CO4	Examine the relationship between supply of money and demand for money for the estimation of inflation.
Semester IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Business Economics- IV	
CO1	Define the basic concepts of public finance.
CO2	Describe the tax and non-tax revenues of the government.
CO3	Express the theories of public expenditure and public debt of the government.
CO4	Modify the budget and other policies of the government.
Course (Paper) Name and No.- Business Economics- II (BAF and BMS)	
CO1	Define the Keynesian concepts of national income, theory of income and employment.
CO2	Interpret the relationship between supply of money and demand for money for the estimation of inflation.
CO3	Identify the role of fiscal and monetary policies in understanding the economy.
CO4	Analyse the impact of international trade on the domestic economy.
Semester V	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Business Economics- V	
CO1	Recall the economic policies of the government of India.
CO2	Illustrate the agricultural policies in India.
CO3	Criticize the industrial and service sector policies of the government of India.
CO4	Examine the banking and financial market of India.

Semester VI	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Business Economics- VI	
CO1	Describe the international trade policies of India.
CO2	Distinguish between various commercial policies adopted by various organisations in the world.
CO3	Explore the balance of payments and the agreements of WTO.
CO4	Examine the banking and financial market of India.
Course (Paper) Name and No.- Business Economics- III (Indian Economy)	
CO1	Study the different aspects of agricultural sector.
CO2	Identify the growth of industrial sector leads to development of economy.
CO3	Summarize the service sector & industrial sector.
CO4	Explore money market and its progress.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Accounting and Finance

B.Com. (Accounting and Finance)

POs		
Sr. No.	Outcome for B.Com. Program After completion of B.Com. program students will acquire	**Graduate Attribute**
PO1	A capability to demonstrate comprehensive knowledge of Accountancy, Commerce and Management	**Disciplinary knowledge**
PO2	An ability to express thoughts and ideas effectively in writing and oral related to business communication	**Communication Skills**
PO3	An ability to recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.	**Critical thinking**
PO4	An ability to think rationally, analyze situations and solve problems adequately.	**Problem solving**
PO5	An ability to create a sense of inquiry and capability for asking relevant and appropriate questions related to Accountancy, Commerce and Management.	**Research-related skills**
PO6	An ability to work effectively and respectfully in different groups in the society and able to facilitate cooperative efforts as a member of a team.	**Cooperation/ Team work**
PO7	An ability to critically analyze, interpret data and draw conclusions with open mind in the field of Accountancy, Commerce and Management.	**Scientific reasoning**
PO8	An ability to use ICT effectively to access, evaluate and analysis of data in the field of accountancy, commerce and management.	**Information/digital literacy**
PO9	An ability to work independently for a project and manage a project through to completion in the field of accountancy, commerce and management.	**Self-directed learning**
PO10	An ability to demonstrate commerce, management values and beliefs to the multiple cultural and global groups.	**Multicultural competence**
PO11	An ability to elicit views of others, mediate disagreements and help reach conclusions in group settings	**Social Interaction**

PSOs	
PSO1	Acquire conceptual, fundamental and application-based knowledge in accountancy, auditing, finance, taxation, law, economics, commerce, communication, research and information technology.
PSO2	Apply communication skills, soft skills, group discussion skills and presentation skills for drafting, data processing and presentation with the help of office productivity tools and effective communication techniques.
PSO3	Prepare, analyse, Evaluate and interpret financial statements and analysing auditing techniques by applying critical thinking skills, analytical skills and problem-solving skills.
PSO4	Develop, estimate and forecast cost of product, budget, tax liability and financial structure of the various forms of organisation and design research

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Financial Accounting I (Major)	
CO1	Describe various concept of accounting standard and Indian Accounting Standards.
CO2	Solve practical problems regarding inventory valuation by FIFO and weighted average method.
CO3	prepare the final account of manufacturing concern.
CO4	Calculate the various ratios and prepare the Departmental Final account.
CO5	Estimate hire purchase price and calculate interest on hire purchase transactions.
Course (Paper) Name and No.- Cost & Management Accounting - I (Major)	
CO1	Explain meaning, objectives and scope, features of Cost & Management Accounting and Classify Cost into different component of Cost and prepare Cost Sheet.
CO2	Define the material procurement procedure, and calculate inventory stock level and prepare stock ledger.
CO3	Calculate employees cost and ascertain direct expenses of various items.
CO4	Calculate of Various overhead rates.
Course (Paper) Name and No.- Computer Application in Business I (SEC)	
CO1	Describe history and parts of computers and demonstrate the knowledge of hardware, software and networks.
CO2	Apply and demonstrate the knowledge of office productivity tools for drafting, data processing and presentation.
CO3	Create Email IDs and make use of various web browsers and search engines.

Course (Paper) Name and No.- Business Mathematics (VSC)	
CO1	Find the derivatives of the functions.
CO2	Determine the interest and annuity.
CO3	Solve the problems by using matrices, determinant, and inverse of the matrices.
Course (Paper) Name and No.- Communication Skills in English I (AEC)	
CO1	To explain the nature and significance of communication in business world
CO2	To analyse verbal and non-verbal methods of communication in corporate world with illustrations.
CO3	To perceive importance of presentation and interview skills in today's competitive and corporate world.
CO4	To design different types of commercial letters successfully.
Course (Paper) Name and No.- Indian Knowledge System (IKS)	
CO1	Find out the economic thought and its sources in India.
CO2	Define the economic thoughts of Kautilya.
CO3	Describe the economic thoughts of Buddhism in India.
CO4	Clarify the thoughts of various thinkers of pre-independent period.
Course (Paper) Name and No.- Understanding India – I (VEC)	
CO1	Explain the overview of Indian society by studying various dimensions of it.
CO2	Examine different issues of Indian Society i.e., status of women in Indian society, human trafficking and problems of transgenders and addiction.
Course (Paper) Name and No.- Digital & Technological Solution – I (VEC)	
CO1	Knowledge about digital paradigm.
CO2	Realization of importance of digital technology, digital financial tools, e-commerce.
CO3	Familiarity with the e-governance and Digital India initiatives.
CO4	An understanding of use & applications of digital technology.
Course (Paper) Name and No.- Environmental Studies – I (VEC)	
CO1	Understand comprehensibly the concept of environment and ecosystem.
CO2	Discuss the man- environmental Interaction.
CO3	Understand the need the biodiversity and its conservation.
CO4	Understanding and analysing the causes effects and measures of pollution.
Course (Paper) Name and No.- Foundation Course in National Service Scheme (NSS) – I	
CO1	Understand historical background, philosophy and objectives of National Service Scheme.
CO2	Understand regular and theme-based activities organised by National Service Scheme.

Course (Paper) Name and No.- Foundation Course in National Cadet Corps (NCC) – I	
CO1	Emphasize a sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion.
CO2	Understand the importance of the conservation of natural resources and protection of Environment.
CO3	Develop the concept of patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces.
Course (Paper) Name and No.- Foundation Course in Physical Education (PE) – I	
CO1	Able to understand the history of physical education in India.
CO2	Identify and relate with the History of Indian physical education and Olympic movement.
CO3	able to comprehend the relationship between Physical Fitness and its Test.
CO4	To familiarize the learner with different types of philosophies and their relation to physical education and sports.
Course (Paper) Name and No.- Foundation Course in Performing Arts (PA) – I	
CO1	To understand various devices used in performing art.
CO2	To develop the skills of memorization, observation, expressions action and Reaction along with Voice modulation.
Course (Paper) Name and No.- Introduction to Fishery management -I (OE)	
CO1	Demonstrate an inclusive understanding of the importance of fisheries and their role in providing food, livelihoods, and ecological balance and explain the fundamental principles and theories of fishery management.
CO2	Identify and analyze the legal and regulatory frameworks governing fisheries at the national and international levels.
CO3	Evaluate the consequences of overfishing and depletion on fish stocks and marine ecosystems, and recognize the importance of managing fisheries sustainably.
Course (Paper) Name and No.- Basics of Electricity for wiring (OE)	
CO1	Learn and acquire hands – on experience in the usage of mustimeters, soldering iron oscilloscopes, and power supplies.
CO2	Design and trouble shoots the basic electrical circuits through hands-on mode.
CO3	Identify the basics components used for Electronic & Electrical experiments.
Course (Paper) Name and No.- Agro Tourism (OE)	
CO1	Explain the basic principles and advantages of agrotourism.
CO2	Enlist the places suitable for agrotourism.
CO3	Apply their knowledge in management of travels, accommodation and food Services during Agrotour.

Course (Paper) Name and No.- Cyber Security (OE)	
CO1	Understand unauthorized keeping the data, network and devices guarded against cyber threats.
CO2	Understand preventive measures in digital payments and Mobile handling.
Course (Paper) Name and No.- Introduction to Python Programming (OE)	
CO1	Understand the basics of python.
CO2	Apply functions, loops, conditional statements.
CO3	Create the lists, tuples and dictionaries.
Course (Paper) Name and No.- Introduction to Photoshop (OE)	
CO1	Understand the basics of Adobe Photoshop to create and edit images.
CO2	Develop images using Photoshop tools.
CO3	Demonstrate the models and layers in images.
CO4	Design RGB, 3d objects using models and layers.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Financial Accounting II (Major)	
CO1	Describe difference in between single-entry system and double entry system and to prepare final accounts from incomplete records.
CO2	Demonstrate transactions between principal and agent and able to apply consignment accounting.
CO3	Discuss basic principles of insurance and able to calculate fire insurance claim regarding goods lost by fire.
CO4	Demonstrate accounting for foreign exchange transaction under AS-11.
CO5	Describe difference in between single-entry system and double entry system and to prepare final accounts from incomplete records.
Course (Paper) Name and No.- Financial Management I (Major)	
CO1	Explain the various aspects of Financial Management and to describe the sources of financing.
CO2	Apply the techniques of valuation and calculate time value of money.
CO3	Explain how financial leverage effects on expected ROE, expected EPS and risk borne by the stockholders and to describe how operating leverage contributes to a firm's business risk.
CO4	Measure the cost of individual components of capital and to calculate WACC.
CO5	Explain the various capital structure theories and to demonstrate the dividend decision models.

Course (Paper) Name and No.- Commerce (Minor)	
CO1	Explain the concept of business environment and various tools of environmental analysis.
CO2	Describe business ethics and discuss various consumer laws in India.
CO3	Distinguish the factors of international business environment and positive and negative impact of environment on business.
CO4	Demonstrate the concept of organized and unorganized retailing and retail scenario in India and Global context.
Course (Paper) Name and No.- Data Analytics with MS- Excel and SPSS (SEC)	
CO1	Explain concept of data analytics & its types, importance & benefits.
CO2	Analyse and visualize the data using MS-excel.
CO3	Analyse and visualize the data using SPSS.
Course (Paper) Name and No.- Business Statistics (VSC)	
CO1	Explain the data by using graphs.
CO2	Apply Summarization Measures to solve the examples.
CO3	Predict the future values by using time series methods and will able to find index numbers.
CO4	Determine the probability.
Course (Paper) Name and No.- Communication Skills in English II (AEC)	
CO1	To explain the nature and significance of communication in business world.
CO2	To analyse verbal and non-verbal methods of communication in corporate world with illustrations.
CO3	To perceive importance of presentation and interview skills in today's competitive and corporate world.
CO4	To design different types of commercial letters successfully.
Course (Paper) Name and No.- Understanding India – II (VEC)	
CO1	Explain the features of Indian constitution, fundamental rights and fundamental duties of Indian citizen.
CO2	Discuss concept of Environment and environmental concerns along with remedial measures.
Course (Paper) Name and No.- Digital & Technological Solution – II (VEC)	
CO1	Knowledge about digital paradigm.
CO2	Realization of importance of digital technology, digital financial tools, e-commerce.
CO3	Familiarity with the e-governance and Digital India initiatives.
CO4	An understanding of use & applications of digital technology.

Course (Paper) Name and No.- Environmental Studies – II (VEC)	
CO1	Gain comprehensive knowledge of climate change, its science and response measures.
CO2	Understand the sources of waste and waste management.
CO3	Develop a critical understanding of the complexity of environmental management.
CO4	Explain sustainable development its goals, targets, challenges and global strategies for sustainable development.
CO5	Learn about the major international treaties and our country's stand and response to the major international agreements.
Course (Paper) Name and No.- Foundation Course in National Service Scheme (NSS) – II	
CO1	Describe concept of volunteerism in National Service Scheme.
CO2	Explain significance of participation in community-oriented services.
Course (Paper) Name and No.- Foundation Course in National Cadet Corps (NCC) – II	
CO1	Develop sense of adventure, sportsmanship and develop confidence, courage, determination, diligence and quest for excellence.
CO2	Apply the knowledge of personal health and hygiene lead a healthy life style and foster habits of restraint and self-awareness.
CO3	Apply the knowledge of weapons and their use and handling.
Course (Paper) Name and No.- Foundation Course in Physical Education (PE) – II	
CO1	To understand the basic concepts of Health and Physical Fitness.
CO2	To familiarize the learner with different types of fitness & its parameters.
CO3	To create awareness about own body Systems & its functioning.
CO4	To acquire the knowledge pertaining to yoga and its Type.
CO5	To familiarize the learner with the concept of obesity and diseases.
Course (Paper) Name and No.- Foundation Course in Performing Arts (PA) – II	
CO1	To recognize the importance and impact of Music, theatre, dance and folk art in life.
CO2	To be able to perform effectively on the stage.
Course (Paper) Name and No.- Introduction to Fishery management-II (OE)	
CO1	Demonstrate skill in fishery data collection, analysis, and stock assessment techniques to make informed management decisions.
CO2	Evaluate the socio-economic and ecological impacts of fishery management decisions on fishing communities and the marine environment interactions, and the impacts of human activities on the environment.
CO3	Apply various fishery management tools and strategies, such as fishing quotas, size limits, and gear regulations, to promote sustainable fishing practices.

Course (Paper) Name and No.- Solar Energy – Fundamentals & Its Application (OE)	
CO1	Learn and acquire hands-on experience in the handling Solar/PV cells.
CO2	Learn and acquire knowledge the solar energy and its relevance.
CO3	Design and trouble shoots the basic electrical circuits through hands-on mode.
CO4	Design basic solar systems.
CO5	Familiarize to determine the effect of several variables on the output.
CO6	Identify the basic components used for Solar systems.
CO7	Explores energy from the sun in terms of radiant energy to expand on the concept of electricity generation.
Course (Paper) Name and No.- Organic Farming (OE)	
CO1	Apply knowledge of organic farming under crop cultivation.
CO2	Explain methods of Composting, Vermicomposting and Biofertilizer.
Course (Paper) Name and No.- Bio-entrepreneurship (OE)	
CO1	Explain the concept of Bio-entrepreneurship.
CO2	Identify the different sectors for the Bio-business.
Course (Paper) Name and No.- Web Designing (OE)	
CO1	Design Table, Form using HTML5.
CO2	Implement graphics-based navigations.
CO3	Understand the concept of CSS.
Course (Paper) Name and No.- Introduction to R Programming (OE)	
CO1	Apply function to read data into R from various sources.
CO2	Use different data structure in R.
CO3	Analyse data and generate reports based on the data.
Course (Paper) Name and No.- Privacy & Security in online social media (OE)	
CO1	Understand the importance of privacy in the digital age.
CO2	Identify common security threats in online social media.
CO3	Implement measures to protect privacy and enhance security.
CO4	Understand online social media policy and privacy.

Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Financial Accounting III	
CO1	Demonstrate the effects on financial statements in case of admission, retirement and death of a partner during the year.
CO2	Describe the concept of profit prior to incorporation and calculate the different ratios for determining the profit/loss for pre and post-incorporation period.
CO3	Calculate purchase consideration and evaluate the effect of amalgamation/conversion in the Balance Sheet.
CO4	Prepare and evaluate a statement of piecemeal distribution of cash under different methods.
Course (Paper) Name and No.- Financial Management II	
CO1	Explain and discuss the various capital structure theories and optimal capital structure and to demonstrate the dividend decision models.
CO2	Apply and analyse the different techniques of capital budgeting for effective decision making.
CO3	Compute and analyse different policies under inventory management technique.
CO4	Compare and evaluate different policies under receivable and payable management.
CO5	Prepare working capital statement and cash budget.
Course (Paper) Name and No.- Direct Taxation I	
CO1	Define and describe concepts of income tax.
CO2	Determine the residential status of different persons.
CO3	Identify and apply the assesse eligible for deduction for deduction under chapter VIA.
CO4	Compute income chargeable to tax under the various heads of income.
CO5	Compute and interpret taxable income and tax liability of individual and HUF.
Course (Paper) Name and No.- Risk Management	
CO1	Define the fundamentals of risk and memorize the history of financial disaster and risk management failures.
CO2	Classify equity, currencies and commodities marked in India and describe the derivatives, future and option contracts and hedging.
CO3	Explain credit risk, procedure of credit risk and lifestyle of credit.
CO4	Evaluate the risk by using various techniques of risk management.

Course (Paper) Name and No.- Principles & Practices of Banking	
CO1	Identify and review banks' major risks, risk management techniques and strategies.
CO2	Estimate bank performance, risk, and efficiency and competition measures and understand their relevance in explaining issues of systemic risk, regulation, and the financing conditions in the economy.
CO3	Explain the dynamic changes of the banking industry and the policy responses because of the recent crisis.
CO4	Explain ethical issues in banking and consider their implications for conduct of business.
Course (Paper) Name and No.- Digital Banking	
CO1	Summarize the basic concepts of digital banking.
CO2	Describe the concepts of branchless banking and financial inclusions.
CO3	Make use of various products of digital banking in their day-to-day banking activities.
CO4	Make use of various domestic and global payment system.
Course (Paper) Name and No.- Business Law (Company Law) – III	
CO1	Define various concepts of the Companies Act, 2013.
CO2	Demonstrates the various provisions of the Insolvency and Bankruptcy Code, 2021.
CO3	Evaluate the various provisions of the Companies Act, 2013.
CO4	Elaborate the constitution of the National Company Law Tribunal.
Course (Paper) Name and No.- Research Methodology in Accounting and Finance	
CO1	Describe various aspects of research methodology.
CO2	Design the research in research methodology in accounting and finance.
CO3	Analyse the data collected & process for drawing conclusion.
CO4	Apply various statistical tools in research.
CO5	Develop research report writing skill.
Course (Paper) Name and No.- Foundation Course in Commerce (Financial Market Operations) - III	
CO1	Outline Indian Financial System.
CO2	Summarize financial market system.
CO3	Explain different types of financial instruments.
CO4	Evaluate different financial services.
Course (Paper) Name and No.- Foundation Course in Foundation Course in NSS – III	
CO1	To Describe important of value system & women empowerment.
CO2	To explain concept and mechanism of disaster management.

Course (Paper) Name and No.- Foundation Course in Foundation Course in NCC – III	
CO1	Emphasize the importance of National Integration, Unity in diversity, Freedom struggle, and national movements in India.
CO2	Apply the knowledge for career development with time management and interview skills.
CO3	Explain the task and role of fighting arms and modes of entry to armed forces.
CO4	Distinguish between group and snap shooting of firing in armed forces.
CO5	Understand the importance of a weapon and its detailed safety precautions necessary for prevention of accidents.
Course (Paper) Name and No.- Foundation Course Foundation Course in Physical Education III	
CO1	Explain the different nutrients to use their daily life.
CO2	Apply the positions and exercise to maintain good body posture.
CO3	Organize the sports medicine practice to the other students to prevent different sports injuries.
CO4	Justify the effects of sports training which is given in different training cycles.
Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Financial Accounting (Special Accounting Areas) – IV	
CO1	Describe various provisions of redemption of preference shares as per Companies Act, 2013.
CO2	Determines the underwriter's liability.
CO3	Calculate the maximum permissible limit of buyback of equity shares.
CO4	Determine different methods of redemption of debentures as per the provisions of the Companies Act, 2013.
CO5	Build the final accounts of companies.
Course (Paper) Name and No.- Cost & Management Accounting– II	
CO1	Describe process cost account and treatment of Normal loss, Abnormal loss and gain in the preparation of process cost accounting.
CO2	Identify total cost of join product and by product apply method of apportionment of join cost to join product and by product.
CO3	Classify different types of cost and determine the total cost of the product.
CO4	Compute notional or estimates profit for contract.
CO5	Ascertain the Unit wise, Job wise, Batch wise Cost of the product.

Course (Paper) Name and No.- Taxation - II (Direct Taxes- II)	
CO1	Describe the various provisions of clubbing of income and set off and carry forward losses as per income tax act.
CO2	Compute taxable income of partnership firm.
CO3	Demonstrate the knowledge of return of income and self-assessments.
CO4	Examine and compute TDs and interest payable as per provision of income tax.
CO5	Assess the file of income tax return for individual/HUF and partnership firms.
CO6	Estimate the advance tax liability of the assesse.
Course (Paper) Name and No.- Wealth Management	
CO1	Define the basic concept of wealth management, summarize structure of capital market and describe the role of wealth management.
CO2	Solve various numerical calculations, share valuation and bond valuations.
CO3	Explain wealth management process and portfolio theories.
CO4	Describe documentation procedure of Operational aspects of wealth management.
Course (Paper) Name and No.- Principles & Practice of Insurance	
CO1	Explain various aspects of insurance policies and its evolution.
CO2	Make use of settlement procedure of insurance policy for its claim.
CO3	Describe various aspects of life insurance and health insurance.
CO4	Classify various general insurance policy.
Course (Paper) Name and No.- Information Technology - II	
CO1	Discuss various emerging technologies of data analytics.
CO2	Describe the basic concepts of Data Analytics.
CO3	Analyze the Data with use of MS Excel.
CO4	Make use of accounting software for recording the accounting transactions.
Course (Paper) Name and No.- Auditing	
CO1	Describe the basic concepts of auditing, principles and types of audits.
CO2	Explain audit planning, procedure and its documentation.
CO3	Make use of audit techniques while auditing and discuss the concepts of Internal audit.
CO4	Examine expenses and income with the help of vouching and assets and liabilities with the help of verification.
Course (Paper) Name and No.- Data Visualization with Power BI & Tableau	
CO1	Explain the concepts, importance and history of power bi.
CO2	Explain the concepts, overview and architecture of tableau.
CO3	Design the dashboard and reports with the use of power bi.
CO4	Create the dashboard and reports with the use of tableau.

Course (Paper) Name and No.- Foundation Course in Management (Introduction to Management) - IV	
CO1	Describe basic management concepts.
CO2	Apply the concept of planning and organizing.
CO3	Classify the procedure of staffing.
CO4	Elaborate importance and principles of directing, motivation, coordination, and controlling.
Course (Paper) Name and No.- Foundation Course in Foundation Course in NSS – IV	
CO1	To explain concept of communicable and non-communicable disease and preventive measures.
CO2	To Develop a critical understanding of the challenges and opportunities in Rural Resources mobilization and NGO Management.
Course (Paper) Name and No.- Foundation Course in Foundation Course in NCC – IV	
CO1	Understand the various social issues and their impact on social life.
CO2	Develop the concept of various markings on the map and how they are co-related to the ground features.
CO3	Understand the process of coping with Stress & emotions.
CO4	Explain the concept of Setting Maps, Radio Telephony Procedures, and Radar of Armed forces.
CO5	Understand that drill as the foundation for discipline and dignity of drill with Arms.
Course (Paper) Name and No.- Foundation Course Foundation Course in Physical Education –IV	
CO1	Recognize the stress and stressor which effects on individuals.
CO2	Identify the levels, awards and sports policy has implemented by state and central government.
CO3	Compare the Yogic and Non-Yogic exercise and preventive measures for different disease.
CO4	Prepare the proper planning for organisation and administration in sports.

Semester V	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Cost Accounting III	
CO1	Describe the uniform costing and inter-firm comparison.
CO2	Explain cost accounting system and prepare reconciliation statement.
CO3	Determine the cost and cost of service sector industry.
CO4	Calculate cost per equivalent unit by applying FIFO and Weighted average method and preparation of process cost accounting.
CO5	Determine and analyse the total cost under traditional and ABC system.
Course (Paper) Name and No.- Financial Management II	
CO1	Describe the financial concepts used in strategic financial management.
CO2	Explain the various capital structure theories and to demonstrate the dividend decision models.
CO3	Apply the different techniques of capital budgeting for effective decision making.
CO4	Calculate NAV with respect to mutual funds and ascertain the valuation of bond.
CO5	Compare and evaluate different policies under receivable and payable management.
Course (Paper) Name and No.- Taxation - III	
CO1	Describe various provisions relating to utilization of Input Tax Credit.
CO2	Explain the concept of GST and discuss the framework of GST.
CO3	Explain and compute the provisions relating to place of supply, Time of supply and Value of supply.
CO4	Determined Person liable for Registration and compute the GST liability of a registered person.

Course (Paper) Name and No.- International Finance	
CO1	Explain future and option of derivatives and calculate various components of derivatives options and futures.
CO2	Determination foreign exchange market and dealing in forging exchange market.
CO3	Determine exchange rate and to make comparison of different currencies.
CO4	Summaries various component of International financial management and evaluate the project by Applying various capital budgeting techniques.

Course (Paper) Name and No.- Financial Analysis and Business Valuation	
CO1	Describe different techniques of financial modelling and project appraisal.
CO2	Demonstrate the various aspects and models of the valuation of the business.
CO3	Analyze the financial statements.
CO4	Determine the value of assets and liabilities.

Course (Paper) Name and No.- Management II (Management Applications)	
CO1	Describe the various avenues of the marketing management.
CO2	Demonstrate comprehensive knowledge of human resource management and application of various related theories.
CO3	Explain the different aspects of production management.
CO4	Discuss and analyze various techniques of financial management.

Course (Paper) Name and No.- Financial Accounting V	
CO1	Describe the block chain accounting.
CO2	Summarize the accounting entries based on GST, Internal Reconstruction & Amalgamation of companies.
CO3	Prepare the statement of affairs, liquidator's final statement and consolidated financial statement.
CO4	Calculate purchase consideration and evaluate the effect of amalgamation/conversion in the Balance Sheet.
CO5	Discuss various methods and legal provisions of internal reconstruction & its effects in Balance sheet

Course (Paper) Name and No.- Financial Accounting VI	
CO1	Describes the legal provision and prepare financial statement of a banking company and the insurance company.
CO2	Demonstrate the comprehensive knowledge of regulation governing non-banking financial companies and preparation of the financial statement.
CO3	Calculate the goodwill and value per share by applying different methods.
CO4	Discuss the statutory provisions of conversion of partnership business into Limited liability partnership and preparation of the final accounts.

Semester VI	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Cost Accounting IV	
CO1	Describe various types of budget and prepare flexible and personal budget.
CO2	Discuss the absorption costing and marginal costing and calculate marginal cost of the product.
CO3	Explain different policies under transfer pricing and calculate transfer price.
CO4	Calculate and analyze the variances under the standard costing system.
CO5	Evaluate various schemes for managerial decision making.
Course (Paper) Name and No.- Financial Management III	
CO1	Describe various concepts in valuation and to make use of different approaches of valuation.
CO2	Explain the modes of acquiring another firm and to determine the exchange ratio for evaluation of mergers.
CO3	Explain the various aspects of corporate restructuring and takeovers and prepare balance sheet after reconstruction.
CO4	Apply the knowledge of lease and hire purchase financing and analyze the NPV under lease and purchase.
CO5	Evaluate working capital management policies and the risk.
Course (Paper) Name and No.- Taxation - IV	
CO1	Describe various kinds of ledgers/Registers to be maintained by the taxable person.
CO2	Describe the basic concepts relating to export promotion schemes under FTP.
CO3	Compute the payment of Taxes and Refunds and Explain the procedure of accounting, auditing & assessments.
CO4	Analyze the provisions relating to TDS & TCS.
CO5	Discuss the provisions relating to Custom Laws and determine the procedure for clearance of imported and exported goods.
Course (Paper) Name and No.- Security Analysis and Portfolio Management	
CO1	Summarize the Concept of Portfolio management and its process.
CO2	Describe theory of Valuation and Calculate Alternative method of Valuation.
CO3	Evaluate Dow theory and Calculate Mathematical Indicators and Market Indicators.
CO4	Discuss and Calculate Economy Analysis, Industry Analysis and Company Analysis.

Course (Paper) Name and No.- Management Control Systems	
CO1	Describe the various development in management accounting and management control systems.
CO2	Analyse the various statements of financial goals set.
CO3	Measure the performance under responsibility centres.
CO4	Discusses methods of inflation accounting.
Course (Paper) Name and No.- Indian Economy	
CO1	Define the concepts of Indian Economy and Agricultural Sector.
CO2	Illustrate the service sector and industrial sector of India.
CO3	Examine money and banking sectors in India.
CO4	Evaluate Industrial sector and industrial policy of India.
Course (Paper) Name and No.- Financial Accounting VII	
CO1	Describe the legal provisions and prepare the final accounts of electricity companies and co-operative societies.
CO2	Demonstrate the knowledge of IFRS and Indian standards.
CO3	Classify fixed and variable income bearing securities and calculate ex-interest and cum-interest price and weightage average cost.
CO4	Analyze accounting policies for maintain accounting of foreign branches.
CO5	Discuss the various mutual fund schemes, calculate NAV and prepare the accounting entries.
Course (Paper) Name and No.- Project Work	
CO1	Explain the various aspects of writing research methodology based on project.
CO2	Apply various statistical and accounting techniques for testing the hypothesis.
CO3	Analyze and interpret the data.
CO4	Develop research project writing skills and draft research project.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Accounting and Finance

M.Com. (Business Analytics)

POs		
Sr. No.	Outcome for M.Com. Program After completion of M.Com. program students will acquire	Graduate Attribute
PO1	An ability to demonstrate comprehensive advanced knowledge of accountancy, commerce, Taxation and Management.	**Disciplinary knowledge**
PO2	An ability to demonstrate confidently with the help of various appropriate media Communicate with others using appropriate media and present complex information in a clear and concise manner to different groups.	**Communication Skills**
PO3	An ability to use modern tools to create, select, and apply appropriate techniques, resources, and modern statistical tools & software.	**Critical thinking**
PO4	An ability to apply the research knowledge to solve critical problems relate to industry and Commerce.	**Problem solving**
PO5	An ability to create research related skills in the field of management and taxations.	**Research-related skills**
PO6	An ability to develop participative skill with high class demonstration of team work by efficiently working as a member of a team.	**Cooperation/Team work**
PO7	An ability to critically analyze, interpret data and draw conclusions with open mind in the field of Advanced accountancy, Taxation and E- Commerce and Management.	**Scientific reasoning**
PO8	An ability to use ICT effectively to access, evaluate and analysis of data in the field of Advanced accountancy, Taxation and Costing.	**Information/digital literacy**
PO9	An ability to work independently for a project and manage a project through to completion in the field of commerce and management.	**Self-directed learning**
PO10	An ability to demonstrate advanced accountancy and E-Commerce values and beliefs to the multiple cultural and global groups.	**Multicultural competence**
PO11	An ability to elicit views of others, mediate disagreements and help reach conclusions in group settings.	**Social Interaction**

PSOs	
PSO1	Acquire conceptual, fundamental and application-based knowledge in Business Analytics, Data Science, Business Intelligence, Artificial Intelligence, Financial Modelling, Business Modelling, Financial analytics, HR and Marketing Analytics.
PSO2	Apply data visualization tools for development of Business modelling & Financial Modelling.
PSO3	Prepare, analyze, Evaluate and interpret financial statements as per Indian AS by applying critical thinking skills, analytical skills and problem-solving skills.
PSO4	Analyze the Human Resources, Marketing & supply chain management model through big data and data mining techniques.

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Introduction to Business Analytics & Data Science	
CO1	Describe the basics of business analysis and Data Science.
CO2	Interpret data management and handling and Data Science Project Life Cycle.
CO3	Discuss the machine learning concept.
CO4	Evaluate the data mining techniques.
Course (Paper) Name and No.- Business Intelligence	
CO1	Identify the decision-making capabilities in the business intelligence architecture and implement activities.
CO2	Categorize and assess consumer behaviour and its influence on firm and household decisions.
CO3	Evaluate the moral challenges involving best practices of ethical behaviour.
CO4	Develop the data analysis framework for optimal performance.
Course (Paper) Name and No.- Statistics & Econometrics	
CO1	Discuss the various concepts of Econometrics.
CO2	Calculate probability distribution, Continuous Random Variables & Probability Distribution, Normal Distribution.
CO3	Analyze the variances by using ANOVA.
CO4	Critically evaluate uses (and misuses) of statistics.

Course (Paper) Name and No.- R Programming	
CO1	Define basics of statistical computing and data analysis.
CO2	Apply R programming in statistics.
CO3	Analyze use of R analytical programming.
CO4	Design and write efficient programs using R to perform routine and specialized data management and analysis tasks.
Course (Paper) Name and No.- Research Methodology	
CO1	Describe various aspects of research methodology.
CO2	Design the research in research methodology in accounting and finance.
CO3	Analyze the data collected & process for drawing conclusion.
CO4	Apply various statistical tools in research.
CO5	Develop research report writing skill.
Course (Paper) Name and No.- Strategic Cost Accounting	
CO1	Apply cost accounting methods to evaluate and project business performance.
CO2	Classify the cost of product, apportionment of cost of product.
CO3	Calculate total cost of the product for fixing selling price.
CO4	Determine the target cost.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Business Application of Block Chain Technologies	
CO1	To describe Blockchain technology and its significance.
CO2	To explain cryptography and Blockchain technology networks.
CO3	To identify Business challenges in Blockchain technology.
CO4	To evaluate the domain specific Blockchain technology business cases.
Course (Paper) Name and No.- Business Modelling	
CO1	Describe the basic of VB and Excel.
CO2	Explain the Power BI and its use.
CO3	Analyse the Power BI techniques.
CO4	Design an application of spreadsheet in the modelling.

Course (Paper) Name and No.- Quantitative Techniques for Managers	
CO1	Evaluate different types of decision-making environments and the appropriate decision-making approaches and tools.
CO2	Construct linear programming problem and to find optimal solution by graphical simplex method.
CO3	Solve Transportation Models and Assignment Models also to solve game theory problems by understanding pure and mix strategies.
CO4	Describe optimal sequence of difference jobs on different machines and queuing theory concepts and CPM, PERT to reduce cost and time.
Course (Paper) Name and No.- Python Programming	
CO1	Explain significance of Python language for developers.
CO2	Make use of loops, functions, lists, tuples, and Range in Python programs.
CO3	Analyse the different ways of data analysis with the help of Python application.
Course (Paper) Name and No.- Financial Reporting	
CO1	Describe and understand the International Financial Reporting standards and their application.
CO2	Prepare and interpret the financial statements according to the Ind AS.
CO3	Develop understanding the concept of GAAP, IFRS and Ind AS.
CO4	Distinguish the scheme of Merger, demerger and Reverse Acquisition.
Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Big Data Analytics	
CO1	Define Big Data and its analytics.
CO2	Demonstrate fundamental enabling techniques and scalable.
CO3	Apply various Big Data Activities using Hive.
CO4	Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to generate analytics.
Course (Paper) Name and No.- Financial Modelling	
CO1	Explain Time value of money models, Basic statistical tools and Microsoft Excel Functions.
CO2	Analyse the various financial and other tools in excel.
CO3	Measure Advanced techniques, Analytical Tools, Sensitivity Analysis, Database Functions and Finance functions for Financial Modelling.
CO4	Determined efficient portfolio, creating dynamic portfolios, portfolio insurance, fixed income portfolio management.

Course (Paper) Name and No.- Artificial Intelligence & Machine Learning	
CO1	Explain need of Artificial Intelligence and Machine Learning in Data analytics.
CO2	Demonstrate fundamentals of Supervised and Unsupervised learning.
CO3	Apply regression analysis on the data available.
CO4	Analyze different Reinforcement Learning & Deep Learning Techniques.
Course (Paper) Name and No.- Python Programming	
CO1	Explain significance of Python language for developers.
CO2	Make use of loops, functions, lists, tuples, and Range in Python programs.
CO3	Analyze the different ways of data analysis with the help of Python application.
Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Financial & Credit Risk Analytics	
CO1	Define about the different kinds of credit available.
CO2	Demonstrate knowledge of credit risk and rating.
CO3	Explain the credit commitments and its application.
CO4	Apply the knowledge of corporate governance and risk management.
CO5	Analyze the portfolio position.
Course (Paper) Name and No.- Human Resources & Marketing Analytics	
CO1	Define Basic concept of HR analytics and Marketing Analytics.
CO2	Explain how to conduct research and statistical analyses linked to human resource planning, recruitment, and selection using appropriate benchmarks and metrics.
CO3	Apply the proper software for recording, maintaining, retrieving, and analyzing Effectiveness of training and performance.
CO4	Analyze various tools to have marketing insights in various marketing areas through empirical data.
CO5	Develop conclusions from data in order to address descriptive, predictive, and prescriptive issues that concern marketing managers.
Course (Paper) Name and No.- Data Mining Techniques	
CO1	Define data mining and its functions.
CO2	Explain classification and clustering algorithms.
CO3	Apply formulate predictive analytics using R & Understand pattern discovery using R.
CO4	Analyze classification and clustering methods applicable to predictive analytics using R.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Management Studies

B.Com. (Management Studies)

POs		
Sr. No.	Outcome for B.Com. Program After completion of B.Com. program students will acquire	Graduate Attribute
PO1	A capability to demonstrate comprehensive knowledge of Accountancy, Commerce and Management	Disciplinary knowledge
PO2	An ability to express thoughts and ideas effectively in writing and oral related to business communication	Communication Skills
PO3	An ability to recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.	Critical thinking
PO4	An ability to think rationally, analyze situations and solve problems adequately.	Problem solving
PO5	An ability to create a sense of inquiry and capability for asking relevant and appropriate questions related to Accountancy, Commerce and Management.	Research-related skills
PO6	An ability to work effectively and respectfully in different groups in the society and able to facilitate cooperative efforts as a member of a team.	Cooperation/ Team work
PO7	An ability to critically analyze, interpret data and draw conclusions with open mind in the field of Accountancy, Commerce and Management.	Scientific reasoning
PO8	An ability to use ICT effectively to access, evaluate and analysis of data in the field of accountancy, commerce and management.	Information/digital literacy
PO9	An ability to work independently for a project and manage a project through to completion in the field of accountancy, commerce and management.	Self-directed learning
P10	An ability to demonstrate commerce, management values and beliefs to the multiple cultural and global groups.	Multicultural competence
PO11	An ability to elicit views of others, mediate disagreements and help reach conclusions in group settings	Social Interaction

PSOs	
PSO1	Will create operational cadre management personnel
PSO2	Develop the lateral thinking, communication skills and social responsibilities among learners.
PSO3	Strengthen the analytical, interpersonal organization and decision-making skills through presentations and seminars.
PSO4	Adequate exposure to operational environment in the field of management.
PSO5	Encourage and inculcate the use of modern technology to solve the practical problems in the real world.
PSO6	Will prepare learners for future career success by encouraging them to develop necessary tools and skills, including written and oral communication skills, an ability to work with others, leadership qualities, and a capability to creatively solve problems.

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Principles of Management	
CO1	Explain the functions and responsibilities of managers & tools and techniques to be used in the performance of the managerial job.
CO2	Analyze and understand the environment of the organization.
CO3	Build the leadership capacity and teamwork skills for business decision making.
CO4	Elaborate the knowledge of current theory and techniques of major business discipline.
Course (Paper) Name and No.- Business Environment	
CO1	Define business and familiarize with the nature of Business Environment and its components.
CO2	Interpret the relationships between Government & business and understand the political, economic and legal policies of the country.
CO3	Analyse social, cultural, technological and strategically aspects of business environment.
CO4	To develop conceptual framework of International Business Environment and generate interest in International Business.

Course (Paper) Name and No.- : Information Technology in Business Management-I	
CO1	Demonstrate understanding of the concepts, structure and design of different types of information systems in organizations and their relationships to each other.
CO2	Make a use of various office productivity tools such as Word processing, spreadsheet and PowerPoint presentation.
CO3	Learners will be able to adapt the concept and application of E-mail, Internet and Domain Name System.
Course (Paper) Name and No.- History of Economic thoughts in India	
CO1	Find out the economic thought and its sources in India.
CO2	Define the economic thoughts of Kautilya.
CO3	Describe the economic thoughts of Buddhism in India.
CO4	Clarify the thoughts of various thinkers of pre-independent period.
Course (Paper) Name and No.- Environmental Studies	
CO1	Understand comprehensibly the concept of environment and ecosystem.
CO2	Discuss the Man-Environmental Interaction.
CO3	Understand the need the biodiversity and its conservation.
CO4	Understanding and analysing the causes, effects and measures of pollution.
Course (Paper) Name and No.- Digital Technologies & Solutions-1	
CO1	Build knowledge about digital paradigm.
CO2	Elaborate the importance of digital technology, digital financial tools, e-commerce.
CO3	List the e-governance and Digital India initiatives.
CO4	Explain use & applications of digital technology.
Course (Paper) Name and No.- Introduction to Human Health and Nutrition	
CO1	Explain nutrition and functions of various nutrients.
CO2	Identify different meal plans as per the age and therapeutic conditions.
CO3	Apply food sanitization and hygiene.

Course (Paper) Name and No.- Organic Farming	
CO1	Apply knowledge of organic farming under crop cultivation.
CO2	Explain methods of Composting, Vermicomposting and Biofertilizer.
Course (Paper) Name and No Business Administration - I	
CO1	Learners will be able to develop understanding of the financial framework of the country and environment in which a business will operate.
CO2	Learners will be able to demonstrate foundational knowledge in finance, HR management, and marketing.
CO3	Learners will be demonstrate an ability to integrate the concepts of the core areas of business.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No:- Principles of Marketing	
CO1	Learners will be able to explain the concept of marketing and define the basic parts of Marketing.
CO2	Learners will be able to categorize the marketing environment consisting of micro and macro factors of marketing and identify the aspects of consumer behaviour.
CO3	Learners will be able to assess the importance of marketing mix in detail.
CO4	Learners will be able to formulate the aspects of Service Marketing, Types of Businesses, plan the Segmentation, Targeting and Positioning for a product/service and choose the recent trends in the marketing field.
Course (Paper) Name and No:- Financial Institution and Market	
CO1	Learners will be able to understand the financial system in Indian as well as at global level.
CO2	Learners will be able to classify various financial markets like money market, capital market, commodity market etc.
CO3	Learners will be able to develop knowledge about various financial Institutions and various financial regulators.
CO4	Learners will be able to determine the role of financial Institutions and financial regulators.

Course (Paper) Name and No:- Foundation of Human Skills	
CO1	Develop and nurture a deep understanding of personal motivation.
CO2	Evaluate and improve upon personal leadership strengths and weaknesses.
CO3	Explain the importance of social responsibility, Elaborate, lead and also guided by the values of self-awareness, equity, social justice, inclusiveness, empowerment, collaboration, citizenship.
Course (Paper) Name and No:- Information Technology in Business Management-II	
CO1	Learners will able to explain various roles MIS have towards strategic goals and operational success of an organization.
CO2	Examine all components in an ERP system and the relationship among the components.
CO3	Explain the basic concepts, scope and application of data warehouse and data mining.
Course (Paper) Name and No:- Foundation Course in Understanding India	
CO1	Explain the features of Indian constitution, fundamental rights and fundamental duties of Indian citizen.
CO2	Discuss concept of Environment and environmental concerns along with remedial measures.
Course (Paper) Name and No:- Digital Technologies & Solutions-II	
CO1	Build knowledge about digital paradigm.
CO2	Elaborate the importance of digital technology, digital financial tools, e-commerce.
CO3	List the e-governance and Digital India initiatives.
CO4	Explain use & applications of digital technology.
Course (Paper) Name and No:- Environmental Studies-II	
CO1	Gain a comprehensive knowledge of climate change, its science and response measures
CO2	Understand the sources of waste and waste management
CO3	Develop a critical understanding of the complexity of environmental management
CO4	Explain sustainable development, its goals, targets, challenges and global strategies for sustainable development.
CO5	Learn about the major international treaties and our country's stand on and responses to the major international agreements.

Course (Paper) Name and No:- Business Administration - II	
CO1	Learners will be able to develop the competencies and attitude in playing the various roles in the business world.
CO2	Learners will be able to evaluate and improve the personal leadership strengths and weaknesses.
CO3	Learners will be able to identify the business opportunities and strategies applicable for gaining profits.
Course (Paper) Name and No:- Personality Development – II	
CO1	Learners will be able to develop the basic idea of significance and reasons for personality development and self-grooming.
CO2	Learners will be able to build confidence and overcome the problems associated with personality.
CO3	Learners will be able to understand and demonstrate knowledge of personal beliefs and values.
CO4	Learners will be able to improve their personality and language related difficulties.
Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No:- Information Technology in Business Management I	
CO1	Demonstrate knowledge of security threats to computer systems and perform counter measures to secure it.
CO2	Analyze the role played by six major types of information systems in organizations and their relationships to each other.
CO3	Define the concept and application of E-mail, Internet and Domain Name System.
CO4	Develop and exhibit proficiency in the use of Word processing, spreadsheet and presentation applications and google forms.

Course (Paper) Name and No:- Business Planning & Entrepreneurial Management	
CO1	Explain foundation of Entrepreneurship development & theories of entrepreneurship.
CO2	Identify various types & classification of entrepreneurs.
CO3	Explain Entrepreneur project development & Business plan.
CO4	Discuss Venture development & its importance.
Course (Paper) Name and No:- Accounting for Managerial Decisions	
CO1	Evaluate and interpret financial statements by using trend %, common size and comparative.
CO2	Define financial ratios and it's utility in Decision making for organization
CO3	Interpret cash inflows and cash outflows of the business from operating, investing and financial activities
CO4	Examine financial statements with the help of tools and techniques for accounting managerial decisions.
Course (Paper) Name and No:- Strategic Management	
CO1	Define business policy and strategies and how does it affect the working of any business organizations.
CO2	Interpret the impact of internal and external environment on strategies of an organization.
CO3	Evaluate various corporate, business and functional level strategies. Also Explain various innovative and creative strategy making models.
CO4	Examine techniques, tools, models and theories of strategic management into practical business world.
Course (Paper) Name and No:- Foundation Course III	
CO1	Define the concepts about environment, biogeochemical cycles and various types of resources available.
CO2	Classify various types of environment degradation, pollution, and recollect the concept of waste management.
CO3	Formulate solutions to the various environmental problems and challenges faced by us as per the legal and regulatory policies with regards to environment protection.
CO4	Explain methods and approaches for sustainable environmental planning, development and management.

Course (Paper) Name and No:- Foundation Course in Physical Education III	
CO1	Explain the principles of nutrition, dietary guidelines and also implement the same for the purpose of improvements.
CO2	Utilizes the knowledge of health to improve physical fitness and apply the parameters to check the health status.
CO3	Make use of knowledge to prevent sports injuries
CO4	Analyse the the importance of sports training without using drugs for performance
Course (Paper) Name and No:- Basics of Financial Services	
CO1	Explain financial markets and its various segments
CO2	Classify different financial institutions and their functions
CO3	Explain the fundamentals of banking and knowledge of banking operations.
CO4	Evaluate different instruments for investment in the financial market.
Course (Paper) Name and No:- Corporate Finance	
CO1	Explain different sources of finance
CO2	Utilize tools and techniques for proper business decision making
CO3	Analyse various investment options based on time value of money.
CO4	Evaluate feasibility of the business
Course (Paper) Name and No:- Consumer Behaviour	
CO1	Outline the consumer decision making process and its application in marketing function of firms.
CO2	Build the skill of analysing consumer information to create consumer-oriented marketing strategies.
CO3	Analyse the environmental and individual influence on consumers.
CO4	Utilise different Consumer decision-making models in business processes.
Course (Paper) Name and No:- Advertising	
CO1	Illustrate the evolution of advertising, its different types and the ethics and laws used in advertising.
CO2	Develop Advertising strategy and apply the same in the marketing mix.
CO3	Design a creative advertisement campaign by making use of the different elements of advertising.
CO4	Examine the growing importance of advertising and career opportunities in advertising.

Course (Paper) Name and No:- Motivation & Leadership	
CO1	Define the concept of motivation and theories of motivation
CO2	Illustrate the Indian scene & work life balance
CO3	Explain Leadership & theories of leadership & types of leader
CO4	Elaborate great leader & their style , activities also roles of great leader
Course (Paper) Name and No:- Recruitment & Selection	
CO1	Summarize the process of recruitment & selection & various traditional & modern techniques of recruitment.
CO2	Create a job profile by defining accountabilities, standards and competencies.
CO3	Describe the skills and knowledge needed to conduct full and fair recruitment and selection.
CO4	Conclude the importance of recruitment & selection, manpower planning, preparation of job description & job analysis & soft skills required for job.
Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No:- Information Technology in Business Management II	
CO1	Infer the basic concepts, scope and application of data warehouse and data mining and big data.
CO2	Identify all components in an ERP system and the relationship among the components.
CO3	Assess various roles MIS have towards strategic goals and operational success of an organization.
CO4	Relate to the relationship between business information needs and decision making with respect to outsourcing
Course (Paper) Name and No:- Business Economics II	
CO1	Define the Keynesian concepts of National income, theory of income and employment.
CO2	Interpret the relationship between the supply of money and demand for money for the estimation of inflation.
CO3	Identify the role of fiscal and monetary policies in understanding the economy.
CO4	Analyze the impact of international trade on the domestic economy.

Course (Paper) Name and No:- Business Research Methods	
CO1	Define the concept and process of business research in a business environment.
CO2	Plan the use of tools and techniques for exploratory, conclusive and causal research.
CO3	Test the hypothesis using statistical techniques
CO4	Build the analytical abilities and research skills.
Course (Paper) Name and No:- Production & Total Quality Management	
CO1	Summarize basics of productivity and total quality management.
CO2	Identify various designing aspects of production systems in different Industries.
CO3	Interpret various certifications and strategies for quality improvement.
CO4	Examine Inventory control techniques and materials management System.
Course (Paper) Name and No:- Foundation Course IV	
CO1	Define the basic concepts of ethics and Business Ethics.
CO2	Analyze scope of ethics in Compliance, finance, financial market, Human resources, marketing, and production.
CO3	Evaluate the theory of corporate governance used by organizations in the day-to-day working.
CO4	Outline the development of Corporate Social Responsibility and the responsibilities of business corporations beyond profit maximization.
Course (Paper) Name and No:- Foundation Course in Physical Education IV	
CO1	Choose the ways and means to avoid stressful situations.
CO2	Build the mindset through the knowledge of rules and scheme of awards of sports.
CO3	Apply the yogic exercises to improve performance and concentration in their personal game and work.
CO4	How to apply good strategies for healthy life style.
Course (Paper) Name and No:- Corporate Restructuring	
CO1	Tell about formulation and implementation of corporate restructuring.
CO2	Develop understanding of causes, methods and types of restructuring
CO3	Build financial statements of internal & external reconstruction of an organisation.
CO4	Explain pre & post impact of reconstruction.

Course (Paper) Name and No:- Strategic Cost Management	
CO1	Classify main elements of cost.
CO2	Estimates the cost incurred for making the product and preparation of cost sheet.
CO3	Make use of tools and techniques to ascertain the cost.
CO4	Determines the value of input units and finished goods under process costing.
Course (Paper) Name and No:- Integrated Markeitng Communication	
CO1	Explain the basic principles of planning and execution in marketing communications.
CO2	Designing an effective advertising and develop sales promotion program.
CO3	Make use of managerial perspective and an informed decision-making ability for Effective and efficient tackling of promotional situations.
CO4	Interpret various range of tools available for marketing communication, and the various facets of advertising, public relation and promotion management.
Course (Paper) Name and No:- Rural Marketing	
CO1	Outline the efforts put by the government in rural development and the problems in rural market and the ways to overcome it.
CO2	Identify the nature of competition in rural markets and the use of marketing mix by manufacturers.
CO3	Analyse the various distribution and communication strategies used in rural markets.
CO4	Develop the rural aspects of marketing and consumer behaviour and the abilities to design effective strategies.
Course (Paper) Name and No:- Change Management	
CO1	Define Change and its features, importance, levels & types.
CO2	Identify the impact of Change & its implementation.
CO3	Explain the resistance to change also how to overcome it & the concept of Organizational development.
CO4	Discuss the effects of implementation of change.

Course (Paper) Name and No:- Training & Development in HRM	
CO1	Explain the process, importance of training & development & also can interpret advantages of training & development & will also understand how to undertake training needs analysis.
CO2	Evaluate the process of management development.
CO3	Describe the counseling techniques with reference to the development of employees, society & Organization.
CO4	Interpret the process of performance management, appraisals & ethics of appraisal.
Semester V	
After completing the course, Student will able to;	
Course (Paper) Name and No:- Logistics & Supply Chain Management	
CO1	Explain various technical concepts used in logistics and supply chain management.
CO2	How various warehousing management systems and transportation can be practiced in various industries?
CO3	To apply various techniques of inventory management and their practical situations.
CO4	Discover recent trends in logistics and supply chain management.
Course (Paper) Name and No:- Corporate Communication & Public Relations	
CO1	Learners gain a foundational knowledge of the key concepts in these fields
CO2	Learners will be able to identify and explain the different elements of corporate communication and analyze how they contribute to effective organizational management.
CO3	Learners develop a comprehensive understanding of corporate communication and public relations and their strategic role in organisations.
CO4	Students will be able to critically evaluate and assess the strengths and weaknesses of various corporate communication practices in different contexts.
Course (Paper) Name and No:- Investment Analysis & Portfolio Management	
CO1	Identify various short term and long term investment avenues.
CO2	Analyse different concepts of risk and return associated with various investment options.
CO3	Evaluate various investment portfolio using tools & techniques
CO4	Make use of tools and techniques to understand risk - return relationship

Course (Paper) Name and No:- Commodity & Derivatives Market	
CO1	Define the meaning of financial derivatives.
CO2	Distinguish between forward futures and options contracts
CO3	Interpret the concept of Derivatives and its types
CO4	Identify about Hedging and the development position of Derivatives in India
Course (Paper) Name and No:- Wealth Management	
CO1	Summarize various wealth management aspects through personnel investment planning, retirement planning, etc.
CO2	Assess investment opportunities by implementing wealth management strategies
CO3	Design, manage and evaluate alternative investment portfolios
CO4	Measure performance of portfolios by applying techniques
Course (Paper) Name and No:- Direct Taxes	
CO1	Demonstrate the knowledge of concepts, principles and terminologies of income tax law.
CO2	Interpret provisions of income tax laws.
CO3	Assess computation of taxable income and tax liability.
CO4	Develop the understanding of return filing.
Course (Paper) Name and No:- Services Marketing	
CO1	Define basic concept of service marketing and how does it differs from product marketing.
CO2	Analyse the impact of service recovery efforts on consumer loyalty and key elements of service marketing mix.
CO3	Identify quality aspects and importance of ethics in service marketing.
CO4	Interpret recent trends in marketing of services in various service sectors.

Course (Paper) Name and No:- E-Commerce & Digital Marketing	
CO1	Define E-Commerce, its significance, innovative uses of E-Commerce, trends in e-commerce in various sectors and M-Commerce & its trends.
CO2	Application of E-commerce in developing competitive advantage for business and Build a website.
CO3	Interpret the importance of security, privacy, ethical issues and avenues related to E-Commerce.
CO4	Perceive the building blocks that constitute digital marketing and the tools, techniques, knowledge to develop cohesive digital marketing strategies.
Course (Paper) Name and No:- Sales & Distribution Management	
CO1	Define knowledge about different components of sales and distribution management and what are the roles and responsibilities of a sales manager.
CO2	Interpret market analysis, sales forecasting approaches and selling concepts to focus on decision making aspects and implementation of decisions in sales and distribution management.
CO3	Design and Implement Distribution Channel Strategy.
CO4	Evaluate sales performance by using different performance evaluation techniques also perceive ethics and trends in sales and distribution management.
Course (Paper) Name and No:- Customer Relationship Management	
CO1	Explain CRM goals and identify milestones in relationship management.
CO2	Analyze the companies which focuses on relationships with customers by using techniques of marketing initiatives, customer service and data management.
CO3	List the shift from short term customer transactions to a long-term relationship model.
CO4	Formulate best CRM strategies and practices.
Course (Paper) Name and No:- Finance for HR Professionals & Compensation Management	
CO1	Describe the basic compensation concepts and the context of compensation practice.
CO2	Identify the internal and external environmental factors that have an impact on the pay structure of an organization
CO3	Illustrate different ways to strengthen the pay-for-performance link.
CO4	Design a pay structure or salary structure for employees working in the Company.

Course (Paper) Name and No:- Strategic Human Resource Management & HR Policies	
CO1	Explain Human Resource Management with a strategic perspective.
CO2	Summarize HRM function and relate with corporate strategy in order to understand HR as strategic resource.
CO3	Assess strategic human resource Management and it's correlation with organizational performance
CO4	Apply theories and concepts relevant to strategic human resource management and utilize it for contemporary organization.
Course (Paper) Name and No:- Performance Management & Career Planning	
CO1	Define the different facets of performance management of an enterprise.
CO2	Explain the features, components and evolution of performance management and its best practices.
CO3	Apply the performance management process like performance planning, benchmarking, managing and performance appraisal.
CO4	Determine the benefits and limitations of career planning and accordingly plan their career.
Course (Paper) Name and No:- Industrial Relations	
CO1	Explain the concept of industrial relation.
CO2	Evaluate the essential concept of industrial relation at organization level and assess industrial dispute and various methods to prevent it.
CO3	Analyze how trade union are helpful in effective communication between workers and management through collaborative bargaining
CO4	Define history & provision of various legislation related to industrial relation in India

Semester VI	
After completing the course, Student will able to;	
Course (Paper) Name and No:- Operation Research (UMS6OPR)	
CO1	Define and formulate linear programming problems and appreciate their limitations.
CO2	Interpret and solve complex problems by minimizing cost
CO3	Develop mathematical skills to analyze and solve networking models arising from a wide range of applications.
CO4	Identify parameters that will influence the optimal solution.
Course (Paper) Name and No:- Innovative Financial Services	
CO1	Explain traditional as well as modern financial services based on fee based and fund based services.
CO2	Select the various intermediaries between the industry and the investors and explain the process of securitization.
CO3	Classify the facility available in the financial market regarding leasing, hire purchase, housing finance etc.
CO4	Summarize the financial products available in the market related to consumer durable & plastic money.
Course (Paper) Name and No:- Project Management	
CO1	Apply project management practices to the launch of new programs, products and services.
CO2	Provide outline of planning and controlling activities to effectively produce and deliver goods and services.
CO3	Analyze appropriate business strategies and practices.
CO4	Evaluate knowledge about capital budgeting, capital structure and asset valuation.
Course (Paper) Name and No:- Strategic Financial Management	
CO1	Illustrate basic concepts of financial management with regards to dividend policy and advanced capital budgeting.
CO2	Examine theories and techniques to make better decisions.
CO3	Demonstrate the knowledge and skills in relation to investment, financing and dividend policy decisions.
CO4	Discuss corporate governance and financial management in banking sector.

Course (Paper) Name and No:- Indirect Taxes	
CO1	Demonstrate the basic knowledge of definitions and concepts GST law.
CO2	Examine implication of provision GST law.
CO3	Summarize the procedures involved from registration till return filing.
CO4	Assess computation of tax liability.
Course (Paper) Name and No:- Brand Management	
CO1	Define meaning and significance of brand management, and how to build, sustain and grow brands.
CO2	Choose and implement various brand management programmes.
CO3	Assess various sources of brand equity.
CO4	Design Brand by using various Brand Elements.
Course (Paper) Name and No:- Retail Management	
CO1	Interpret Organised Retail Sector and comprehend the ways retailers use technology to support the retail business.
CO2	Make use of various retail strategies related to the retail sector to achieve competitive advantage.
CO3	Appraise Merchandise Management and decide on the pricing of the products to attract the customers.
CO4	Develop a retail outlet.
Course (Paper) Name and No:- International Marketing	
CO1	Outline strategies for entering into the international market.
CO2	Analyze environmental variables that influence international marketing and conduct research to enter a new international market.
CO3	Make use of strategies and tactics that can lead to successful international marketing.
CO4	Formulate a comprehensive International Marketing Plan.
Course (Paper) Name and No:- Media Planning & Management	
CO1	Explain different features, impact and role of media in marketing.
CO2	Identify different budgeting techniques used, buying processes and tactics, and scheduling of media.
CO3	Gather knowledge of underlying criteria for evaluating the advantages and failure in data sources, media research, and media mix and media strategies.
CO4	Develop a sense of judgment when evaluating media with the help of different media measurement metrics and media buys.

Course (Paper) Name and No:- HRM in Global Perspective	
CO1	Explain the key term, theories and demonstrate it in field of IHRM.
CO2	Define the basic concepts of Expatriates and Repatriates and relate it with challenges faced by Expatriates and Repatriates.
CO3	Analyse the global cross culture and workforce management and relate it with reference to Human Resource Management.
CO4	Evaluate HRM trend and assess its Challenges.
Course (Paper) Name and No:- Organisational Development	
CO1	Interprete the basics of Organizational Development & role of OD practitioner.
CO2	Evaluate the implementation of OD interventions and judge their usefulness against other change tools and techniques.
CO3	Formulate an approach for organization development in response to appropriate organizational diagnosis, business imperatives and internal and external contextual forces.
CO4	Describe the data and explains the effectiveness of OD interventions.
Course (Paper) Name and No:- HRM in Service Sector Management	
CO1	Define the concept and growing importance of HRM in the service sector.
CO2	Illustrate the ways of managing human resources in the service sector.
CO3	Adapt to the trending issues and challenges of HR in various service sectors.
CO4	Analyse the significance of the human element in creating customer satisfaction through service quality.
Course (Paper) Name and No:- Indian Ethos in Management	
CO1	Adapt values and practice of IE in management.
CO2	Demonstrate correlation between traditional and modern management system.
CO3	Analyze the stress management techniques and discover its wide spectrum.
CO4	Explain concept and importance of learning and relate to system of India.

Faculty of Science

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Chemistry

B.Sc. (Chemistry)

POs		
Sr. No.	**Outcome for B.Sc. Program After completion of B.Sc. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

PSOs	
PSO1	The students will have sound understanding of fundamental and application-based principles and theories in Physical, Inorganic, Organic and Analytical Chemistry
PSO2	Students will learn various techniques to perform scientific experiments as well as accurately record and analyse the results of such experiments
PSO3	Student will learn the usage of analytical instruments, select, and apply appropriate techniques and resources for the analysis
PSO4	Extensive laboratory and classroom work will skill the students with in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
PSO5	Students will be acquainted with new areas in both chemistry and allied fields of science and technology
PSO6	Students will understand the applications and impact of the chemistry in societal, and environmental contexts, and demonstrate its knowledge and need for sustainable development
PSO7	Students will learn to apply ethical practices such as limited and safe use of hazardous chemicals, responsibility toward environmental and health safety
PSO8	solving, critical thinking and analytical reasoning as applied to scientific problems
PSO9	Students will be able to work in team and thus get prepared as a perfect professional chemist with respect to knowledge, responsibility and teamwork

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- General Chemistry – I	
CO1	Recall thermodynamics terms, the first law of thermodynamics and terms like normality, molarity.
CO2	Solve the Numerical problems based on the Concentration of solutions.
CO3	Classify the elements according to electronic configuration and explain details of periodic trends and atomic structure.
CO 4	Explain the name, bonding, structure and bond fission of organic compounds.
Course (Paper) Name and No.- General Chemistry – II	
CO 1	Explain enantiomer, optical activity, diastereomers, projection formulas, isomerism.
CO 2	Outline the metallic and non-metallic nature, oxidation states, electronegativity, Anomalous behaviour and allotropy of main group elements.
CO 3	Explain the reactivity of group 1 and group 2 elements and the effects of Oxides of carbon, sulphur and nitrogen on the environment.
CO 4	Define surface tension, Viscosity, Refractive index of Liquid, order of reaction.
Course (Paper) Name and No.- Chemistry Practical	
CO 1	Find exact concentrations of the solutions and enthalpy of dissolution.
CO 2	Apply chemical kinetics law to calculate the rate constant of the reaction.
CO 3	Find the normality of the acids and bases and purity of the samples gravimetrically.
CO 4	Apply Thin Layer Chromatography (TLC), Distillation, Recrystallization, sublimation methods for separation of mixtures.
Course (Paper) Name and No- Chemistry in Ancient India (IKS)	
CO 1	Explain the ancient Indian Science and Technology.
CO 2	Apply the knowledge of Rasayan Shastra used during ancient period and Charaka Samhita.
CO 3	Tell the history of Metals and Metallurgy in Ancient India**.**
CO 4	Explain the knowledge of extraction and smelting of metals in ancient India.
Course (Paper) Name and No-- Chemistry in Everyday Life-I (Open elective)	
CO1	Student understand the role of chemistry in everyday life.
CO2	Analyse the connection between chemistry and nutrition and life.
CO3	Describe the impact of chemistry in areas of human activity.
CO 4	Find the various chemicals used in the daily human life.

Course (Paper) Name and No-- Techniques in Environmental Analysis-I (SEC)	
CO1	Categorise the various parameters for determining the water quality such as alkalinity, hardness, total dissolved solids etc.
CO2	Apply knowledge of basic water chemistry to solve problems associated with water/ waste-water treatment and water quality.
CO3	Understand various water treatment processes.
CO4	Apply the basic practical knowledge for sample of water analyses.
Course (Paper) Name and No -- Practical's in Techniques in Environmental Analysis-I (SEC)	
CO1	Find the p^H, Acidity, Alkalinity of the given water samples.
CO2	Analyse the solid pollutant present in the water samples.
CO3	Determine the total hardness and purity of the given water samples.
Course (Paper) Name and No-- Good Laboratory Practices-I (VSC)	
CO1	Apply practical skills in science courses with the understanding of laboratory practices
CO2	Understand the different aspects and laboratory techniques in Chemistry
CO3	Make use of safety measures while working in the laboratory.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No-- General Chemistry – III	
CO 1	Explain deviations from ideal gas laws, Joule-Thomson effect and nanotechnology with the experimental setup.
CO 2	Define the equilibrium constant, Le-Chatelier Principle and the second law of thermodynamics.
CO 3	Discuss basic terms of co-ordination chemistry, qualitative analysis and acid-base theories.
CO 4	Identify the products of reactions of alkanes, alkenes and alkynes.
Course (Paper) Name and No-- General Chemistry – IV	
CO 1	Identify the shapes of molecules with and without lone pair of electrons and the oxidation number of elements to balance the redox equations.
CO 2	Explain Law of crystallography, Different types of interaction of electromagnetic radiation with matter, Degree of ionization and Henderson equation for acidic and basic buffers.
CO 3	Classify between aromatic, anti-aromatic, and non-aromatic compounds
CO 4	Write the mechanism of the Electrophilic aromatic substitution reaction.

Course (Paper) Name and No-- Chemistry Practical	
CO 1	Apply chemical kinetics law to calculate the rate constant of reaction.
CO 2	Make use of colorimeter and pH meter.
CO 3	Identify organic compound containing C,H (O) N, S, X elements.
CO 4	Identify cations and anions from the given mixture of compounds and percentage of metal present in the sample by titration.
Course (Paper) Name and No-- Chemistry in Everyday Life-II (Open elective)	
CO1	Know the various compounds used in the everyday life.
CO2	Analyse the role of chemistry in the different compounds utilised in the daily life.
CO3	Understand the importance of chemistry in the everyday life.
Course (Paper) Name and No-- Techniques in Environmental Analysis-II (SEC)	
CO1	Understanding the sources and causes of soil pollution.
CO2	Study the soil pollution to understand the various health impacts.
CO3	List the various control measure of soil pollution.
CO4	Determine the quality of soil of the surrounding.
Course (Paper) Name and No-- Practical's in Techniques in Environmental Analysis-II	
CO1	Identify the quality of soil of the surroundings.
CO2	Develop the environmental control plan for environment pollution problem.
CO3	Classify the various samples of soil according to their purity.
CO4	Discover the various components of soil.
Course (Paper) Name and No-- Fundamentals of Chemistry (Minor)	
CO1	Explain study chemical equilibrium.
CO2	Explain the basics of acids and bases.
CO3	Understand the fundamentals of chemistry
Course (Paper) Name and No-- Practical's in Minor Chemistry-I (Minor)	
CO1	Prepare solutions of different Molarity/Normality.
CO2	Determine quality of substance.
CO3	Perform the estimation of fruit juices, shampoos, etc.
CO4	Separate the mixtures by Chromatography.

Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Paper-I	
CO1	Illustrate the equation of Gibbs free energy, Chemical potential, Transport number and degree of Ionization.
CO2	Explain different types of ionic crystals and hybridizations.
CO3	Construct the molecular orbital diagram of homonuclear diatomic molecules.
CO4	Compare the different properties, reactions and reactivity of alkyl/aryl/halides/organometallic compounds/alcohol, Phenol and epoxide
Course (Paper) Name and No.- Paper-II	
CO1	Explain complex chemical reactions, Collision and activated complex theory, effect of temperature on Arrhenius equation, thermodynamics of ideal solutions.
CO2	Summarize the chemistry of Boron, Silicon and Germanium compounds.
CO3	Recall the facts and basic concepts like distillation of solution, Haber process and role of active methylene compounds.
CO4	Construct the names and methods of preparation of carbonyl group compounds.
Course (Paper) Name and No.- Paper-III (Analytical Chemistry)	
CO1	Classify analytical methods and errors in analysis.
CO2	Outline the methods of calibration of tools used and preparations for titrimetric analysis.
CO3	Explain the principles of titrimetric analysis and UV-Visible spectroscopy.
CO4	Apply statistical methods to treat the analytical data.
Course (Paper) Name and No.- Practical	
CO1	Determination of various constants such as solubility products, dissociation constant, rate constant based on physical principles.
CO2	Identify the ions in inorganic salts.
CO3	Demonstrate the effectiveness of crystallization as a separation technique.
CO4	Infer the obtained results effectively presentation

Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Paper-I	
CO1	Explain thermodynamics properties, equilibrium constant and different types of electrodes.
CO2	Illustrate Gibb's Phase rule, Phase diagram of one and two component system with examples.
CO3	List the properties of transition metal compounds and different types of isomers in coordination compounds.
CO4	Compare properties, acidity, preparations, reactions, nucleophilicity of acyl substituents of carboxylic acid and stereochemistry.
Course (Paper) Name and No.- Paper-II	
CO1	Explain law of crystallography, types of crystal, Interplanar distance in lattice, types of catalysis, Mechanisms and Kinetics of catalyst.
CO2	Explain the concept of hydration of cations and anions with respect to effect of charge and radius.
CO3	Identify the hazardous effect of air pollutant like sulphuric acid, nitric acid and phosphoric acid.
CO4	Outline the synthesis, reaction of amines and heterocyclic compounds like Furan, Pyrrole, Thiophene.
Course (Paper) Name and No.- Paper-III (Analytical Chemistry)	
CO1	Classify various separation methods based on their principles.
CO2	Discuss the principles, construction and working of instrumental techniques based on the electrochemical properties of the analytes.
CO3	Describe chemical methods of analysis and their suitable parameters.
CO4	Apply the analytical methods to determine the physico chemical of environmental analysis.
Course (Paper) Name and No.-Practical	
CO1	Find emf, amount of acid, acid strength potentiometrically.
CO2	Compare the strength of HCl and H_2SO_4 by kinetically.
CO3	Calculate the amount from given sample by conductometrically and gravimetrically.
CO4	Analyze qualitatively bifunctional organic compounds.

Semester V	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Physical Chemistry I	
CO1	Memorize concept of dipole moment, polar and non- polar molecules, examples of colligative properties, basic terms of radioactivity and Surface tension.
CO2	Differentiate Rotational Spectroscopy and Vibrational Spectroscopy Raman Spectroscopy, Freundlich Adsorption Isotherm and Langmuir Adsorption Isotherm.
CO3	Explain first and second law of photochemistry Raoult's law, Clapeyron equation, van't Hoff Factor.
CO4	Apply spectroscopic data for solving different numerical, lattice space information for determination structure of unit cell and Carbon Dating method.
Course (Paper) Name and No.- Inorganic Chemistry, Paper- II	
CO1	Explain concept of Superconductivity, types of super conductors and its applications, imperfections in solids and their effect on properties, chemistry of inner transition elements, extraction and applications, chemistry of non-aqueous solvents.
CO2	Explain electrical properties of conductors, insulators and semiconductors on the basis of Band theory. Explain Inorganic Polymers, Chemistry of interhalogens and Pseudo halogens.
CO3	Assign the point group for given molecules using basic concepts of molecular symmetry and construct molecular orbital diagrams for heteronuclear diatomic molecules and polyatomic species.
CO4	Determine packing density of different types of cubic unit cells.
Course (Paper) Name and No.- Practical I (Physical and Inorganic Chemistry)	
CO1	Handle and Understand principles of different instruments like Potentiometry, Conductometry, pH Metry.
CO2	Determine molecular weight of substance by using Rast Method.
CO3	With the help of Fractional change method find out order of reaction.
CO4	Develop the practical skills for preparation of different inorganic metal complexes.

Course (Paper) Name and No.- Organic Chemistry, Paper-III	
CO1	Explain the fate of the excited molecule in photochemistry and systematic study of photochemical reactions.
CO2	Apply the concepts in writing and predicting the mechanism of organic reactions.
CO3	Examine the spectral data of UV-Visible, IR, NMR and Mass spectroscopy for structure elucidation of organic compounds.
CO4	Construct the structures of carbohydrates and its inter-conversion, describe the structures of proteins, nucleic acids and its components.
Course (Paper) Name and No.- Analytical Chemistry Paper IV	
CO1	Define, and explain the concepts of quality control, quality assurance, grades of chemicals, concentrations and importance of sampling at a basic level.
CO2	Explain the theoretical principals of titrations and apply them for end point detection and selection of suitable indicators.
CO3	Apply the Nernst law to the solvent extraction and describe the principles and processes of solvent extraction and solid phase extraction.
CO4	Describe the role of analytical instruments in science and allied fields and explain the principles, instrumentation, working of Spectroscopic techniques.
Course (Paper) Name and No.- Organic and Analytical Chemistry Practical II	
CO 1	Demonstrate the skills in quantitative analysis of the real samples such as cosmetics, environmental samples, fertilizers etc., apply appropriate methods to obtain experimental data and interpret it.
CO2	Use instrumental techniques for the estimation of various samples, and practice calibration of instruments and preparation of standards and references.
CO3	Identify chemical type of components present in binary mixture of solid-solid mixture and unknown organic compound by micro-scale technique.
CO4	Apply skills in the separation and qualitative analysis of organic compounds of solid-solid mixtures by microscale technique.

Course (Paper) Name and N: Drugs and Dyes Paper-V	
CO1	Define the routes of administration, methods of ingestion, tolerance, withdrawal and interactions of these drugs with other psychoactive and non-psychoactive drugs.
CO2	Explain details about the pharmacodynamics agents used for the treatment of different diseases side effects and synthesis.
CO3	Classify the dyes based on applications and dyeing methods.
CO4	Make use of Unit processes required for the synthesis of dyes intermediates.
Course (Paper) Name and No: Drugs and Dyes Paper-V	
CO1	Synthesis of simple drugs i.e aspirin.
CO2	Estimation of Ibuprofen.
CO3	Determination of iron from given drug sample.
CO4	Project on cotton dyeing.
Course (Paper) Name and No.- Physical Chemistry I	
CO1	Recall the concept Ionic Strength, activity and activity Coefficient, examples of different polymers, and concept of nanomaterial and nanotechnology.
CO2	Differentiate between Concentration cell and chemical cell natural and artificial polymers.
CO3	Understand cell representation rules to representation of cells phase rule to determine degree of freedom.
CO4	Apply co-precipitation method for synthesis of new nanomaterials in laboratory.
Course (Paper) Name and No.- Inorganic Chemistry, Paper- II	
CO1	Demonstrate the knowledge of organometallic chemistry, and metallurgy.
CO2	Explain importance of nanomaterials, Chemical methods of synthesis of nanomaterials and forms of nanomaterials.
CO3	Construct molecular orbital diagram of different coordination compounds, Analyse the electronic spectra of complexes.
CO4	Measure Crystal field stabilization energy (CFSE) for octahedral complexes using basic concepts of Crystal Field Theory.

Course (Paper) Name and No.- Practical I (Physical and Inorganic Chemistry)	
CO1	Handle and Understand principles of different instruments like Colorimetry, Potentiometry, Conductometry.
CO2	Determine molecular weight of any high polymer polyvinyl alcohols by viscosity measurement.
CO3	Interpret the order of reaction graphically from given experimental data and to calculate the specific rate constant.
CO4	Develop the practical skills for preparation of different inorganic metal complexes.
CO5	Examine the percentage purity of the inorganic compounds qualitatively and quantitively and impurity identification.
Course (Paper) Name and No.- Organic Chemistry, Paper-III	
CO1	Explain stereoselectivity, stereospecificity, mechanism and stereochemistry of substitution, elimination and addition and rearrangement reactions.
CO2	Predict the synthons and functional group transformation and classify the selectivity of reagents and catalyst in organic synthesis.
CO3	Describe the structures of proteins, nucleic acids and its components.
CO4	Interpret the analytical and chemical evidences for structure elucidation of natural products.
Course (Paper) Name and No.- Analytical Chemistry Paper IV	
CO1	Explain the fundamentals and working of electroanalytical techniques such as polarography and amperometry.
CO2	Discuss the basics of chromatography, contrast and describe underlying principle, instrumentation and working of advanced separation methods such as GC, HPLC and HPTLC.
CO3	Explain principles of thermal and radioanalytical methods and study of thermal decomposition of materials.
CO4	Apply analytical techniques for the analysis of cosmetics and food and describe food preservation and processing techniques.

Course (Paper) Name and No.- Organic and Analytical Chemistry Practical II	
CO1	Demonstrate the analytical skills required for detection, identification, separation and analysis of food samples, environmental samples, pharmaceuticals etc.
CO2	Conduct, analyze and interpret results of a chemical analysis and communicate effectively in written reports and other formats
CO3	Demonstrate the separation of the liquid-liquid and solid-liquid mixtures by fractional distillation.
CO4	Plan organic synthesis with calculations, stoichiometry, aspects of synthesis and predictions of spectral data in IR and NMR of the reactant and product.
Course (Paper) Name and N: Drugs and Dyes Paper-V	
CO1	Explain details about the chemotherapeutic agents used for the treatment of different diseases side effects and synthesis.
CO2	Explain drug discovery design and development and drug metabolism and application of nanoparticles in medicinal chemistry.
CO3	Classify the dyes based on Chemical Constitution and preparations.
CO4	Explain the non-textile uses, Health and Environmental Hazards of the dyes.
Course (Paper) Name and No: Drugs and Dyes Practical, Paper-V	
CO1	Synthesize, Crystallization Physical constant, able to understand process of purification.
CO2	Determination of Calcium from given Calcium tablet.
CO3	Examine monograph.
CO4	Apply the TLC technique for the separation of the mixture of dyes.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Chemistry

M.Sc. (Organic Chemistry)

POs		
Sr. No.	Outcome for M.Sc. Program After completion of M.Sc. program students will acquire	Graduate Attribute
PO1	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge
PO2	An ability to demonstrate proficiency in various instrumentation, modern tools, and advanced techniques to meet industrial expectations and research outputs.	Disciplinary knowledge
PO3	Ability to identify problems, formulate, and prove hypotheses by applying theoretical knowledge and skills relevant to the discipline.	Problem-solving
PO4	The ability to articulate thoughts, research ideas, information, scientific outcomes in oral and in written presentation to range of audience.	Communication skills
PO5	A capacity for independent, conceptual, and creative thinking, and critical analysis through the existing methods of enquiry.	Critical thinking
PO6	Acquisition of skills required for cutting edge research, investigations, field study, documentation, networking, and ability to build logical arguments using scholarly evidence.	Research skills
PO7	An ability to portray good interpersonal skills with the ability to work collaboratively as part of a team undertaking a range of different team roles	Teamwork
PO8	The ability to understand ethical responsibilities and impact of scientific solutions in global, societal, and environmental context and contribute to sustainable development	Moral and ethical awareness/ multicultural competence
PO9	An openness to and interest in life-long learning through directed and self-directed study	self-directed learning
PO10	The ability to translate the knowledge and demonstrate the skills required to be employed and successful professional development.	Life-long learning
PO11	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge

PSOs	
PSO1	Develop analytical thinking and apply the same for understanding principles, proposing mechanism and logical conclusions.
PSO2	Comprehensive understanding of the interdisciplinary nature of Chemistry and emerging trends in Chemistry.
PSO3	Enormous employment opportunities at Research and Development as well as synthetic division of chemical, pharmaceutical, dyestuff and food industries.
PSO4	Competency in design and planning of synthesis and carry out with Good Laboratory Practices.
PSO5	Access, search and use of chemical literature and acquiring necessary skills to succeed in research and advance studies.
PSO6	Research opportunities to pursue Ph.D. programme.
PSO7	Competency in handling instruments and interpretation of spectral data for structure determination of organic compounds

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Organic Chemistry paper-III	
CO1	Understand the types of reaction and their applications.
CO2	Summarize the various aspects of aromaticity, aliphatic and aromatic nucleophilic substitution reactions with their mechanism and examples.
CO3	Apply the concept of Configurational descriptors (R,S nomenclature) to chiral centres in Organic compounds.
CO4	Predict the mechanism, selectivity, importance and applications of oxidizing and reducing agent.
Course (Paper) Name and No.- Organic Chemistry Practical	
CO1	Plan preparation of organic compounds
CO2	Demonstrate the skill of purification of organic compounds by recrystallization and sublimation methods.
CO3	Apply the thin layer chromatography technique to check the purity of the synthesized product.
CO4	Can Sketch the structure of organic compounds using software Chem Biodraw.
Course (Paper) Name and No.- Analytical Chemistry	
CO1	Explain the concept of data domain, performance characteristics of an instrument/method, total quality management, quality standards for laboratories, quality audits and quality reviews.
CO2	Discover the applications of UV-Visible spectroscopy, IR spectroscopy, and Differential scanning calorimetry.
CO3	Identify the need of automation in chemical analysis, safety measures in laboratory, need of accreditation of laboratories and GLP.
CO4	Interpret the data based on calculations and statistical tests.
Course (Paper) Name and No.- Analytical Chemistry Practical	
CO1	Demonstrate the titration skills for the analysis of samples of a diverse variety.
CO2	Apply the statistical methods for data analysis.
CO3	Analyse the measured data based on Chemical principles.
CO4	Measure the characteristics of ion exchange resins.

Course (Paper) Name and No.- Inorganic Chemistry, Paper-1	
CO1	Explain theories of bonding, hybridization, resonance concept, MOT for diatomic species of first transition Series, Polyatomic species and Higher boranes, carboranes, metalloboranes and metallocarboranes, metal carbonyls and halide clusters.
CO2	Explain The concept of band theory, Fermi level, K-Space and Brillouin Zones. Structures of Compounds of the type: AB, AB2 etc. and Preparative methods of inorganic solids & nano materials.
CO3	Construct Group Multiplication Tables, Character tables using concept of Molecular Symmetry and Group Theory.
CO4	Determine electronic parameters such as Δ, B, C, Nephelauxetic ratio, formation constants of metal complexes and Characterize coordination compounds using techniques like thermal studies, Conductivity measurements, electronic spectral and magnetic measurements, IR, NMR and ESR spectroscopic
Course (Paper) Name and No.- Inorganic Chemistry Practical	
CO1	Prepare various inorganic complexes such as Bis-(tetramethylammonium) tetrachloroCuprate (II) (Me4 N) 2[CuCl4],Tetramminemonocarbanato Cobalt (III) Nitrate, Bis (ethylenediammine) Copper (II) Sulphate, Hydroniumdichlorobis(dimethylglyoximato), etc.
CO2	Determine the electrolytic nature of inorganic compounds.
CO3	Apply Slope intercept method for determination of equilibrium constants forFe^{+3}/ SCN- system.
CO4	Analyze the inorganic complex for percentage of metal and ligand.
Course (Paper) Name and No.- Physical Chemistry (Electives-I)	
CO1	Prove Maxwell relations and its significance and applications to ideal gases, Joule Thomson experiment, Joule Thomson coefficient and inversion temperature. Apply Third law of Thermodynamics to find out absolute entropy.
CO2	Make use of quantum mechanics for Particle waves and Schrödinger wave equation, wave functions, properties of wave functions, Normalization of wave functions, orthogonality of wave functions. Particle in a one, two- and three-dimensional box.

Course (Paper) Name and No.- Physical Chemistry (Electives-II)	
CO1	Define, understand basic terms of Chemical Dynamics i.e. rate constant, order of reaction, molecularity of reaction also compare Composite Reactions and Polymerization reactions.
CO2	Make use of Colloids and Surface Phenomena in daily applications.
Course (Paper) Name and No.- Physical Chemistry Practical	
CO1	Know the principles of different instruments like Potentiometry, Conductometry, pH Metry.
CO2	Determine the heat of solution of sparingly soluble acid and identify the reaction between acetone and iodine.
Course (Paper) Name and No.- Research Methodology	
CO1	Explain the importance of different types of print and digital resources for gap analysis and data collection.
CO2	Design/propose methodologies preferably with green and safe approach to conduct research.
CO3	Anayze scientific data by statistical and graphical methods.
CO4	Apply skills of chemical safety & ethical handling of chemicals.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Organic Chemistry paper	
CO1	Explain the Generation of carbanion, enolate, enamine with their alkylation & acylation reaction and name reactions with their mechanism.
CO2	Illustrate mechanism, stereochemistry, applications and importance of name reactions and rearrangements.
CO3	Explain the role of reagents in organic synthesis.
CO4	Interpret the structure of organic compounds using combined of spectral techniques.

Course (Paper) Name and No.- Organic Chemistry Practical	
CO1	Identify the chemical type of components present in a binary mixture of an organic compound.
CO2	Apply skills in the separation and qualitative analysis of organic compounds of binary mixtures by microscale technique.
CO3	Make use of crystallization, sublimation and distillation for purification of the organic compounds.
CO4	Demonstrate the practical aspects in the preparation of the organic compounds derivatives.
Course (Paper) Name and No.- Analytical Chemistry	
CO1	Translate the theoretical principles of advanced separation techniques, spectroscopic techniques, radioanalytical techniques, electroanalytical techniques into applications.
CO2	Explain the working principles of surface analytical techniques such as SEM, STM, TEM, ESCA, Auger spectroscopy and ICP-AES.
CO3	Compare the different ion sources and mass analyzers in mass spectroscopy.
CO4	Determine the electrical quantities such as charge, current, potential using Electroanalytical methods.
Course (Paper) Name and No.- Analytical Chemistry Practical	
CO1	Demonstrate the operational skills on the selected instruments and retrieve information.
CO2	Develop a sense of time management, safe use of chemicals and environmental safety.
Course (Paper) Name and No.- Inorganic Chemistry	
CO1	Recall Organometallic Chemistry of Transition metals, Eighteen and sixteen electron rules, Preparation and property's structure and bonding of the Organometallic compounds.
CO2	Explain Photochemical Reactions, Ligand substitution reactions of: Octahedral complexes, Square planar complexes, trans-effect, its theories and applications. Redox reactions: inner and outer sphere mechanisms, stereochemistry of substitution reactions of octahedral complexes.
CO3	Explain Bioinorganic Chemistry related to biological oxygen carriers; hemoglobin, hemerythrene and hemocyanine- structure of metal active center and differences in mechanism of oxygen binding, Copper containing enzymes, Nitrogen fixation Metal ion transport and storage, Medicinal applications of cis-platin and related compounds.
CO4	Discuss the implication of toxic metallic species radioactive materials on environment and biological system using case studies.

Course (Paper) Name and No.- Inorganic Chemistry Practical	
CO1	Analyse ores and alloys using volumetric and gravimetric analysis.
CO2	Estimate percentage of metals in the ore and alloy.
CO3	Apply the potentiometric method for redox titrations of Fe, Cu etc.
Course (Paper) Name and No.- Physical Chemistry (Electives-I)	
CO1	Explain Bioenergetics, Real solutions and Fugacity of real gases also show graphical representations of BET isotherms.
CO2	Prove expressions for the total wave function for 1s,2s, 2p and 3d orbitals of hydrogen and aapplication of the Schrödinger equation to two electron system.
Course (Paper) Name and No.- Physical Chemistry (Electives-II)	
CO1	Explain terms involved in Chemical Kinetics and Molecular Reaction Dynamics. Elementary Reactions in Solution, Kinetics of reactions catalysed by enzymes - Michaelis-Menten analysis, Lineweaver-Burk and Eadie Analyses, Inhibition of Enzyme action.
CO2	Apply Photochemistry to solve NET, SET GATE Problems.
Course (Paper) Name and No.- Physical Chemistry Practical	
CO1	Know principles of different instruments like Potentiometry, Conductometry, pH Metry and colorimeter.
CO2	Make use of graphical representation to identify Shape of Orbitals.
Course (Paper) Name and No.- On Job Training	
CO1	Practical Skill Development: Trainees will acquire hands-on experience and proficiency in relevant industry tools, techniques, and processes, effectively applying theoretical knowledge to real-world tasks.
CO2	Problem-Solving Abilities: Trainees will develop critical thinking and problem-solving skills by addressing practical challenges and troubleshooting issues encountered in the work environment.
CO3	Professional Competency: Trainees will demonstrate enhanced job readiness and professional competency, including adherence to industry standards, effective communication, and teamwork
CO4	Industry Knowledge: Trainees will gain a deeper understanding of industry practices, workflows, and organizational culture, improving their ability to navigate and contribute effectively within their field.
CO5	Performance Improvement: Trainees will improve their performance and productivity by integrating feedback and learning from experienced professionals, leading to better job performance and career growth.

Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Theoretical Organic Chemistry-I, Paper I	
CO1	Explain the structure, generation, stability and reactions of organic reactive intermediates and importance of neighbouring group participation, role of FMOs.
CO2	Apply the principles of photochemistry to carbonyl compounds, olefins, arenes and radical reactions.
CO3	Identify pericyclic reactions and describe cycloaddition reactions, electrocylic reactions and sigmatropic rearrangements.
CO4	Analyze conformation of medium size ring, fused ring, bridge ring, steroids and reactivity of addition, elimination, rearrangement and reduction with stereoselective and stereospecific reactions.
Course (Paper) Name and No.- Synthetic Organic Chemistry –I, Paper II	
CO1	Summarize generation, stability, structure, stereochemical aspects of free radicals, its characteristic reactions and use in organic synthesis.
CO2	Explain preparation of organometallic compound, its applications, mechanism and regiochemistry of reactions involving metals/non-metalsin organic synthesis.
CO3	Compare between enamines and enolates, methods of preparation, applications with stereochemical aspects in synthetic reactions
CO4	Predict the products of name reactions, domino reactions, click reactions, multicomponent reactions and describe the mechanisms showing how the products are formed
Course (Paper) Name and No.- Natural products Heterocyclic chemistry and Spectroscopy-I, Paper III	
CO1	Explain the occurrence, structural features, and biological importance and multistep synthesis of natural products.
CO2	Draw conclusion based on evidence for structure elucidation and synthesis of natural products.
CO3	Construct the names of heterocyclic compounds by IUPAC nomenclature and explain synthesis and reactivity of heterocyclic compounds.
CO4	Interpret the data for the structure elucidation of organic compounds based on UV, IR, ^{1}H-NMR and ^{13}C-NMR.

Course (Paper) Name and No.- Medicinal, Biogenesis and Green Chemistry, Paper IV	
CO1	Demonstrate the knowledge of the twelve principles of green chemistry which they can practice to a range of workplace for a safer less toxic and healthier environment.
CO2	Explain the basic terms used in medicinal chemistry, the pharmacokinetics of drug, drug structure activity relationship, physical chemical parameters of drugs and procedures in drug design.
CO3	Apply skills required for drug design, development of modern methods of synthesis required for employment in the pharmaceutical industries.
CO4	Build the Biogenesis and biosynthesis of natural products by acetate pathway, shikimate pathway and mevalonate it pathway.
Course (Paper) Name and No.- Bioorganic Chemistry, Paper IV	
CO1	Summarize amino acids, peptides, proteins and nucleic acids and chemical synthesis of oligonucleotides.
CO2	Explain importance of enzymatic reactions and factors affecting enzyme kinetics.
CO3	Relate the importance of enzymes in the synthesis of organic compound.
CO4	Explain biological importance and metabolism of carbohydrates and lipids.
Course (Paper) Name and No.-Ternary Mixture (Practical)	
CO1	Identify the chemical type of components present the in ternary mixture of organic compounds.
CO2	Apply skills in detection, identification and separation of organiccompounds of ternary mixtures by microscale technique.
Course (Paper) Name and No.- Identification of organic compounds (Practical)	
CO1	Identify the chemical type of components present the in ternary mixture of organic compounds.
CO2	Demonstrate the practical aspects in the preparation of the organic compounds and their derivatives
Course (Paper) Name and No.- Single step preparation (Practical)	
CO1	Demonstrate the skills in organic preparations required for pursuing a career in the pharmaceutical, chemical industry, research etc.
CO2	Make use of column chromatography, crystallization steam and vacuum distillation for purification of the organic compounds.
CO3	Identify the prepared organic compounds by Thin Layer Chromatography.

Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Theoretical Organic Chemistry-II, Paper I	
CO1	Explain the principles of molecular association and organization, host- guest interaction, structure and properties of crown ether, cryptands, cyclophanes, rotaxanes, cyclodextrines, molecular self-assembly and Supramolecular polymers.
CO2	Explain principles, methods of asymmetric synthesis and use of chiral auxiliaries in asymmetric synthesis.
CO3	Apply the linear free energy relationship for determination of organic reaction mechanism using Hammett equation and Taft equation.
CO4	Determine the enantiomer and diastereomer composition by different methods, asymmetric transformation, molecular dissymmetry and chiroptical properties and explain the ORD and CD curves, Cotton effects,octane rule and its applications.
Course (Paper) Name and No.- Synthetic Organic Chemistry –II, Paper II	
CO1	Explain the concepts of retrosynthesis, protecting groups, synthetic planning and selective transformations in organic synthesis.
CO2	Apply disconnection approach, FGI, FGA, FGR and recognize starting compounds in designing organic synthesis of target molecules.
CO3	Summarize electro-organic chemistry and use of organocatalyst, Lewis acid, crown ethers, cryptands, micelles etc. in selected methods of organic synthesis.
CO4	Predict the products of organic synthesis in which transition and rare earth metals are used.
Course (Paper) Name and No.- Natural products Heterocyclic chemistry and Spectroscopy-II, Paper III	
CO1	Explain occurrence, classification, structural and stereochemical featuresof steroids, insect pheromones, insecticides, vitamins and their biological role in life related processes.
CO2	Plan the synthesis of biologically important steroids, vitamins, antibiotics, insecticides.
CO3	Apply fundamentals of heterocyclic reactivity and synthesis skills required for heterocyclic compounds in research and industry and explain the names of heterocyclic compounds by IUPAC nomenclature and replacement nomenclature.
CO4	Interpret the data for the structure elucidation of organic compounds based on UV, IR, ^{1}H-NMR, ^{13}C-NMR two dimensional spectroscopic techniques, COSY and HETCOR spectra, NOE and NOESY, INEPT, APT and INADEQUATE techniques.

Course (Paper) Name and No.- Intellectual Property Rights & Cheminformatics, Paper IV	
CO1	Define various terminologies related to IPR.
CO2	Explain the role of law in the violation of IPR.
CO3	Summarise the various models of cheminformatics.
CO4	Apply the knowledge of cheminformatics to predict the properties of compounds, structures and drug designing.
Course (Paper) Name and No.- Research Methodology, Paper IV	
CO1	Explain the importance of different types of print and digital resources for gap analysis and data collection.
CO2	Design/propose methodologies preferably with green and safe approach to conduct research.
CO3	Anayze scientific data by statistical and graphical methods.
CO4	Apply skills of chemical safety & ethical handling of chemicals.
Course (Paper) Name and No.- Two step preparation(Practical)	
CO1	Plan the synthesis of organic compounds.
CO2	Make use of thin layer chromatography and physical constant to know the purity of organic compounds.
CO3	Apply principles of purification techniques such as recrystallization and distillation for purification of organic compounds.
CO4	Compare spectral data of reactant and product and explain mechanism of reactions and MSDS of chemicals.
Course (Paper) Name and No.- Spectral identification &Project or Internship	
CO1	Interpret spectral data like FT-IR, ^{13}C NMR, ^{1}HNMR, UV-Visible spectrum and Mass spectrum for structure elucidation of organiccompound.
CO2	Analyze the print and digital resources critically to formulate the research problem, argue and justify the statements.
CO3	Apply the existing methodologies or develop a new methodology toaddress the research problem.
CO4	Interpret the results and structures it to communicate via dissertation, and oral presentation by following ethical guidelines.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Chemistry

M.Sc. (Analytical Chemistry)

POs		
Sr. No.	Outcome for M.Sc. Program After completion of M.Sc. program students will acquire	Graduate Attribute
PO1	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge
PO2	An ability to demonstrate proficiency in various instrumentation, modern tools, and advanced techniques to meet industrial expectations and research outputs.	Disciplinary knowledge
PO3	Ability to identify problems, formulate, and prove hypotheses by applying theoretical knowledge and skills relevant to the discipline.	Problem-solving
PO4	The ability to articulate thoughts, research ideas, information, scientific outcomes in oral and in written presentation to range of audience.	Communication skills
PO5	A capacity for independent, conceptual, and creative thinking, and critical analysis through the existing methods of enquiry.	Critical thinking
PO6	Acquisition of skills required for cutting edge research, investigations, field study, documentation, networking, and ability to build logical arguments using scholarly evidence.	Research skills
PO7	An ability to portray good interpersonal skills with the ability to work collaboratively as part of a team undertaking a range of different team roles	Teamwork
PO8	The ability to understand ethical responsibilities and impact of scientific solutions in global, societal, and environmental context and contribute to sustainable development	Moral and ethical awareness/ multicultural competence
PO9	An openness to and interest in life-long learning through directed and self-directed study	self-directed learning
PO10	The ability to translate the knowledge and demonstrate the skills required to be employed and successful professional development.	Life-long learning
PO11	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge

PSOs	
PSO1	Students will have a strong foundation in the fundamentals and application of various theoretical concepts in Analytical, Inorganic, Organic and Physical Chemistry
PSO2	Students will learn advanced characterization techniques by gaining the knowledge of spectroscopy, chromatography, electroanalytical methods, hyphenated techniques and chemistry of synthetic and natural products
PSO3	Student will learn the usage of analytical instruments, select, and apply appropriate techniques and resources for the analysis
PSO4	Students will demonstrate their laboratory skills in qualitative, quantitative, separation and advanced instrumental methods
PSO5	Students will identify the need of IPR by integrating the knowledge of total quality management, GLP and GMP
PSO6	Research ability will be developed as the students get skilled to problem solving, critical thinking and analytical reasoning as applied to scientific problems
PSO7	The ability to communicate scientific information in written, oral and electronic formats will be developed among students
PSO8	Students will be able to learn application of various softwares for interpretation and representation of results.

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Physical Chemistry I	
CO1	Prove Maxwell relations and its significance and applications to ideal gases, Joule Thomson experiment, Joule Thomson coefficient and inversion temperature. Apply Third law of Thermodynamics to find out absolute entropy.
CO2	Make use of quantum mechanics for Particle waves and Schrödinger wave equation, wave functions, properties of wave functions, Normalization of wave functions, orthogonality of wave functions. Particle in a one, two- and three-dimensional box.
CO3	Define, understand basic terms of Chemical Dynamics i.e. rate constant, order of reaction, molecularity of reaction also compare Composite Reactions and Polymerization reactions.
CO4	Make use of Colloids and Surface Phenomena in daily applications.
Course (Paper) Name and No.- Analytical Chemistry PSC1AC1	
CO1	Explain the concept of data domain, performance characteristics of an instrument/method, total quality management, quality standards for laboratories, quality audits and quality reviews.
CO2	Discover the applications of UV-Visible spectroscopy, IR spectroscopy, Differential scanning calorimetry.
CO3	Identify the need of automation in chemical analysis, safety measures in laboratory, need of accreditation of laboratories and GLP.
CO4	Interpret the data based on calculations and statistical tests.
Course (Paper) Name and No.- Analytical Chemistry Practical	
CO1	Demonstrate the titration skills for the analysis of samples of a diverse variety.
CO2	Apply the statistical methods for data analysis.
CO3	Analyze the measured data based on Chemical principles.
CO4	Measure the characteristics of ion exchange resins.
Course (Paper) Name and No.- Organic Chemistry paper-III	
CO1	Understand the types of reaction and their applications.
CO2	Summarize the various aspects of aromaticity, aliphatic and aromatic nucleophilic substitution reactions with their mechanism and examples.
CO3	Apply the concept of Configurational descriptors (R,S nomenclature) to chiral centres in Organic compounds.
CO4	Predict the mechanism, selectivity, importance and applications of oxidizing and reducing agent.

Course (Paper) Name and No.- Organic Chemistry Practical	
CO1	Plan preparation of organic compounds.
CO2	Demonstrate the skill of purification of organic compounds by recrystallization and sublimation methods.
CO3	Apply the thin layer chromatography technique to check the purity of the synthesized product.
CO4	Can Sketch the structure of organic compounds using software Chem Biodraw.
Course (Paper) Name and No.- Physical Chemistry Practical	
CO1	Know the principles of different instruments like Potentiometry, Conductometry, pH Metry.
CO2	Determine the heat of solution of sparingly soluble acid and identify the reaction between acetone and iodine.
Course (Paper) Name and No.- Inorganic Chemistry (Elective-I)	
CO1	Explain theories of bonding, hybridization, resonance concept, MOT for diatomic species of first transition Series, Polyatomic species and Higher boranes, carboranes, metalloboranes and metallocarboranes, metal carbonyls and halide clusters.
CO2	Explain The concept of band theory, Fermi level, K-Space and Brillouin Zones. Structures of Compounds of the type: AB, AB2 etc. and Preparative methods of inorganic solids & nano materials.
Course (Paper) Name and No.- .- Inorganic Chemistry (Elective-II)	
CO1	Construct Group Multiplication Tables, Character tables using concept of Molecular Symmetry and Group Theory.
CO2	Determine electronic parameters such as Δ, B, C, Nephelauxetic ratio, formation constants of metal complexes and Characterize coordination compounds using techniques like thermal studies, Conductivity measurements, electronic spectral and magnetic measurements, IR, NMR and ESR spectroscopic.
Course (Paper) Name and No.- Inorganic Chemistry Practical's	
CO1	Prepare various inorganic complexes such as Bis-(tetramethylammonium) tetrachloroCuprate (II) (Me4 N) 2[CuCl4],Tetramminemonocarbanato Cobalt (III) Nitrate, Bis (ethylenediammine) Copper (II) Sulphate, Hydroniumdichlorobis(dimethylglyoximato) etc.
CO2	Determine the electrolytic nature of inorganic compounds.
CO3	Apply Slope intercept method for determination of equilibrium constants forFe^{+3}/ SCN- system.
CO4	Analyze the inorganic complex for percentage of metal and ligand.

Course (Paper) Name and No.- Research Methodology	
CO1	Explain the importance of different types of print and digital resources for gap analysis and data collection.
CO2	Design/propose methodologies preferably with green and safe approach to conduct research.
CO3	Anayze scientific data by statistical and graphical methods.
CO4	Apply skills of chemical safety & ethical handling of chemicals.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Physical Chemistry I	
CO1	Explain Bioenergetics, Real solutions and Fugacity of real gases also show graphical representations of BET isotherms.
CO2	Prove expressions for the total wave function for 1s,2s, 2p and 3d orbitals of hydrogen and aapplication of the Schrödinger equation to two electron system.
CO3	Explain terms involved in Chemical Kinetics and Molecular Reaction Dynamics. Elementary Reactions in Solution, Kinetics of reactions catalysed by enzymes -Michaelis-Menten analysis, Lineweaver-Burk and Eadie Analyses, Inhibition of Enzyme action.
CO4	Apply Photochemistry to solve NET, SET GATE Problems.
Course (Paper) Name and No.- Physical Chemistry Practical	
CO1	Know principles of different instruments like Potentiometry, Conductometry, pH Metry and colorimeter.
CO2	Make use of graphical representation to identify Shape of Orbitals.
Course (Paper) Name and No.- Analytical Chemistry	
CO1	Translate the theoretical principles of advanced separation techniques, spectroscopic techniques, radioanalytical techniques, electroanalytical techniques into applications.
CO2	Explain the working principles of surface analytical techniques such as SEM, STM, TEM, ESCA, Auger spectroscopy and ICP-AES.
CO3	Compare the different ion sources and mass analyzers in mass spectroscopy.
CO4	Determine the electrical quantities such as charge, current, potential using Electroanalytical methods.
Course (Paper) Name and No.- Analytical Chemistry Practical	
CO1	Demonstrate the operational skills on the selected instruments and retrieve information.
CO2	Develop a sense of time management, safe use of chemicals and environmental safety.

Course (Paper) Name and No.- Organic Chemistry paper	
CO1	Explain the Generation of carbanion, enolate, enamine with their alkylation & acylation reaction and name reactions with their mechanism.
CO2	Illustrate mechanism, stereochemistry, applications and importance of name reactions and rearrangements.
CO3	Explain the role of reagents in organic synthesis.
CO4	Interpret the structure of organic compounds using combined of spectral techniques.
Course (Paper) Name and No.- Organic Chemistry Practical	
CO1	Identify the chemical type of components present in a binary mixture of an organic compound.
CO2	Apply skills in the separation and qualitative analysis of organic compounds of binary mixtures by microscale technique.
CO3	Make use of crystallization, sublimation and distillation for purification of the organic compounds.
CO4	Demonstrate the practical aspects in the preparation of the organic compounds derivatives.
Course (Paper) Name and No.- Inorganic Chemistry (Elective-I)	
CO1	Recall Organometallic Chemistry of Transition metals, Eighteen and sixteen electron rules, Preparation and property's structure and bonding of the Organometallic compounds.
CO2	Explain Photochemical Reactions, Ligand substitution reactions of: Octahedral complexes, Square planar complexes, trans-effect, its theories and applications. Redox reactions: inner and outer sphere mechanisms, stereochemistry of substitution reactions of octahedral complexes.
Course (Paper) Name and No.- Inorganic Chemistry (Elective-II)	
CO1	Measure the physical property of the samples and relate it with quantity.
CO2	Construct the graphs based on the measurements and calculations.
Course (Paper) Name and No.- Inorganic Chemistry Practicals	
CO1	Analyze ores and alloys using volumetric and gravimetric analysis.
CO2	Estimate percentage of metals in the ore and alloy.
CO3	Apply the potentiometric method for redox titrations of Fe, Cu etc.

Course (Paper) Name and No.- On Job Training	
CO1	Practical Skill Development: Trainees will acquire hands-on experience and proficiency in relevant industry tools, techniques, and processes, effectively applying theoretical knowledge to real-world tasks.
CO2	Problem-Solving Abilities:Trainees will develop critical thinking and problem-solving skills by addressing practical challenges and troubleshooting issues encountered in the work environment.
CO3	Professional Competency: Trainees will demonstrate enhanced job readiness and professional competency, including adherence to industry standards, effective communication, and teamwork.
CO4	Industry Knowledge:Trainees will gain a deeper understanding of industry practices, workflows, and organizational culture, improving their ability to navigate and contribute effectively within their field.
CO5	Performance Improvement:Trainees will improve their performance and productivity by integrating feedback and learning from experienced professionals, leading to better job performance and career growth.
Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Quality in Analytical Chemistry (Paper-I) PSC3QAC	
CO1	Students will understand importance of GLP and their regulations.
CO2	Students will understand theoretical aspects of sampling, pre-treatment and method validation.
CO3	Students will learn the laboratory accreditation, its benefits and importance of ICH guidelines.
CO4	Student will get knowledge of how to measure uncertainty in measurements, dealing with signal to noise ratio and legislator aspects of pharmaceutical industries.
Course (Paper) Name and No.: PSC3QAP Practical's (Paper-I)	
CO1	Students will learn the analysis of quality of various types of samples using instrumental methods of analysis.
CO2	Students will learn graphical representation of the data.
Course (Paper) Name and No. Advanced Instrumental Technique (Paper-II) PSC3AIT	
CO1	Student will help to understand the theoretical concepts of surface analytical techniques.
CO2	Student will understand advanced spectroscopic techniques used for characterization of matter.
CO3	Students will get detailed insights of advanced electroanalytical techniques.
CO4	Student will find applications of chemiluminescence, ORD-CD, Photoacoustic spectroscopy in analytical chemistry.

Course (Paper) Name and No. Practical's (Paper-II) PSC3AIP	
CO1	Students will learn the various advanced analytical techniques for analysis of different samples.
CO2	Students will get knowledge of quality control methods and understand the importance of accuracy.
Course (Paper) Name and No. Bioanalytical Chemistry and Food Analysis (Paper-III) PSC3BCF	
CO1	Student will learn bioanalytical techniques of analysis.
CO2	Student will understand the importance of Immunoassays and its applications.
CO3	Student will get general idea about food processing, food preservation and determination of food contaminant etc.
CO4	Student will understand technique use in food packaging and food analysis.
Course (Paper) Name and No. Practicals (Paper-III) PSC3BCP	
CO1	Students will perform practical based upon food analysis.
CO2	Students will understand data acquisition and analysis.
Course (Paper) Name and No.: Elective paper E1 Environmental and Certain Industrially Important Materials (Paper-IV) PSC3ENC	
CO1	Student will learn different aspects of Chemistry of atmosphere and environmental legislation.
CO2	Student will understand the quality and requirement of potable water and bore well water.
CO3	Student will study the details of sources and hazardous of soil pollutant and monitoring of air pollution.
CO4	Student will do the detail study of control of pollution through Green Chemistry.
Course (Paper) Name and No. Elective paper E2 Pharmaceutical and Organic Analysis (Paper-IV) PSC3POA	
CO1	Student will get general idea regarding the pharmaceutical analysis and quality control methods of pharmaceutical industry.
CO2	Student will know the details of drug analysis on the basis of functional groups and other factors.
CO3	Student will understand the applications of analytical chemistry in forensic science.
CO4	Student will learn the various aspects of cosmetic industry and analysis of different types of cosmetics.
Course (Paper) Name and No. Practical's (Paper-IV) PSC3ENP/ PSC3POP	
CO1	Students will perform the practical based on estimations of drugs by non-aqueous Titration.
CO2	Students will perform the practical based on the analysis of water sample.

Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No. Quality in Analytical Chemistry (Paper-I) PSC4QAC	
CO1	Students will get detailed insights of modern chromatographic techniques for separation of mixture on the basis of charge, size, and affinity of composition.
CO2	Student will learn details of various separation processes.
CO3	Student will study the separation, analysis and standardization of herbal based products.
CO4	Student will understand the concept of electrophoresis in analysis and basics of nanotechnology.
Course (Paper) Name and No. Practical's (Paper-I) PSC4QAP	
CO1	Student will understand the use of various instrumental methods for the analysis of different samples.
Course (Paper) Name and No. Advanced Instrumental Technique (Paper-II) PSC4AIT	
CO1	Student will do the detail study of principle, instrumentation and applications of NMR spectroscopy.
CO2	Student will understand the detail concept of mass spectroscopy and Raman spectroscopy.
CO3	Student will learn principle and interfacing of radio analytical techniques and hyphenated thermal methods
CO4	Student will know the detail concept of hyphenated techniques including GC-MS, GCIR, LC-MS, and HPLC-MS et
Course (Paper) Name and No. Practical's (Paper-II) PSC4AIP	
CO1	Student will able to do Interpretation of data using various advanced techniques.
CO2	Student will able to do Interpretation of spectra of NMR, Mass, IR, UV visible.
Course (Paper) Name and No. Selected Topics in Analytical Chemistry (Paper-III) PSC4STA	
CO1	Student will learn the different aspects of effluent treatment.
CO2	Student will understand steps involved in solid waste management.
CO3	Student will get an idea about classifications and applications of plastics, polymer, paints and pigments and their environmental impact.
CO4	Student will study metallurgical analysis.
Course (Paper) Name and No. Practical's (Paper-III) PSC4STP	
CO1	Students will learn quantitative estimation of various types of metallurgical samples.
Course (Paper) Name and No. Intellectual Property (Paper-IV) PSC4IPR	
CO1	Student will learn about details intellectual property.
CO2	Student will get knowledge of intellectual property rights (IPR).
CO3	Student will understand concepts in cheminformatics.

CO4	Student will learn about industrial designing and traits in it.
Course (Paper) Name and No. Research Methodology (Paper-IV)	
CO1	Student will learn every aspect of publication of research paper such as terms associated with journals, referencing and library resources.
CO2	Student will get conversant with the methods of data analysis and various softwares employed for it.
CO3	Student will get knowledge of actual writing scientific papers.
CO4	Student will get information of the safety and ethical handling of chemicals.
Course (Paper) Name and No. Practicals (Paper-IV) PSC4AIP/PSC4REP	
CO1	Student will actually get involved in research work.
CO2	Student will understand the analysis of data generated by their research work.
CO3	Student will learn how to present research work.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Microbiology

B.Sc. (Microbiology)

POs		
Sr. No.	**Outcome for B.Sc. Program** **After completion of B.Sc. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork

PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

PSOs	
PSO1	The program is aimed at equipping the students with basic knowledge in various branches of Microbiology such as Microbial Genetics, Molecular Biology, Virology, Medical Microbiology, Immunology, Microbial Biochemistry and Industrial Microbiology. Additionally, it also makes students aware of interdisciplinary sciences such as Bioinformatics and Bioinstrumentation.
PSO2	At the end, student will have employability in food industry, pharmaceutical industry, Agricultural industry and fishery. Students will work as microbiologist in QA and production departments.
PSO3	Students will develop basic understanding of the subject and will have developed life skills to solve environmental and hygiene related problems.

COs	
Semester I	
After Completion of the course the learner will be able to;	
Open Elective Course 1: Exploring Microbiology I	
CO1	Explain importance of Microbes.
CO2	Explain the component of Microscope.
CO3	Differentiate between light microscope and Electron Microscope.
Course (Paper) Name and No.- Mandatory Paper 1: Introduction to Microbiology-I	
CO1	Distinguish between Prokaryotic and Eukaryotic cells.
CO2	Explain concepts of microscopy.
CO3	Outline the contribution of scientist towards microbiology.
Course (Paper) Name and No.- Vocational Skill Course 1: Microbial Analysis of Water	
CO1	Determine pH, TDS, COD, BOD of waste water.
CO2	Analyse drinking water for presence of indicator organism.
CO3	Explain treatment methods for waste water.
	Semester II
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Mandatory Paper 1: Microbial control and Microbial interactions	
CO1	Evaluate antimicrobial effectiveness of agent.
CO2	Explain preservation techniques.
CO3	Distinguish between microbial interactions.
Course (Paper) Name and No.- Mandatory Paper 2: Microbes in human health	
CO1	Classify protozoa and fungi.
CO2	Explain factors responsible for infection.
CO3	Outline host defense against infection.
Course (Paper) Name and No.- Open Elective Course 2: Exploring Microbiology II	
CO1	Differentiate phase of bacterial growth curve.
CO2	Analyse factors affecting growth of bacteria.
CO3	Explain culture media and sterilization methods.

Course (Paper) Name and No.- Vocational Skill Course 2: Microbial Analysis of Food	
CO1	Explain principles and methods of food preservation.
CO2	Determine number of bacteria from food sample.
CO3	Assess the microbial quality of Milk.
Course (Paper) Name and No.- Minor Course 1: Understanding Biomolecules	
CO1	Classify biomolecules.
CO2	Explain determination of biomolecule concentration.
CO3	Differentiate between qualitative and quantitative analysis.

Semester III

After Completion of the course the learner will be able to;

Course (Paper) Name and No.- I: Estimation of Biomolecules and Introduction to Bioenergetics and Biostatistics	
CO1	Explain the method of extraction and estimation of biomolecules.
CO2	Apply concept of thermodynamics to bioenergetics.
CO3	Solve biostatistical problems related to measurement of central tendency and dispersion.
CO4	Determine concentration of solutions in terms of molarity, normality molality, osmolarity, mole fraction, etc.
Course (Paper) Name and No.: II: Introduction to fermentation technology and Applied Microbiology	
CO1	Compare primary and secondary screening methods.
CO2	Explain the parts of the fermenter and its type.
CO3	Apply standard microbiological techniques for the testing and preservation of milk /food.
CO4	Demonstrate the understanding of techniques used for wastewater management and treatment.
Course (Paper) Name and No.: III: Introduction to Microbial Genetics and Molecular Biology	
CO1	Compare the structure and biochemistry of DNA and RNA, nucleotides, and their types.
CO2	Explain the methods of DNA sequencing like Maxam & Gilbert and Sanger's method.
CO3	Categorize the different types of mutations which may occur in DNA and their repair mechanisms.
CO4	Enlist the basic concepts of steps involved in DNA replication and protein synthesis.

Semester IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.: Introduction to Metabolism and Enzymology	
CO1	Explain the concepts of metabolism and metabolic pathways.
CO2	Develop kinetic model of enzyme Inhibition.
CO3	Compare solute uptake mechanisms of bacteria.
CO4	Illustrate preparation of vesicles for study of solute uptake.
Course (Paper) Name and No.: II: Introduction to Medical Microbiology and immunology	
CO1	Define various terms associated with Epidemiology.
CO2	Explain the importance of pathogenic bacteria in human disease concerning infections of the respiratory tract, gastrointestinal tract, skin, and nervous system.
CO3	Classify the types of immune systems, cells involved in the immune system.
CO4	Select the immunological and molecular techniques for disease diagnosis.
Course (Paper) Name and No.: III: Advances Analytical Techniques, Soft Skills and Applications of Microbiology	
CO1	Define the basic terms involved in Bioinformatics.
CO2	Explain the importance of research work, research planning and interpretation of data.
CO3	Develop the understanding of principle, working and applications of separation and spectrophometric techniques of Centrifugation, Chromatography and Spectrophotometry.
CO4	Categorize the distinct types of Biosensors and Nanoparticles.
Semester V	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.: I: Microbial Genetics I	
CO1	Explain the fundamental principles of Central dogma of life.
CO2	Co –relate between prokaryotic and eukaryotic DNA replication, transcription, and translation.
CO3	Compare the various gene exchange mechanisms found in microorganisms.
CO4	Determine the role of mutagenic agents and their effects onto the growth of living cells.
Course (Paper) Name and No.: II: Medical Microbiology & Immunology	

CO1	Explain mode of transmission, diagnosis, prophylaxis and treatment of respiratory, gastrointestinal skin diseases and virulent factors of pathogen.
CO2	Describe the structure and function of immunoglobulins, cells and organs involved in formation of adaptive immune response.
CO3	Analyze the mechanism of antigen antibody reaction and its application in diagnosis of various infections.
CO4	Compare Koch postulates and molecular Koch postulates in identification of pathogen.
Course (Paper) Name and No.- Course (Paper) Name and No.: III: Microbial Biochemistry I	
CO1	Explain mechanism of generation of electrochemical energy and ATP synthesis.
CO2	Demonstrate EMP, ED, HMP pathways and TCA cycle.
CO3	Differentiate between catabolism and anabolism of lipids.
CO4	Deduct fermentation pathways.
Course (Paper) Name and No.: IV: Bioprocess Technology Part-I	
CO1	Explain the techniques of strain improvements in Industrial Microbiology.
CO2	Develop the design of bioreactors and media for fermentation under different conditions.
CO3	Select the procedures and techniques for the upstream and downstream process of fermentation.
CO4	Compare traditional industrial fermentation such as Beer, Wine, Vinegar, etc.
Course (Paper) Name and No.:V: Applied component Biotechnology	
CO1	Apply knowledge to carry out biophysical techniques (electrophoresis, spectrophotometry) in biotechnology.
CO2	Apply techniques for engineering biomolecules industrial and marine organisms for potential applications.
CO3	Compare the mechanisms of generating transgenic animals.
CO4	Create strategies to bioremediate the pollutants from soil.

Semester VI	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.: Microbial Genetics I	
CO1	Explain basic tools and steps involved in r- DNA technology.
CO2	Find In-Silico Analytical techniques used in Bioinformatics and Proteomics.
CO3	Classify viruses based onto their general structure, genetic material, and life cycle.
CO4	Explain the regulation of genes expression at molecular level.
Course (Paper) Name and No.: II: Medical Microbiology & Immunology	
CO1	Explain the structure and role of T & B cells in adaptive immune response.
CO2	Differentiate between modes of action of different chemotherapeutic agents in disease treatment.
CO3	Evaluate the mode of transmission, pathogenesis and treatment of central nervous system and sexually transmitted diseases.
CO4	Describe the role of vaccines in disease prevention, complement system in immune response.
Course (Paper) Name and No.: III: Microbial Biochemistry II	
CO1	Describe general reactions of amino acid metabolism and amino acid fermentation.
CO2	Summarize factors affecting catalytic efficiency of enzymes.
CO3	Analyze the regulatory mechanism of a pathway.
CO4	Judge the assimilatory and dissimilatory pathways of inorganic metabolism.
Course (Paper) Name and No:IV: Bioprocess Technology Part II	
CO1	Explain the industrial production of bioinsecticides, biofertilizers, and biopolymers such as xanthan gum, PHA, alginate, etc.
CO2	Apply the knowledge of principles and applications of animal and plant tissue culture techniques, and immobilization techniques.
CO3	Build the understanding of IPR, Patent, Criteria for patentability, Indian patent act, Role of the patent in R & D.
CO4	Compare industrial fermentation such as Penicillin, Mushroom, Glutamic acid, etc.
Course (Paper) Name and No.: V: Applied component Biotechnology	
CO1	Explain the role of biotechnology in society.
CO2	Examine the role of biotechnology in healthcare sector (animal & human healthcare, genetic counselling, and forensic medicine).
CO3	Inspect problems related to genetic engineering in plant biotechnology.
CO4	Interpret the issues of bioenergy and biofuel in the world.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel

(Autonomous)

Department: Microbiology

M.Sc. (Microbiology)

POs		
Sr. No.	Outcome for M.Sc. Program After completion of M.Sc. program students will acquire	Graduate Attribute
PO1	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge
PO2	An ability to demonstrate proficiency in various instrumentation, modern tools, and advanced techniques to meet industrial expectations and research outputs.	Disciplinary knowledge
PO3	Ability to identify problems, formulate, and prove hypotheses by applying theoretical knowledge and skills relevant to the discipline.	Problem-solving
PO4	The ability to articulate thoughts, research ideas, information, scientific outcomes in oral and in written presentation to range of audience.	Communication skills
PO5	A capacity for independent, conceptual, and creative thinking, and critical analysis through the existing methods of enquiry.	Critical thinking
PO6	Acquisition of skills required for cutting edge research, investigations, field study, documentation, networking, and ability to build logical arguments using scholarly evidence.	Research skills
PO7	An ability to portray good interpersonal skills with the ability to work collaboratively as part of a team undertaking a range of different team roles	Teamwork
PO8	The ability to understand ethical responsibilities and impact of scientific solutions in global, societal, and environmental context and contribute to sustainable development	Moral and ethical awareness/ multicultural competence
PO9	An openness to and interest in life-long learning through directed and self-directed study	self-directed learning
PO10	The ability to translate the knowledge and demonstrate the skills required to be employed and successful professional development.	Life-long learning
PO11	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge

PSOs	
PSO1	The program is aimed at equipping the students with basic knowledge in various branches of Microbiology such as Microbial Genetics, Molecular Biology, Virology, Medical Microbiology, Immunology, Microbial Biochemistry, Environmental Microbiology, Advances in Biotechnology and Industrial (food, pharmaceutical) Microbiology. Additionally, it also makes students aware of interdisciplinary sciences such as Bioinformatics and Bioinstrumentation
PSO2	At the end, student will have employability in food industry, pharmaceutical industry, Agricultural industry and fishery. Students will work as microbiologist in Research, QC, QA and production departments
PSO3	Students will develop basic understanding of the subject and will have developed life skills to solve environmental and hygiene related problems

COs	
Semester I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-1 Molecular Genetics -1	
CO1	Explain the importance of DNA recombination and repair.
CO2	Explain the concept of global gene regulation and its importance in bacterial physiology.
CO3	Describe the molecular mechanisms underlying gene regulation in prokaryotes.
Course (Paper) Name and No.-2 Biochemistry	
CO1	Correlate the structure and function of bioorganic molecules to their biological roles.
CO2	Explain the enzymatic mechanisms involved in the breakdown of complex organic molecules.
CO3	Analyse the role of anaerobic bacteria in biogeochemical cycles and ecosystem functioning.
Course (Paper) Name and No.-3 Medical Microbiology and Microbial Pathogenesis	
CO1	Analyse the molecular mechanisms of virulence factors employed by pathogens to cause disease.
CO2	Analyse the virulence factors and mechanisms of transmission for selected emerging pathogens.
CO3	Apply bacteriological techniques for the isolation, identification, and characterization of clinically relevant bacteria.
Course (Paper) Name and No.-Elective 1 Environmental Microbiology & Sustainability	
CO1	Evaluate the biotechnological potential of extremophiles and their enzymes (extremozymes) for various applications.
CO2	Demonstrate a comprehensive understanding of ecological principles and their application to environmental management.
CO3	Analyze the impacts of human activities on ecosystems and natural resources.

Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-1 Molecular Genetics -2	
CO1	Explain the role of chromatin structure, epigenetic modifications, and transcription factors in gene regulation.
CO2	Apply population genetics principles to understand genetic variation and evolution.
CO3	Explain the principles and applications of various molecular techniques used in genetics research.
Course (Paper) Name and No.- 2 Applied Biochemistry	
CO1	Evaluate the role of enzymes in biochemical processes and Industrial activities.
CO2	Analyze the cellular responses to different stress conditions (e.g., oxidative stress, heat shock, osmotic stress).
CO3	Evaluate the potential applications of unusual biomolecules in medicine, agriculture, and industry.
Course (Paper) Name and No.- 3 Applied Immunology	
CO1	Analyze the various evasion mechanisms employed by pathogens to subvert host defenses.
CO2	Classify different types of immunological disorders.
CO3	Evaluate the diagnostic and therapeutic approaches for immunological disorders.
Course (Paper) Name and No.- Elective 1 Bioinformatics & Immunodiagnostics	
CO1	Explain the fundamental concepts of biological databases, sequence alignment, and phylogenetic analysis.
CO2	Describe the role of immunodiagnostics in disease prevention, diagnosis, and monitoring.
CO3	Critically evaluate the clinical utility of immunodiagnostic tests.

Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- : Research Methodology	
CO1	Demonstrate understanding of research methodology.
CO2	Design hypothesis and methods of data collection.
CO3	Differentiate between different types of sampling and variables.
CO4	Demonstrate understanding of data analysis and report writing.
Course (Paper) Name and No.- : Food Microbiology	
CO1	Explain the importance and sources of microorganisms in food etc.
CO2	Analyze qualitative and quantitative microbial testing of food sample.
CO3	Summarize the food quality parameters by using HAACCP, QA and QC.
CO4	Explain general production methods of fermented food like Cheese, Sausage, Pickles.
Course (Paper) Name and No.- : Advances in Biotechnology	
CO1	Describe plant tissue culture techniques, for developing transgenic plants. By using vectors & selectable markers.
CO2	Explain the concepts of animal tissue culture to construct transgenic animals which has better yielding capacity.
CO3	Differentiate between different methods for synthesis of nanoparticles and application of nanoparticles in the field of diagnostic and medicine.
CO4	Define concepts of pharmacogenomics, pharmacokinetics, and tissue engineering, prenatal , pre-implantation diagnosis, gene therapy and antisense technology in treatment of genetic diseases.
Course (Paper) Name and No.- : Applied &Environment Microbiology	
CO1	Illustrate the events of soil, marine and agricultural microbiology.
CO2	Apply physiological and molecular techniques in microbial ecology studies.
CO3	Analyze the water and food samples as a part of quality check.
CO4	Construct knowledge on biotechnological application of extreme proteins.

Semester IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- 1Tools and Techniques: Bio-molecular Analysis	
CO1	Construct the flow diagrams of spectroscopic techniques.
CO2	Compare between Gas chromatography and High-performance liquid chromatography.
CO3	Explain molecular biology techniques such as PCR variations, Hybridization array technology, and FISH.
CO4	Demonstrate the use of Microscopy, diffraction techniques and photoluminescence spectroscopy in nanotechnology studies.
Course (Paper) Name and No.- 2 Pharmaceutical Microbiology	
CO1	Explain the importance of QA, QC, and GMP aspects in the pharmaceutical industry.
CO2	Describe the importance of quality control and documentation in the pharmaceutical industry.
CO3	Analyse various validation and calibration methods used in the cosmetic industry.
CO4	Apply modern methods to test newly discovered drugs.
Course (Paper) Name and No.- 3 Advances in Biotechnology.	
CO1	Compare different downstream processing techniques for production of therapeutic compounds, and new methods for vaccine production and drug discovery.
CO2	Describe concepts of IPR and Bioethics in field of biotechnology.
CO3	Develop different methods for extraction of bioactive compounds from marine environment & its application in various fields.
CO4	Explain synthesis of DNA by different chemical and molecular methods, expression of protein in prokaryotic and eukaryotic expression host.
Course (Paper) Name and No.- Applied &Environment Monitoring & Management	
CO1	Apply knowledge on management of natural resources and safety standards.
CO2	Evaluate the issues related pollution and its management.
CO3	Construct strategies to eradicate biofilm from different environments.
CO4	Design strategies of bioremediation for field application.

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Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel

(Autonomous)

Department: Biotechnology

B.Sc. (Biotechnology)

POs		
Sr. No.	**Outcome for B.Sc. Program After completion of B.Sc. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

PSOs	
PSO1	Students will learn the basic concepts of Chemistry and analytical chemistry applied in Biological Sciences.
PSO2	An education in Cell biology, Biochemistry, Animal and plant physiology, human genetics and Immunology will impart knowledge to the students about cellular structure, biomolecules, metabolic pathways, its regulation along with defence mechanism and physiological processes in plants and animals.
PSO3	Students will also learn the concepts of biodiversity, ecology environment and its conservation.
PSO4	Students will gain basic information of microbial cultures, sterilization methods and enzyme production. They will be taught bio-safety guidelines and good laboratory practices.
PSO5	Introduction of recent topics like Drug delivery, Marine biotechnology, Bioinformatics will impart knowledge of mechanism of drug delivery, drug designing and applications of marine organisms as food, nutraceutical and cosmetics etc.
PSO6	Students will understand the principles and the applications of molecular biology and genetic engineering methods with an emphasis on the application of recombinant DNA technology to animals, plants and microbial organisms.
PSO7	The course will give the knowledge of Bioethics, IPR, entrepreneurship, scientific writing, Communication, and management skills to the students.
PSO8	Students will get hands-on training of techniques used in Cell Biology, Biochemistry, Microbiology, Immunology, Molecular Biology and Genetic Engineering.

COs	
SEMESTER – I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Fundamentals of Biotechnology [Major I]	
CO1	Explain Branches and scope of Biotechnology.
CO2	Enlist the industries and institutions dealing with Biotechnology.
CO3	Justify the role of microbes in biotechnological processes like fermentation and bioremediation.
Course (Paper) Name and No.- Cell Biology and Genetics [Major II]	
CO1	Explain the ultrastructure and function of organelles in prokaryotic and eukaryotic cells.
CO2	Illustrate principles of Mendelian genetics, gene interaction, sex determination and mechanisms of genetic exchange in bacteria.
Course (Paper) Name and No.- Mushroom Cultivation- I (Skill Enhancement Course)	
CO1	Identify edible and wild type mushrooms.
CO2	Apply the steps involved in Mushroom production and compost preparation.
CO3	Evaluate the importance of different types of Mushrooms and their cultivation.
Course (Paper) Name and No.- Basic tools and Techniques in Biotechnology (Vocational Skill Course I)	
CO1	Solve the numerical problems related to practical.
CO2	Interpret the results and experimental data.
CO3	Demonstrate the use of basic instruments used in Biotechnology.
Course (Paper) Name and No.- Wonders of Curcuma and Neem (Indian Knowledge System)	
CO1	Identify the various applications of Curcuma and Neem.
CO2	Apply the traditional knowledge to make many commercial products.
CO3	Enlist the importance of controversial patent cases in context to Neem and turmeric.
Course (Paper) Name and No.- Introduction to Human Health and Nutrition (Open Electives 1)	
CO1	Explain nutrition and functions of various nutrients.
CO2	Identify different meal plans as per the age and therapeutic conditions.
CO3	Apply food sanitation and hygiene.

Course (Paper) Name and No.- Agro-tourism (Open Electives 2)	
CO1	Explain the basic principles and advantages of Agrotouruism.
CO2	Enlist the places suitable for Agrotouruism.
CO3	Apply their knowledge in management of travels, accommodation and food services during Agrotourism.
Course (Paper) Name and No.- Practicals of Fundamentals of Biotechnology & Cell Biology and Genetics	
CO1	Develop hands-on proficiency in fundamental biotechnology techniques.
CO2	Develop hands-on proficiency in media preparation and sterilization, preservation and enumeration of microorganisms.
CO3	Demonstrate different type of staining technique.
CO4	Show different gene transfer mechanisms like conjugation and transformation.
Course (Paper) Name and No.- Practicals of Basic tools and Techniques in Biotechnology	
CO1	Illustrate the use of basic biotechnology tools, including micropipettes, centrifuges, and spectrophotometers.
CO2	Discuss different fundamental techniques such as qualitative analysis of amino acids, carbohydrates and lipids.
Course (Paper) Name and No.- Practicals of Mushroom Cultivation	
CO1	Develop the skills in mushroom cultivation techniques, including substrate preparation, inoculation, and harvesting.
CO2	Analyze the nutritional value of mushroom.
SEMESTER – II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Bioorganic Chemistry [Major-I]	
CO1	Explain Isomerism in context to Biomolecules.
CO2	Differentiate between chiral and achiral molecules and different enantiomers.
CO3	Develop skills towards use of titrimetric and gravimetric analysis.
Course (Paper) Name and No.- Molecular Biology-I [Major-II]	
CO1	Compare the replication in prokaryotes and eukaryotes.
CO2	Classify the different types of mutations.
CO3	Illustrate different DNA repair mechanisms.

Course (Paper) Name and No.- Bio-business in Mushroom Cultivation (Skill Enhancement Course -01)	
CO1	Apply the methods of making value added mushroom products.
CO2	Analyze nutritive values of mushroom products and its cost.
CO3	Design a business plan of Mushroom Cultivation.
Course (Paper) Name and No.- Plant Tissue Culture Techniques (Vocational Skill Course)	
CO1	Explain the basic Principles of Plant Tissue culture.
CO2	Design a Plant Tissue Culture lab.
CO3	Apply various in-vitro culture techniques for plant /crop improvement.
Course (Paper) Name and No.- Basic Microbiology [Minor-1]	
CO1	Build skill towards use of microscopy and staining techniques.
CO2	Explain the concepts of sterilization and the mechanism of disinfection.
Course (Paper) Name and No.- Organic Farming (Open Elective 3)	
CO1	Apply knowledge of organic farming under crop cultivation.
CO2	Explain methods of Composting, Vermicomposting and Biofertilizer.
Course (Paper) Name and No.- Biobusiness and Bioentrepreneurship (Open Elective 4)	
CO1	Explain the concept of Bio-entrepreneurship.
CO2	Identify the different sectors for the Bio-business.
Course (Paper) Name and No.- Practicals of Bioorganic Chemistry	
CO1	Demonstrate the practical knowledge of titrimetric analysis.
CO2	Apply the techniques in gravimetry.
Course (Paper) Name and No.- Practicals of Molecular Biology	
CO1	Demonstrate hands-on experience with molecular biology techniques, including genomic DNA extraction and agarose gel electrophoresis etc.
CO2	Develop skills in quantitative estimation and study the effect of mutagen on nucleic acids.
Course (Paper) Name and No.- Practicals of Basic Microbiology	
CO1	Apply acquired hands-on skills in basic microbiology techniques, including monochrome, differential and special staining.
CO2	Develop skills in enumeration by Breed's count method.

Course (Paper) Name and No.- Practicals of Plant Tissue Culture Techniques	
CO1	Organise hands-on experience in plant tissue culture techniques, including media preparation, sterilization, and micropropagation.
CO2	Develops the ability to synthesize artificial seeds.
Course (Paper) Name and No.- Practicals of Bio-business in Mushroom cultivation	
CO1	Design business plans for mushroom cultivation, including market analysis, cost estimation etc.
CO2	Apply the skills related to preparations of value-added products of mushroom and its nutritional analysis.
SEMESTER – III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Bioanalytical Techniques [Paper-I]	
CO1	Develop an understanding of the different aspects of classical as well as advanced biophysical techniques.
CO2	Infer the principles and applications of various Immuno-techniques.
CO3	Relate principles of Electrophoretic Techniques and its application in biology.
Course (Paper) Name and No.- Applied Chemistry-I [Paper-II]	
CO1	Develop an understanding of basic principles and techniques in Organic and Green Chemistry.
CO2	Discuss the synthesis of organic compounds and their corresponding role in biotechnology.
CO3	Explain the role of Green Chemistry and its application in Industrial biotechnology.
Course (Paper) Name and No.- Immunology [Paper-III]	
CO1	Recall the definition and functions of Effector Molecules in the Immune response.
CO2	Explain the role of Effector Molecules and their mechanism in Immune response.
CO3	Explain the generation of different types of cells and their respective roles in Adaptive Immune response.
CO4	Classify various vaccines and learn regarding their production via hybridoma technology.
Course (Paper) Name and No.- Cell Biology and Cytogenetics [Paper-IV]	
CO1	Discuss types and major functions of cytoskeleton.
CO2	Elaborate the principles underlying Genetic Linkage, DNA recombination and chromosomal mapping.
CO3	Develop an understanding regarding population genetics and its role in evolutionary biology.

Course (Paper) Name and No.- Molecular Biology [Paper-V]	
CO1	Discuss the mechanisms associated with Gene Expression at the level of Prokaryotic Transcription.
CO2	Outline the mechanisms associated with Gene Expression at the level of Eukaryotic Transcription.
CO3	Explain the mechanism of the Translation process.
Course (Paper) Name and No.- Bioprocess Technology [Paper-VI]	
CO1	Outline on different types of industrially important microorganisms and their methods for preservation.
CO2	Explain principles underlying design of Fermenter and Fermentation Process.
CO3	Summaries In-vivo and In-vitro Assay of Industrial Products.
Course (Paper) Name and No.- Research Methodology [Paper-VII]	
CO1	Elaborate the basic principles of Research Methodology, research design and identify a Research Problem.
CO2	Outline the process of Scientific Writing and scientific interpretation.
CO3	Identify the overall Process of Designing a Research Study and research ethics.
Course (Paper) Name and No.- Greenhouse Technology [Paper-VIII]	
CO1	Classify different types of greenhouses.
CO2	Illustrate different greenhouse management system.
Course (Paper) Name and No.- Practicals of Bioanalytical Techniques Applied Chemistry-I	
CO1	Build skill of bioanalytical techniques and applied chemistry methods, including spectroscopic analysis and electrophoretic separation.
CO2	Develop skills in purification and estimation of organic compounds.
Course (Paper) Name and No.- Practicals of Immunology Cell Biology and Cytogenetics	
CO1	Acquire practical skills in immunology techniques like - RA Factor Test, ELISA.
CO2	Acquire practical skills in vaccine preparation and pedigree analysis.
Course (Paper) Name and No.- Practicals of Molecular Biology and Bioprocess Technology	
CO1	Build skill in key molecular biology techniques, including DNA extraction, gel electrophoresis, gene expression etc.
CO2	Develop practical skills in production, purification and estimation of alcohol and antibiotics.

SEMESTER – IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Biochemistry [Paper- I]	
CO1	Discuss the Metabolic Pathways of Carbohydrates, Amino Acids, Lipids and Nucleotides.
CO2	Explain the Role of Energy Rich Molecules in Metabolism.
CO3	Elaborate the lipid metabolism, energy yield and metabolic disorders of biomolecules.
Course (Paper) Name and No.- Applied Chemistry- II [Paper- II]	
CO1	Develop an understanding of the different aspects of Sampling and Separation techniques.
CO2	Identify natural products as well as extraction and separation techniques.
CO3	Discuss basic concepts in Polymer Chemistry and Nanomaterials.
Course (Paper) Name and No.- Medical Microbiology [Paper- III]	
CO1	Summarize the factors playing a role in causing a disease.
CO2	Discuss the various aspects of Systemic Infections including Causative Agents, symptoms and Prophylaxis.
CO3	Explain different causative organisms involved in GI, STD and Nosocomial infections.
Course (Paper) Name and No.- Environmental Biotechnology [Paper- IV]	
CO1	Illustrate air and soil microbiology.
CO2	Develop the understanding of waste water treatment and pollution control.
CO3	Explain the bioremediation technologies and its application.
Course (Paper) Name and No.- Biostatistics and Bioinformatics [Paper- V]	
CO1	Adapt the basic concepts of Bioinformatics.
CO2	Construct a thorough understanding of fundamental biological principles, beginning with genetics, molecular biology, genomics, and evolutionary biology.
CO3	Apply the various statistical tools for analysis of biological data.
Course (Paper) Name and No.- Molecular Diagnostics [Paper- VI]	
CO1	Develop the basic understanding for Principles used in Molecular Diagnosis.
CO2	Build analytical skills to understand new Diagnostic Methods.
CO3	Apply the knowledge and skills gained in the course should be useful in developing new Diagnostic Kits.

Course (Paper) Name and No.- Entrepreneurship Development [Paper- VII]	
CO1	Develop an understanding of the systematic process and to select and screen a business idea.
CO2	Design strategies for successful implementation of ideas.
CO3	Create a Business Plan for an innovative bio business.
CO4	Build the insights and knowledge in Marketing and Business management.
Course (Paper) Name and No.- Nutraceuticals and Functional Food [Paper- VIII]	
CO1	Explain nutraceuticals properties and their functions.
CO2	Value functional food as remedies.
Course (Paper) Name and No.- Practicals of Biochemistry and Applied Chemistry-II	
CO1	Analyse experiments related to biochemical techniques to check organ functioning, enzyme assays and metabolic analysis.
CO2	Develop skills in analysis and interpretation of results of bioanalytical techniques like HPLC, GC as well as nanoparticles synthesis and their characterization etc.
Course (Paper) Name and No.- Practicals of Medical microbiology and Environmental Biotechnology	
CO1	Demonstrate different medical microbiology techniques, including pathogen identification.
CO2	Develop skills in applying environmental biotechnology methods for bioremediation, analysis of potable water.
Course (Paper) Name and No.- Practicals of Biostatistics and Bioinformatics and Molecular Diagnostics	
CO1	Develop hands-on skills in molecular diagnostic technique.
CO2	Apply statistical techniques for analysing biological data in biostatistics and bioinformatics.
SEMESTER – V	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Cell Biology and Animal Tissue Culture [Paper-I]	
CO1	Discuss the major groups of intracellular-and membrane-bound receptors, be able to give examples of such receptors.
CO2	Explain different types of cancer, its diagnosis, treatment and preventive measures.
CO3	Explain design, layout of ATC Lab along with equipment used in tissue culture.
CO4	Identify media constituents and media formulation strategies and techniques for mammalian cell culture.

Course (Paper) Name and No.- Medical Microbiology & Instrumentation [Paper II]	
CO1	Compare and contrast replication mechanisms used by viruses along with their cultivation, purification techniques.
CO2	Explain the role of different types of vaccines in their prevention.
CO3	Identify various common and new emerging diseases of humans, different diagnostic techniques and various methods involved in infection control.
CO4	Demonstrate the mechanism of action of different antimicrobial agents and analyse the importance of appropriate drug therapy by learning the mechanisms of development of drug resistance.
CO5	Comparands apply different separation techniques & use them in research work.
Course (Paper) Name and No.- Genomes and Molecular Biology [Paper III]	
CO1	Elaborate on the gene transfer methods in plants by physical, chemical methods as well as plasmid derived vector systems.
CO2	Summarize the animal transfection methods and applications of transgenic animals.
CO3	Explain tools and techniques used in molecular biology.
CO4	Discuss various gene editing methods and regulations of prokaryotic gene.
Course (Paper) Name and No.- Marine Biotechnology and Developmental Biology [Paper IV]	
CO1	Apply knowledge of marine ecosystems and the principles of biotechnology, the importance of biotechnology in exploring and conserving marine biodiversity.
CO2	Identify and evaluate specific marine biotechnological applications, demonstrating their understanding of the real-world uses and implications of biotechnology in marine-related industries and research.
CO3	Elaborate the stages of animal development & mechanism of differentiation.
CO4	Demonstrate the features and stages of plant development with model organism & Stem cell biology.
Course (Paper) Name and No.- Applied Component: Biosafety [Paper V]	
CO1	Develop an understanding about Biosafety, Biological risk assessment and Hazardous Characteristics of an Agent.
CO2	Explain an overview regarding regulatory biosafety guidelines and various roles of Competent authorities.
CO3	Apply Microbiological testing in pharmaceuticals & common microbial contaminants.
CO4	Explain the concepts of biosafety in biotechnology and its regulations.

Course (Paper) Name and No.- Practicals of Cell biology, Medical Microbiology and Instrumentation	
CO1	Demonstrate different antibiotic sensitivity tests.
CO2	Identify antigen, prepare and sterilize vaccines etc.
Course (Paper) Name and No.- Practicals of Genomes and Molecular Biology and Marine Biotechnology and Developmental Biology	
CO1	Determine genomic analysis and choose appropriate molecular biology techniques such as transformation, conjugation etc.
CO2	Demonstrate genomic DNA extraction and estimate gelatine and collagen from marine sources.
Course (Paper) Name and No.- Practicals of Applied Component: Biosafety	
CO1	Demonstrate essential biosafety protocols to handle biological materials safely in a laboratory setting.
CO2	Develop the ability to conduct risk assessments and implement safety measures to prevent laboratory hazards.
SEMESTER – VI	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Biochemistry [Paper I]	
CO1	Explain the quaternary protein ligand interactions, protein folding and degradation.
CO2	Explain metabolic pathways and to learn their importance.
CO3	To classify the hormones and their functions.
CO4	Identify the diseases associated with hormones.
Course (Paper) Name and No.- Industrial Microbiology [Paper II]	
CO1	Explain different productions in dairy industry.
CO2	Elaborate on bacterial and fungal inoculum development.
CO3	Examine outline of Down-streaming processing and understand various methods applied in solvent recovery, cell disruption & separation.
CO4	Demonstrate regarding requirements of GMP, QA-QC along with various documentation, validation of methods and Audit reports.

Course (Paper) Name and No.- Pharmacology and Neurochemistry [Paper III]	
CO1	Students will be able to Summarize the basic concept of mechanism of drug action.
CO2	Elaborate drugs and their poisonous effect if the administered for longer period of time.
CO3	Outline the basic concept of toxicology and their types.
CO4	Explain the basic neurochemistry and action of specific drugs on the Central Nervous System.
Course (Paper) Name and No.- Environmental Biotechnology [Paper IV]	
CO1	Apply renewable energy sources for both domestics and industrial application.
CO2	Explain the current applications of biotechnology to environmental quality evaluation, monitoring and remediation of contaminated environments.
CO3	Identify the most common techniques for preventing, minimizing, recycling, disposing and treatment of waste and their application on site remediation.
CO4	Discuss various treatment methodologies for hazardous waste management.
Course (Paper) Name and No.- Applied component: Agribiotechnology [Paper VI]	
CO1	Apply greenhouse technology and its uses.
CO2	Explain the methods of plant improvement and use of microbes as bio-fertilizers, PGPRs, bio-pesticides, Microbial Inoculants.
CO3	Illustrate the Inoculate formulations, biocontrol and Polymicrobial Inoculant Formulations.
CO4	Discuss genetic and molecular markers in plant breeding.
Course (Paper) Name and No.- Practicals of Biochemistry and Industrial Microbiology	
CO1	Develop hands-on proficiency in biochemical techniques, such as protein separation by salting out, dialysis, and size exclusion chromatography etc.
CO2	Develop practical skills in industrial microbiology through microbial analysis, production of fermented products and its analysis.
Course (Paper) Name and No.- Practicals of Pharmacology - Neurochemistry and Environmental Biotechnology and Project Work	
CO1	Organise hands-on experience and practical skills in evaluating pharmacological parameters such as LD50 and ED50 using suitable models.
CO2	Develop proficiency in environmental biotechnology methods, including the study of heavy metal effects on bacterial growth, physico-chemical analysis of industrial effluents.

Course (Paper) Name and No.- Practical of Applied Component: Agribiotechnology	
CO1	Develop hands-on experience in isolating beneficial microbes and in preparing and evaluating the effects of bio-fertilizers on plant growth.
CO2	Develop practical skills in conducting rapid screening tests for abiotic stress tolerance, estimating proline content in salt-stressed plants, preparing synthetic seeds etc.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Biotechnology

M.Sc. (Biotechnology)

POs		
Sr. No.	Outcome for M.Sc. Program After completion of M.Sc. program students will acquire	Graduate Attribute
PO1	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge
PO2	An ability to demonstrate proficiency in various instrumentation, modern tools, and advanced techniques to meet industrial expectations and research outputs.	Disciplinary knowledge
PO3	Ability to identify problems, formulate, and prove hypotheses by applying theoretical knowledge and skills relevant to the discipline.	Problem-solving
PO4	The ability to articulate thoughts, research ideas, information, scientific outcomes in oral and in written presentation to a range of audience.	Communication skills
PO5	A capacity for independent, conceptual, and creative thinking, and critical analysis through the existing methods of enquiry.	Critical thinking
PO6	Acquisition of skills required for cutting edge research, investigations, field study, documentation, networking, and ability to build logical arguments using scholarly evidence.	Research skills
PO7	An ability to portray good interpersonal skills with the ability to work collaboratively as part of a team undertaking a range of different team roles	Teamwork
PO8	The ability to understand ethical responsibilities and impact of scientific solutions in global, societal, and environmental context and contribute to sustainable development	Moral and ethical awareness/ multicultural competence
PO9	An openness to and interest in life-long learning through directed and self-directed study	self-directed learning
PO10	The ability to translate the knowledge and demonstrate the skills required to be employed and successful professional development.	Life-long learning
PO11	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge

PSOs	
PSO1	Courses will provide integrated knowledge of biochemistry, cell biology and Immunology with details of protein folding, protein targeting, and regulation of metabolic pathways, bio-membranes, cell signalling, vaccinology, immunological techniques and Animal Models.
PSO2	Students will develop understanding of history, theoretical basis, and latest technologies in the area of biotechnology.
PSO3	On completion of course, students should be able to gain basic skills in plant and animal biotechnology.
PSO4	Students will get conceptual exposure to computational, biostatical and bioinformatics tools.
PSO5	Course will provide integrated knowledge of operations of various fermenters and important microbial/enzymatic industrial processes in the food and fuel industry. It will also provide knowledge on intellectual property rights and their implications in biological research and product development
PSO6	Courses will provide integrated knowledge and broad perspectives of various pandemics diseases and emerging pathogens. Students will be familiar with the basic concepts and significance of Biologics/Biosimilar principles and the applications of enzyme technology with enzyme purification techniques.
PSO7	Students will develop understanding about Health hazards of pollution and waste, solid waste management, biodiversity concepts and data management and environmental monitoring.
PSO8	Students will be able to understand the basic science behind the properties of nanomaterials synthesis and applications of nanomaterials.
PSO9	Students will get knowledge of the emerging fields of OMICS and Systems Biology, biological systems as a whole and how parts of systems interact with each other and their applications for screening, testing and treatment of human diseases.
PSO10	Students will have a firm foundation in Drug Discovery and Clinical Studies along with detail information of Clinical Trial Design and Indian Regulations, Pharmacovigilance and Clinical Data Science.
PSO11	Students will develop skills for the processing and analysis of scientific data along with knowledge of techniques used Food Technology – Nutraceuticals.

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Biochemistry (Course-1)	
CO1	Illustrate major metabolic pathways with Principles of Metabolic regulations.
CO2	Discuss protein structure, folding pathways and diseases within the context.
CO3	Justify the role of amino-acid and nucleic acid metabolic pathways in various disease pathologies.
CO4	Importance of different adaptations in plants with respect to carbon assimilation.
Course (Paper) Name and No.- Cell Biology and Genetics (Course-2)	
CO1	Outline the concept of regulation of cell cycle and cell death.
CO2	Discuss cell-cell interactions, transport and trafficking in the maintenance of cellular integrity and functions.
CO3	Explain chromatin structure and organization of chromosomes.
CO4	Elaborate on karyotyping and mapping of the genome.
Course (Paper) Name and No.- Molecular Biology (Course-3)	
CO1	Compare the mechanism of replication in prokaryotes and eukaryotes.
CO2	Elaborate on transcription in Prokaryotes & Eukaryotes.
CO3	Explain the different DNA damage and repair systems.
CO4	Discuss the mechanism of translation, gene expression and transposition.
Course (Paper) Name and No.- (Practical of Course Biochemistry and Molecular Biology) (Course-4)	
CO1	Estimate the concentrations of different biomolecules.
CO2	Conduct Experiments related to Molecular Biology.
Course (Paper) Name and No.- Nutraceutical and Nutrigenomics (Elective-1)	
CO1	Explain characteristics features, classification and application of nutraceuticals.
CO2	Elaborate on significance of nutraceuticals and nutrigenomics for health management.
Course (Paper) Name and No.- (Practical of Cell Biology and Genetics and Nutraceutical and Nutrigenomics)	
CO1	Conduct Experiments related to Cell Biology.
CO2	Analyse the nutritive value and functional food.
Course (Paper) Name and No.-Research Methodology (Minor-1)	
CO1	Explain various scientific research and methodology.
CO2	Elaborate on different academic databases, search engines and research metrics.
CO3	Outline the different modes of scientific communication.
CO4	Discuss various research ethics and scientific misconduct.

Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.-Immunology and Medical Microbiology (Course-5)	
CO1	Discuss structural features of components of the immune system as well as their function.
CO2	Explain the concept of cytokines, hypersensitivity reactions and Autoimmunity.
CO3	Elaborate the concept of tumor immunology, immunodeficiency and Transplantation.
CO4	Explain the Types of Vaccine, concept of Vaccine technology, disease specific vaccine design.
Course (Paper) Name and No.- Advanced Techniques in Biotechnology (Course-6)	
CO1	Illustrate the principle, instrumentation and applications of various advanced spectroscopic techniques.
CO2	Elaborate on emerging techniques in Genomics & Transcriptomics.
CO3	Discuss the advanced techniques used in molecular cytogenetics.
CO4	Illustrate the principle underlying various advance microscopy & spectroscopy and proteomics techniques.
Course (Paper) Name and No.- Bioinformatics and Biostatistics (Course-7)	
CO1	Explain types of databases and sequence analysis.
CO2	Discuss various methods for protein modeling and sequence analysis and alignment.
CO3	Solve problems based on central tendency, dispersion, parametric and non-parametric tests.
CO4	Apply the various statistical tools like ANOVA, correlation, regression and probability for analysis of biological data.
Course (Paper) Name and No.- (Practical of Immunology and Medical Microbiology and Bioinformatics and Biostatistics)	
CO1	Apply the immunological Techniques.
CO2	Make use of Bioinformatics tools in Biotechnology.
Course (Paper) Name and No.- Nanobiotechnology (Elective-2)	
CO1	Explain different nanomaterials synthesis and its characterization.
CO2	Elaborate on application of nanomaterials and mechanism of nanotoxicity.
Course (Paper) Name and No.-(Practical of Advanced Techniques in Biotechnology and Nanobiotechnology)	
CO1	Apply advanced techniques such as 2D PAGE, affinity chromatography, SDS-PAGE, and immunoassays.
CO2	Develop expertise in techniques of nanobiotechnology such as, synthesis and characterization of nanoparticles, antimicrobial testing.

Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Applied Virology & Microbiology (Paper I)	
CO1	Discuss different pandemic diseases and its causative agent.
CO2	Apply epidemiological principles in prevention, control and management of pandemic disease.
CO3	Elaborate different Emerging Infections caused by pathogens.
CO4	Explain different aspects of biofilm and their management.
Course (Paper) Name and No.-Trends in Environmental Biotechnology (Paper II)	
CO1	Discuss on air pollution management in urban and rural areas.
CO2	Apply different methodologies for treatment of soil pollution.
CO3	Elaborate on different monitoring methods used for biodiversity and environmental sustainability.
CO4	Outline on different Biodiversity & Environment Monitoring methods.
Course (Paper) Name and No.- Agriculture and Animal Biotechnology (Paper III)	
CO1	To explain the various methods of the crop improvements such as micropropagation, somatic embryogenesis and, synthetic seed and germplasm conservation.
CO2	To contrast the conventional and modern crop improvement techniques such as metabolic engineering of plant and GM crop technology.
CO3	To identify the scope and applications of stem cell tissue engineering in modern clinical sciences.
CO4	To summarize the method of animal cloning technology and application of animal biotechnology in production of regenerative medicines and vaccines.
Course (Paper) Name and No.- Enzyme Technology and Bioentrepreneurship (Paper IV)	
CO1	Explain enzyme production and its purification.
CO2	Elaborate on trends in Enzymology and its application.
CO3	Build entrepreneurial skills, by understanding the various operations involved in venture creation.
CO4	Design business plans by understanding bio marketing.
Course (Paper) Name and No.- (Practical of Applied Virology & Microbiology and Trends in Environmental Biotechnology) PRACTICAL- I	
CO1	Develop skills in virology and microbiology techniques, including viral titering via plaque assays, immunoassays for virus detection, and antibiotic susceptibility testing.
CO2	Evaluate various parameters related to soil, water and compost quality.

Course (Paper) Name and No.- (Practical of Agriculture and Animal Biotechnology and Enzyme Technology and Bioentrepreneurship) PRACTICAL- II	
CO1	Develop skills in agriculture and animal biotechnology, including media preparation for plant tissue culture, micropropagation, synthetic seed preparation, and animal cell culture techniques.
CO2	Develop expertise in enzyme technology, including screening enzyme producing microorganisms, partial purification, and activity, as well as preparing business plans for marketing biopharmaceuticals or bio-agricultural products.
Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Nanobiotechnology and Food Biotechnology (Paper I)	
CO1	Classify the different types of nanomaterials and method for synthesis of nanomaterial.
CO2	Explain various applications of Nanomaterials and principles of Nano toxicology.
CO3	Outline steps involved in food processing, preservation and packaging.
CO4	Justify the role of nutraceuticals in management of health and disease.
Course (Paper) Name and No.-OMICS & Bioinformatics (Paper II)	
CO1	Explain OMICS technologies to contribute to different databases.
CO2	Compare the techniques involved in Genomics, Proteomics, transcriptomics, Lipidomics and Metabolomics.
CO3	Apply methods like DNA microarray, Proteomics etc.
CO4	Elaborate on applications of Bioinformatics in various fields.
Course (Paper) Name and No.-Approaches to Drug discovery and Biologics (Paper III)	
CO1	Explain drug and Clinical Research Informatics in Drug Discovery.
CO2	Experiment with protocols/techniques required for characterization of the Biosimilars relative to the Reference Biologic.
CO3	Elaborate on the basic concepts of production and significance of Biologics/Biosimilar.
CO4	Discuss scope, purpose and process of Pharmacovigilance
Course (Paper) Name and No.- Biostatistics & Intellectual Property Rights (Paper IV)	
CO1	Solve problems based on central tendency, dispersion, p value, correlation, regression.
CO2	Apply the various statistical tools for analysis of biological data.
CO3	Classify intellectual property rights and legal forms of protection.
CO4	Discuss ethical issues posed by biotechnological research and ethical implications of biotechnological products and techniques.

Course (Paper) Name and No.- (Practical of Nanobiotechnology and Food Biotechnology, OMICS & Bioinformatics, Approaches to Drug discovery and Biologics, Biostatistics & Intellectual Property Rights) PRACTICAL- I	
CO1	Explain synthesis and characterizing nanoparticles and Investigating bio-burden and antioxidant properties of various food products.
CO2	Develop expertise in bioinformatics techniques, including BLAST, ClustalW, and structure prediction databases, and will learn to perform phylogenetic analysis and utilize web resources like NCBI and Uniprot for biological data interpretation.
Course (Paper) Name and No.- Project Dissertation PRACTICAL- II	
CO1	Identify and investigate a research problem.
CO2	Apply an appropriate research design and extend it with appropriate methods.
CO3	Appraise the ethics of research.
CO4	Interpret the results drawing conclusions and justify the significance of the findings for educational practice and research. Organize the research work and Report writing.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Computer Science

B.Sc. (Computer Science)

POs		
Sr. No.	**Outcome for B.Sc. Program** **After completion of B.Sc. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyse, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyse and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

PSOs	
PSO1	Challenging and varied subjects aligned with the current trend with the introduction of Machine Intelligence specific subjects.
PSO2	Understand Data Management Skills.
PSO3	Learn the skills of Image processing.
PSO4	Introduction of the physical world through Architecting of IoT and Wireless Sensor Networks and Mobile Communication.
PSO5	Security domain is also evolved by the introduction of Ethical Hacking, Cyber Forensic and Information and Network Security.
PSO6	Get the hands-on experience Linux Server Administration and Web Services topics are included.

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Computer Organization Design and Architecture (Major I)	
CO1	Explain the underlying principles of computers.
CO2	Analyse the Instruction set architecture.
CO3	Analyse the role of various hardware components of processor.
Course (Paper) Name and No.- Programming with Python-I (Major II)	
CO1	Understand the basics of python.
CO2	Apply functions, loops and conditional statements.
CO3	Create the lists, tuples and dictionaries.
Course (Paper) Name and No.- Statistics for Data Science (VSC)	
CO1	Explain measures of central tendency.
CO2	Describe the measures of dispersion and Classify discrete, continuous probability distribution.
Course (Paper) Name and No.- Web Designing (SEC)	
CO1	Design Table, Form using HTML5.
CO2	Understand the concept of CSS.

Course (Paper) Name and No.- Programming with C (SEC)	
CO1	Implement basic concepts of C.
CO2	Develop code based on decision making.
Course (Paper) Name and No.- History and Evolution of Computing (IKS)	
CO1	Implement basic concepts of C.
CO2	Develop code based on decision making.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Relational Database System (Major I)	
CO1	Illustrate the basic elements of a relational database management system.
CO2	Identify the data models for relevant problems.
Course (Paper) Name and No.- Programming with Python-II (Major II)	
CO1	Implement the concepts of file handling.
CO2	Implement the concepts of exception handling.
CO3	Develop the Graphical user Interfaces using Tkinter.
Course (Paper) Name and No.- Artificial Intelligence (Minor)	
CO1	Explain the concepts, techniques and building blocks of AI.
CO2	Apply different AI strategies for problem-solving, inference, vision, knowledge representation and learning.
Course (Paper) Name and No.- Linear Algebra: Applications in Computer Science (VSC)	
CO1	Define vector spaces and subspaces.
CO2	Compare matrices and linear transformation.
Course (Paper) Name and No.- PHP Programming (SEC)	
CO1	Summarize the basic concepts of PHP and its applications.
Course (Paper) Name and No.- Programming with C++ (SEC)	
CO1	Implement features of object-oriented programming to solve real world problems.
Semester III	
After completing the course, Student will able to;	

Course (Paper) Name and No.- I.Theory of Computation	
CO1	Summarize the mathematical concepts of theoretical computer science.
CO2	Build abstract machines using associated languages and grammars.
CO3	Apply rigorous formal mathematical methods to prove properties of languages, grammars, and automata.
CO4	Evaluate solvable and unsolvable problems.
Course (Paper) Name and No.- II.Core Java	
CO1	Design java-based applications using Object-oriented features.
CO2	Demonstrate the use of predefined and customizable packages for real-time applications.
CO3	Explain the concepts of Wrapper classes, Collections, and Inner classes.
CO4	Explain the concepts of File, Exception handling and Networking.
Course (Paper) Name and No.- III. Operating System	
CO1	Describe the fundamental structure of an operating system.
CO2	Utilize operating system algorithms such as CPU scheduling, Process, and Deadlock.
CO3	Analyse the behaviour of the operating system in terms of process synchronization and coordination.
CO4	Illustrate the concept of file and memory management of an operating system.
Course (Paper) Name and No.- IV. Database Management Systems	
CO1	Describe the principles of database management systems.
CO2	Identify different storage and recovery techniques used in database systems.
CO3	Apply crash recovery and transaction management techniques on database.
CO4	Build a PL/SQL program that will handle data manipulation operations using Oracle databases.
Course (Paper) Name and No.- V. Combinatorics and Graph Theory (Core Subject)	
CO1	Utilize combination, permutation, and enumeration techniques to solve counting problems.
CO2	Apply the basic concepts of graph theory, such as Eulerian trails, Hamiltonian cycles, bipartite graphs, and planar graphs.
CO3	Evaluate real-time problems using the concept of graph theory.
CO4	Analyze different strategies to find out the optimal solution.

Course (Paper) Name and No.- VI. Physical Computing and IoT Programming (Core Subject)	
CO1	Analyze System On Chip Architectures.
CO2	Explain the preparation of Raspberry Pi hardware and installation.
CO3	Apply Linux commands to configure Raspberry Pi.
CO4	Demonstrate the use of predefined raspberry pi interfaces for real-time applications.
Course (Paper) Name and No.-VII. Web Programming (Skill Enhancement)	
CO1	Design valid, and meaningful web pages using emerging technologies.
CO2	Develop client-side and server-side web applications using scripting language.
CO3	Develop database-driven web-based applications.
CO4	Create web-based applications using XML.
Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- I. Fundamentals of Algorithms (Core Subject)	
CO1	Understand concepts of algorithms to design efficient program.
CO2	Analyse solution to an algorithmic problem with optimize solution.
CO3	Apply types of Data Structures to real world problem.
CO4	Analyze algorithms for Time and Space Complexity.
Course (Paper) Name and No.-II. Advanced JAVA (Core Subject)	
CO1	Explain the concepts of J2EE architecture and MVC Architecture along with struts framework.
CO2	Design dynamic web applications using java database connectivity and server side technologies.
CO3	Understand and explore use of java server programming.
CO4	Design java application using JavaBeans and JSON.
Course (Paper) Name and No.-III. Computer Networks (Core Subject)	
CO1	Explain the concepts of networking.
CO2	Analyse IP addressing and its role in networking.
CO3	Analyse the role of each layer in the network model.
CO4	Outline the role of protocols provided by each layer of network model.

Course (Paper) Name and No.-IV. Software Engineering (Core Subject)	
CO1	Illustrate the different phases of Software development life cycle.
CO2	Apply software testing and quality assurance concepts while developing software.
CO3	Design and develop software requirement specification documents using OOAD.
CO4	Understand software measurement and metrics.
Course (Paper) Name and No.-V. Linear Algebra using Python (Core Subject)	
CO1	Develop a computational thinking while learning linear algebra.
CO2	Apply implementation of linear algebra concepts using python.
CO3	Understand span, linear independence, basis, and dimension, and apply these concepts to various vector spaces and subspaces.
CO4	Compare the concepts of linear algebra in the field of computer science.
Course (Paper) Name and No.-VI. .Net Technologies (Core Subject)	
CO1	Understand the Framework of Dot Net technology.
CO2	Develop dynamic, interactive and responsive web applications using various controls and events.
CO3	Apply various validation controls to authenticate web pages.
CO4	Build a connection between database and web page.
Course (Paper) Name and No.- VII. Android Developer Fundamentals (Skill Enhancement)	
CO1	Demonstrate the Understanding of fundamental of Android Programming.
CO2	Sketch attractive Interfaces by using layouts and controls.
CO3	Develop Android applications by using Java programming language.
CO4	Demonstrate programming skills for managing tasks on mobile platform.
Semester V	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Artificial Intelligence (Elective-I)	
CO1	Explain the concepts, techniques and building blocks of AI.
CO2	Apply different AI strategies for problem-solving, inference, vision, knowledge representation, and learning.
CO3	Design and develop various applications of AI techniques in Intelligent agent, and Expert system.
CO4	Compare different reinforcement learning approaches.

Course (Paper) Name and No.- Linux Server Administration (Elective-I)	
CO1	Demonstrate the installation of Linux server.
CO2	Demonstrate the role and responsibilities of a Linux system administrator.
CO3	Develop and maintain Linux-based system.
CO4	Apply appropriate service on Linux server as per requirement.
Course (Paper) Name and No.- Software Testing and Quality Assurance (Elective-I)	
CO1	Describe fundamental concepts of software metrics and quality assurance.
CO2	Demonstrate Software Quality Tools and their effectiveness.
CO3	Apply various types of manual and automated testing.
CO4	Identify and manage defects of software to improve its quality.
Course (Paper) Name and No.- Information and Network Security (Elective-II)	
CO1	Identify generic security threats and vulnerabilities.
CO2	Analyse information and network security Problems.
CO3	Assess and Apply various cryptographic techniques.
CO4	Implement security solutions for confidentiality, authentication, and privacy.
Course (Paper) Name and No.- Architecting of IoT (Elective-II)	
CO1	Design & develop IoT Devices.
CO2	Evaluate various IOT data link layer protocols.
CO3	Evaluate various IOT Network layer protocols.
CO4	Demonstrate the working of sensors, Actuators.
Course (Paper) Name and No.- Web Services (Elective-II)	
CO1	Describe the web service specification standards and the primitives of Service Oriented Architecture.
CO2	Create web services using core components of the framework.
CO3	Examine the principles and applications of SOAP-based and REST-based web services.
CO4	Develop secure and quality-based web services.
Course (Paper) Name and No.- Game Programming (Skill Enhancement)	
CO1	Apply geometric concepts for the preparation of animation clips.
CO2	Demonstrate the use of DirectX graphical engine.
CO3	Describe the architecture of Graphical Processing Unit.
CO4	Differentiate Augmented, Virtual, and Mixed Reality techniques.

Course (Paper) Name and No.- Project Implementation	
CO1	Design and develop computer-based software for current and advanced trends.
CO2	Demonstrate communication and technical skills.
Semester VI	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Cloud Computing (Elective-I)	
CO1	Explain delivery models of cloud computing architecture.
CO2	Describe the functions of a virtual data centre and cloud computing.
CO3	Analyse the Software as a Service in cloud computing.
CO4	Apply cloud computing frameworks in different environment.
Course (Paper) Name and No.- Cyber Forensics (Elective-I)	
CO1	Plan and Prepare all stages of an investigation to collect evidences.
CO2	Analyse information gathered and report them in the form of document to present in the court.
CO3	Analyse legal aspect and Ethics in cyber forensics.
CO4	Evaluate real time case study in cyber forensics.
Course (Paper) Name and No.- Wireless Sensor Network and mobile communication (Elective-I)	
CO1	Demonstrate the functioning of wireless communication system and standards.
CO2	Explain multiple access techniques for Wireless Communication.
CO3	Understand various applications of wireless network.
CO4	Design and implementation of wireless sensors.
Course (Paper) Name and No.- Information Retrieval (Elective-II)	
CO1	Describe the field of Information retrieval and its relationship to search engines.
CO2	Compare different types of link analysis and specialized search methods.
CO3	Examine the different retrieval metrics for evaluating information retrieval.
CO4	Analyse various search engine optimization techniques.
Course (Paper) Name and No.- Digital Image Processing (Elective-II)	
CO1	Describe the fundamental concepts of a digital image processing system.
CO2	Analyse the images in the frequency domain using various transforms.
CO3	Evaluate image enhancement techniques.
CO4	Apply various compression and segmentation techniques.

Course (Paper) Name and No.- Data Science (Elective-II)	
CO1	Describe the concept of data, information and knowledge.
CO2	Apply different data mining techniques to real world business problems and interpret results using data visualization techniques.
CO3	Analyse ethical issues related to data security and privacy in business.
CO4	Develop data mining models.
Course (Paper) Name and No.- Ethical Hacking (Skill Enhancement)	
CO1	Identify different phases of an attack.
CO2	Demonstrate security, vulnerabilities and weakness in target application.
CO3	Identify legal and ethical issues related to vulnerability and penetration testing.
CO4	Test and exploit system using various tools and understand impact of hacking and real time machines.
Course (Paper) Name and No.- Project Implementation	
CO1	Design and develop computer-based software for current and advanced trends.
CO2	Demonstrate communication and technical skills.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Computer Science

M.Sc. (Computer Science)

POs		
Sr. No.	**Outcome for M.Sc. Program After completion of M.Sc. program students will acquire**	**Graduate Attribute**
PO1	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge
PO2	An ability to demonstrate proficiency in various instrumentation, modern tools, and advanced techniques to meet industrial expectations and research outputs.	Disciplinary knowledge
PO3	Ability to identify problems, formulate, and prove hypotheses by applying theoretical knowledge and skills relevant to the discipline.	Problem-solving
PO4	The ability to articulate thoughts, research ideas, information, scientific outcomes in oral and in written presentation to range of audience.	Communication skills
PO5	A capacity for independent, conceptual, and creative thinking, and critical analysis through the existing methods of enquiry.	Critical thinking
PO6	Acquisition of skills required for cutting edge research, investigations, field study, documentation, networking, and ability to build logical arguments using scholarly evidence.	Research skills
PO7	An ability to portray good interpersonal skills with the ability to work collaboratively as part of a team undertaking a range of different team roles	Teamwork
PO8	The ability to understand ethical responsibilities and impact of scientific solutions in global, societal, and environmental context and contribute to sustainable development	Moral and ethical awareness/ multicultural competence
PO9	An openness to and interest in life-long learning through directed and self-directed study	self-directed learning
PO10	The ability to translate the knowledge and demonstrate the skills required to be employed and successful professional development.	Life-long learning
PO11	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge

PSOs	
PSO1	Learners will be able to communicate computer science concepts, designs, and solutions effectively and professionally.
PSO2	Able to Identify, analyse and synthesize scholarly literature relating to the field of computer science.
PSO3	Gain knowledge of computing to produce effective designs and solutions for specific problems.
PSO4	Promotes research-oriented activity through different subjects.

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Analysis of Algorithm and Research Computing(Major I)	
CO1	Describe detailed design strategies of the algorithm.
CO2	Illustrate various advanced design and analysis techniques.
CO3	Analyse Number- Theoretic algorithms to solve NP-completeness problems.
CO4	Elaborate the ideas of research.
Course (Paper) Name and No.- Robotics(Major II)	
CO1	Describe the concepts of robotics and its components.
CO2	Analyse the internal and external perceptions of the robot based on different types of sensors.
CO3	Evaluate the planning, mapping, and navigation of robots.
CO4	Construct a robot using Raspberry Pi.
Course (Paper) Name and No.- Wireless Sensor Network (Major III)	
CO1	Understand various applications of wireless sensor networks.
CO2	Describe the concepts, protocols, design and implementation of wireless sensor networks.
CO3	Evaluate new ideas for solving wireless sensor network design issues.
Course (Paper) Name and No.- Research Methodology (Minor)	
CO1	Formulate research problem and carry out research analysis.
CO2	Follow research ethics.
CO3	Understand about IPR and filing patents in R&D.

Course (Paper) Name and No.- Advanced Database Systems(Elective)	
CO1	Describe the concept of distributed database systems.
CO2	Illustrate data modelling and database development processes for object-oriented, temporal, spatial databases and deductive database.
Course (Paper) Name and No.- Machine Intelligence (Elective)	
CO1	Understand the basic concepts and types of learning from data.
CO2	Analyse the models using different Machine Learning techniques.
CO3	Create probabilistic and unsupervised learning models for handling unknown patterns.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Cloud Computing (Major I)	
CO1	Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing.
CO2	Identify problems, and explain, analyse, and evaluate various cloud computing platforms for the solution.
CO3	Implement different types of Service Oriented Architecture systems.
CO4	Analyse the issues in Resource provisioning and Security governance in clouds.
Course (Paper) Name and No.- Natural Language Processing(Major II)	
CO1	Design and implement NLP applications that solve real-world problems such as sentiment analysis, named entity recognition, and machine translation.
CO2	Develop practical skills in implementing NLP techniques for word level, syntactic, and semantic analysis to solve real-world problems.
CO3	Demonstrate a solid understanding of the fundamental concepts and techniques of NLP, including linguistic theories, parsing, tokenization, and part-of-speech tagging.
Course (Paper) Name and No.- Security(Cryptography and Cryptanalysis)(Major III)	
CO1	Analyse the modes of attacks and security threats.
CO2	Understand the hierarchy of cipher.
CO3	Interpret the working of DES.
CO4	Interpret the working of RSA cryptosystem.

Course (Paper) Name and No.- Business Intelligence and Big data Analytics (Elective)	
CO1	Describe the concepts of Business Intelligence and data warehouse.
CO2	Build business Data Warehouse.
CO3	Evaluate data mining process and Association analysis.
Course (Paper) Name and No.- Machine Learning (Elective)	
CO1	Acquire point estimation techniques for estimating parameters of machine learning models.
CO2	Analyse advanced machine learning techniques for classification.
Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.-I. Advanced Computing (Web3 Technologies)	
CO1	Demonstrate a comprehensive understanding of block chain technology, including its principles, architecture, and use cases.
CO2	Analyze the security and privacy implications of block chain technology, and implementing cryptographic techniques to ensure data integrity and confidentiality.
CO3	Apply block chain concepts to solve real-world problems, and develop decentralized applications using smart contracts.
CO4	Identify the potential benefits and limitations of block chain technology in different industries, and evaluate its suitability for different use cases.
Course (Paper) Name and No.-I. Advanced Computing (Trends in Cloud Computing)	
CO1	Articulate the main mechanism, key technologies of cloud computing.
CO2	Explain various cloud computing architectures.
CO3	Implement different types of cloud management services.
CO4	Explain various areas of applications for cloud computing.
Course (Paper) Name and No.- II. Security (Cryptography and Cryptanalysis)	
CO1	Analyse the concept of cryptography and cryptanalysis.
CO2	Analyse and use methods for cryptography.
CO3	Implement some of the prominent techniques for public-key cryptosystems and digital signature schemes.
CO4	Understand the notions of public-key encryption and digital signatures and sketch their formal security definitions.

Course (Paper) Name and No.- II. Security (Cyber Security and Risk Assessment)	
CO1	Develop skills to use kali Linux for penetration testing.
CO2	Use open-source tools for Reconnaissance.
CO3	Perform vulnerability assessment using popular tools.
CO4	Learn about advanced ways to exploit web apps and cloud security.
Course (Paper) Name and No.- III. Business Intelligence and Big Data Analytics –II (Mining Massive Data sets)	
CO1	Apply pre-processing techniques on Big data.
CO2	Apply relational algebra, matrix operations using map reduce.
CO3	Analyse similarity and hashing concepts of documents.
CO4	Evaluate stream concepts like sampling, filtering, estimating moments etc.
Course (Paper) Name and No.- III. Big Data Analytics: Tools and Frameworks	
CO1	Evaluate Data engineering as a discipline of study and differentiate it from Data Science.
CO2	Design and build data warehouses.
CO3	Collect data from the web and store it in SQL and NoSQL databases.
CO4	Perform data transformation and analysis.
Course (Paper) Name and No.- IV. Predictive Modelling and Analytics	
CO1	Examine data set for prediction analysis.
CO2	Analyse the predictor model which helps in the context of decision making.
CO3	Interpret the results of implemented techniques.
CO4	Understand the decision making process based on prediction.
Course (Paper) Name and No.-IV. Machine Learning	
CO1	Acquire point estimation techniques for estimating parameters of machine learning models.
CO2	Analyse advanced Machine Learning techniques for classification.
CO3	Compare different sampling techniques.
CO4	Construct directed acyclic graph.

Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.-I. Simulation and Modelling	
CO1	Understand principles of simulation and usage of software.
CO2	Demonstrate the use of statistical and queuing models in simulation.
CO3	Analyse input models with proper verification and validation.
CO4	Analyse output for a single model.
Course (Paper) Name and No.- II. Deep Learning	
CO1	Demonstrate the use of Deep Feed-forward Network.
CO2	Analyse optimization of Deep Models training.
CO3	Build and train CNN and RNN.
CO4	Demonstrate use of Auto encoders and Deep Generative Models.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Computer Science

M.Sc. (Data Analytics)

POs		
Sr. No.	**Outcome for M.Sc. Program After completion of M.Sc. program students will acquire**	**Graduate Attribute**
PO1	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge
PO2	An ability to demonstrate proficiency in various instrumentation, modern tools, and advanced techniques to meet industrial expectations and research outputs.	Disciplinary knowledge
PO3	Ability to identify problems, formulate, and prove hypotheses by applying theoretical knowledge and skills relevant to the discipline.	Problem-solving
PO4	The ability to articulate thoughts, research ideas, information, scientific outcomes in oral and in written presentation to range of audience.	Communication skills
PO5	A capacity for independent, conceptual, and creative thinking, and critical analysis through the existing methods of enquiry.	Critical thinking
PO6	Acquisition of skills required for cutting edge research, investigations, field study, documentation, networking, and ability to build logical arguments using scholarly evidence.	Research skills
PO7	An ability to portray good interpersonal skills with the ability to work collaboratively as part of a team undertaking a range of different team roles	Teamwork
PO8	The ability to understand ethical responsibilities and impact of scientific solutions in global, societal, and environmental context and contribute to sustainable development	Moral and ethical awareness/ multicultural competence
PO9	An openness to and interest in life-long learning through directed and self-directed study	self-directed learning
PO10	The ability to translate the knowledge and demonstrate the skills required to be employed and successful professional development.	Life-long learning
PO11	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge

PSOs	
PSO1	Learners will be able to communicate computer science concepts, designs, and solutions effectively and professionally.
PSO2	Able to Identify, analyse and synthesize scholarly literature relating to the field of computer science.
PSO3	Gain knowledge of computing to produce effective designs and solutions for specific problems.
PSO4	Promotes research-oriented activity through different subjects

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Statistical Methods and Probability Distribution(Major I)	
CO1	Apply the descriptive statistical concepts.
CO2	Categorize the data by making displays, summaries and tables.
CO3	Apply the standard discrete probability distributions to various situations.
CO4	Evaluate various continuous probability distributions.
Course (Paper) Name and No.- Python Programming I(Major II)	
CO1	Explain the core concepts of the python programming language.
CO2	Create the python programs using compound data types.
CO3	Create classes and objects.
CO4	Design and implement GUI & Database applications.
Course (Paper) Name and No.- Business Intelligence and Big Data Analytics (Major III)	
CO1	Understand the basic concept of Business Intelligence and data Pre-processing in the real world.
CO2	Understand the concept of Data warehouse and Data mining.
CO3	Implement Analytical methods of Big Data.
CO4	Explore Big Data applications using Hadoop tools.

Course (Paper) Name and No.- Research Methodology (Minor)	
CO1	Formulate research problem and carry out research analysis.
CO2	Follow research ethics.
CO3	Understand about IPR and filing patents in R & D.
Course (Paper) Name and No.- Advanced Microsoft Excel(Elective)	
CO1	Understand the features of Excel.
CO2	Understand the use of various functions in Excel.
CO3	Analyse the working of different functions and chart wizard.
Course (Paper) Name and No.- Data Warehousing and Data Mining (Elective)	
CO1	Design a Data warehouse system and perform business analysis with OLAP tools.
CO2	Apply frequent pattern and association rule mining techniques for data analysis.
CO3	Apply appropriate classification and clustering techniques for data analysis.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Advanced Statistical methods and Testing of hypothesis (Major I)	
CO1	Analyse the estimation theory.
CO2	Interpret sample and population distribution and their applications.
CO3	Examine various statistical tests to classify the data.
CO4	Evaluate regression and time series analysis.
Course (Paper) Name and No.- Python Programming II (Major II)	
CO1	Explain the core concepts of data analysis and computing using python.
CO2	Create the python programs using libraries.
CO3	Apply practical knowledge to Machine learning and deep learning.
CO4	Apply models for data analysis.
Course (Paper) Name and No.- Data Science(Major III)	
CO1	Understand basic data science concepts.
CO2	Explain layered frameworks and technology stack in data science.
CO3	Elaborate management layers in data science and assess super steps in data science.
CO4	Utilize, transform and report super steps.

Course (Paper) Name and No.- Text Mining(Elective)	
CO1	Compare and contrast methods for sentence segmentation, tokenization, part-of-speech tagging, syntactic parsing and semantic representation.
CO2	Categorize the text using knowledge engineering and machine learning techniques.
CO3	Apply different information extraction techniques.
Course (Paper) Name and No.- Linear Algebra using Python (Elective)	
CO1	Understand the features of Excel.
CO2	Understand the use of various functions in Excel.
CO3	Analyse the working of different functions and chart wizard.
Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.-I Deep Learning	
CO1	Extract features from Image and Video Data.
CO2	Implement Image Segmentation and Instance Segmentation in Images.
CO3	Implement image recognition and image classification using a pertained network (Transfer Learning).
CO4	Analyse Traffic Information using Twitter Data.
Course (Paper) Name and No.- II Big Data Analytics: Tools and Frameworks	
CO1	Understand the fundamental concepts and principles of big data analytics.
CO2	Demonstrate proficiency in utilizing Apache Spark for in-memory computing, interactive data analysis, and building scalable big data applications.
CO3	Apply tools such as Hive, HBase, Sqoop, and Flume for data warehousing, querying, and data ingestion in the Hadoop ecosystem.
CO4	Apply tools such as Hive, HBase, Sqoop, and Flume for data warehousing, querying, and data ingestion in the Hadoop ecosystem.
Course (Paper) Name and No.-III Soft Computing	
CO1	Apply various soft computing techniques for real time problems.
CO2	Use appropriate neural network for real time problems.
CO3	Use fuzzy rules and reasoning to develop decision support system and expert system.
CO4	Apply genetic techniques for optimization problems.

Course (Paper) Name and No.- III Time Series Analysis	
CO1	Estimate models for time series data sets.
CO2	Interpret the results of implemented techniques.
CO3	Gain and explore the knowledge of time and space domains.
CO4	Explore and solve statistical problems related to time series.
Course (Paper) Name and No.-IV Natural Language Processing	
CO1	Understand the field of natural language processing.
CO2	Sense of the capabilities and limitations of current natural language technologies.
CO3	Model linguistic phenomena with formal grammar.
CO4	Understand the mathematical and linguistic foundations underlying approaches to the various areas in NLP.
Course (Paper) Name and No.-IV Information Retrieval	
CO1	To understand about search engine.
CO2	To understand about Retrieval models and implementation: Vector Space Models.
CO3	To understand about Query expansion and feedback.
CO4	To understand about Probabilistic models; statistical language models.
Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- I. Data Visualization	
CO1	Explore various data visualization techniques in order to provide new insight.
CO2	Apply appropriate data visualization techniques to provide trends/insights for the given dataset.
CO3	Apply visualization tools / techniques for various data analysis tasks.
CO4	Given the application context for a given data set, Design the information Dashboard for access information based on user criteria.
Course (Paper) Name and No.- II.Predictive Modelling and Analytics	
CO1	Estimate data set for prediction analysis.
CO2	Interpret the results of implemented techniques.
CO3	Understand the decision-making process based on prediction.
CO4	Gain knowledge about making use of information in the context of decision making.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Information Technology

B.Sc. (Information Technology)

POs		
Sr. No.	**Outcome for B.Sc. Program After completion of B.Sc. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

PSOs	
PSO1	Gain proficiency in the field of Networking and Security.
PSO2	Develop Programming skills that help to meet the needs of the IT industry.
PSO3	Build soft skills for employability and personality development in the Industrial environment.

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Introduction to C++ (Major I)	
CO1	Define basic concepts of C++ programming language.
CO2	Illustrate different types of operators of C++ language.
CO3	Explain characteristics of object oriented programming approach with C++.
CO4	Elaborate Classes and objects in OOPs.
Course (Paper) Name and No.- Introduction to C++ Practical (Major I)	
CO1	Demonstrate basic C++ programs.
CO2	Construct C++ programs using conditional statements and loops.
CO3	Explain use of functions and arrays in C++ programs.
CO4	Build programs using classes and objects, constructors and inheritance.
Course (Paper) Name and No.- Computer Organization and Design (MajorII)	
CO1	Explain the underlying principles of computers.
CO2	Analyse how data is transferred between various peripheral devices in the computer.
CO3	Define the various types of number systems and logic gates.
CO4	Elaborate the different types of Flip-Flops.
Course (Paper) Name and No.- Computer Organization and Design Practical (Major II)	
CO1	Classify logic gates and their ICs and universal gates.
CO2	Simplify the given Boolean expressions using a minimum number of logic gates and ICs.
CO3	Build arithmetic circuits.
CO4	Design Encoder, Decoder, Multiplexer and Demultiplexer.
Course (Paper) Name and No.- Introduction to Statistics (VSC)	
CO1	Recall measures of central tendency.
CO2	Describe the measures of dispersion.
CO3	Classify discrete and continuous probability distribution.
CO4	Solve various problems with help of probability

Course (Paper) Name and No.- Introduction to Statistics Practical (VSC)	
CO1	Make use of basic commands of R programming.
CO2	Analyse the concepts of various descriptive statistical functions.
CO3	Analyse the concepts of various Graphical functions.
CO4	Explain the probability using programming.
Course (Paper) Name and No.- Introduction to Web Designing (SEC)	
CO1	Define fundamentals of Internet, and the principles of web design.
CO2	Build semantic, HTML and CSS web page.
CO3	Elaborate a Code handful and useful HTML & CSS examples.
CO4	Make use of implementation of Hyperlink.
Course (Paper) Name and No.- Introduction to Web Designing Practical (SEC)	
CO1	Define head tag and body tag in the give web page.
CO2	Creating static web pages using HTML5 and CSS
CO3	Design a responsive website using HTML5 and CSS.
CO4	Determine the procedure to organize display as per given screen layout using frames.
Course (Paper) Name and No.- Introduction to Multimedia (OE1)	
CO1	Summarize the key concepts in current multimedia technology.
CO2	Find different Image Format and study it.
CO3	List the different types of audio and video format.
CO4	Create quality multimedia software titles.
Course (Paper) Name and No.- Introduction to Photoshop (OE2)	
CO1	Understand the basics of Adobe Photoshop to create and edit images.
CO2	Develop images using Photoshop tools.
CO3	Demonstrate the use of models and layers in images.
CO4	Design RGB, 3d objects using models and layers.
Course (Paper) Name and No.- Digital and Technology Solution (VEC)	
CO1	Build knowledge about digital paradigm.
CO2	Elaborate the importance of digital technology, digital financial tools, e-commerce.
CO3	List the e-governance and Digital India initiatives
CO4	Explain use & applications of digital technology

Course (Paper) Name and No.- History of Evolution and Growth of IT in India (IKS)	
CO1	Define scope and historical background of IT in India.
CO2	Demonstrate pre-independence and post-independence era of IT industry in India.
CO3	Determine growth of software industry in India.
CO4	Elaborate challenges and future aspects of indian IT industry.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Programming Fundamentals Using Python (Major I)	
CO1	Explain Python syntax and basic programming concepts.
CO2	Utilize data types, variables, and operators in Python.
CO3	Learn control flow statements (if-else, loops) for program control and logic.
CO4	Acquire knowledge of built-in data structures like lists, tuples, and dictionaries.
Course (Paper) Name and No.- Programming Fundamentals Using Python Practical (Major I)	
CO1	Understanding the Scripting and Automation in python.
CO2	Implement the Handling of User Input.
CO3	Implement Programming Concepts like structure, pattern, etc.
CO4	Identify the methods to create and manipulate programs.
Course (Paper) Name and No.- Database Management System (Major II)	
CO1	Design E-R model to represent normalized database.
CO2	Explain the fundamental of RDBMS.
CO3	Explain the transactions of database.
CO4	Elaborate the View in DBMS
Course (Paper) Name and No.- Database Management System Practical (Major II)	
CO1	Build Basic Database.
CO2	Build SQL statement.
CO3	Modify E-R model to relational table.
CO4	Construct integrity constraints.

Course (Paper) Name and No.- Introduction to Embedded System (Minor)	
CO1	Explain Microprocessor, Microcontroller.
CO2	Make use of Assembly Language Programming
CO3	Define core components of embedded system.
CO4	Elaborate 8051 embedded c.
Course (Paper) Name and No.- Introduction to Embedded System Practical (Minor)	
CO1	Create simple Assembly Language Program.
CO2	Evaluate Operations on Memory Locations.
CO3	Design a reprogrammable embedded computer using 8051 microcontroller.
CO4	Make use of components like seven-segment display, Oscilloscope, Stepper motor and create traffic signals.
Course (Paper) Name and No.- Linear Algebra (VSC)	
CO1	Define vector spaces and subspaces.
CO2	Relate matrices and linear transformation.
CO3	Find kernel and image of linear transformation.
CO4	Evaluate matrix representation.
Course (Paper) Name and No.- Linear Algebra Practical (VSC)	
CO1	Make use of basic commands of python programming.
CO2	Explain properties of vector spaces.
CO3	Analyze the concept of properties of linear transformation.
CO4	Evaluate determinant and inverse of matrix.
Course (Paper) Name and No.- Advanced Web Programming (SEC)	
CO1	Elaborate the creation of dynamic web pages using server side PHP programming.
CO2	Explain use of advanced technologies such as JQuery to create attractive interactive web pages.
CO3	Make use of MySQL to integrate web forms and databases.
CO4	Explain the basics of XML markup Language.
Course (Paper) Name and No.- Advanced Web Programming Practical (SEC)	
CO1	Use PHP to create dynamic web pages.
CO2	Create responsive web pages to interact with databases.
CO3	Develop attractive web pages using advanced technologies such as JQuery and XML.

Course (Paper) Name and No.- Privacy and security in online social media (OE1)	
CO1	Explain the importance of privacy in the digital age
CO2	Identify common security threats in online social media
CO3	Implement measures to protect privacy and enhance security
CO4	Explain online social media policy and privacy
Course (Paper) Name and No.- Introduction to Game Designing and Cartoon Animation(OE2)	
CO1	Summarize Scratch Interfaces
CO2	Create the Scratch mini Projects
CO3	Discuss advanced Programming in Scratch
CO4	Elaborate Planning and Designing of Games
Course (Paper) Name and No.- Digital and Technology Solution (VEC)	
CO1	Build Knowledge about digital paradigm.
CO2	Realization of importance of digital technology, digital financial tools, e-commerce.
CO3	Elaborate with the e-governance and Digital India initiatives.
CO4	Explain use & applications of digital technology.
Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- I. Python Programming	
CO1	Explain the basic principles of the python programming language.
CO2	Create the python program in functions, string, file handling & exception handling.
CO3	Explain facts of object-oriented concepts & modules.
CO4	Design GUI & Database applications.
Course (Paper) Name and No.- I. Python Programming Practical	
CO1	Create programs of objects, strings, functions, arrays, etc.
CO2	Solve programming errors using exception handling.
CO3	Construct the concepts of OOP like class, inheritence, polymorphism, encapsulation etc.
CO4	Design the GUI using database applications.

Course (Paper) Name and No.- II. Data Structures	
CO1	Define the basics of algorithm analysis and array operations.
CO2	Elaborate Operations on Linked lists, Stack and Queue.
CO3	Explain Different searching and sorting techniques, tree and AVL tree structures.
CO4	Solve Problems based on graph and hashing techniques.
Course (Paper) Name and No.- II. Data Structures Practical	
CO1	Develop different data structure techniques.
CO2	Create Linked list, Stack and Queue Operations.
CO3	Make use of searching and sorting techniques
CO4	Build a tree and display its elements
Course (Paper) Name and No.- III. Computer Network	
CO1	Explain the function of each layer in OSI & TCP/IP model.
CO2	Elaborate functions of data link layer &its protocols.
CO3	Define the concepts of Network layer routing protocols and addressing.
CO4	Explain the working of different transport layer protocols.
Course (Paper) Name and No.- III. Computer Network Practical	
CO1	Determine information about IP address.
CO2	Apply network commands for network configuration.
CO3	Utilize IP routing using routing techniques.
CO4	Make use of wireshark tool for IP packet scanning
Course (Paper) Name and No.- IV. Advanced SQL	
CO1	Define different database objects to access oracle database.
CO2	Elaborate the DDL and DML database statements and associated naming rules.
CO3	Explain advanced database objects required for PL/SQL programs
CO4	Explain the basic concepts of Big Data
Course (Paper) Name and No.- IV. Advanced SQL Practical	
CO1	Apply DDL and DML statements to access database.
CO2	Create database objects using SET operators.
CO3	Build basic PL/SQL programs.
CO4	Develop PL/SQL program using Advanced Database objects.

Course (Paper) Name and No.-V. Applied Mathematics	
CO1	Evaluate Matrices using different methods and polar, exponential forms of complex functions.
CO2	Analyze different solutions of differential equation using various methods and differential equations with constant coefficients.
CO3	Explain the properties and theorems of Laplace and integrate the Laplace transform and evaluate differential equations using Laplace transform.
CO4	Analyze multiple integrals and properties of beta and gamma functions and error functions.
Course (Paper) Name and No.- V. Mobile Programming Practical	
CO1	Build a simple basic program using Cordova commands.
CO2	Create an application using contacts plugin and camera plugin.
CO3	Develop an application using contacts plugin, device plugin and accelerometer plugin.
CO4	Analyze use of Network Information plugin, splash screen plugin and vibration plugin.
Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- I. Core Java	
CO1	Explain the basic concepts of Java Programming
CO2	Build java code using control structure and iteration.
CO3	Explain advance class features
CO4	Elaborate multithreading, IO File handling, exception handling and AWT application.
Course (Paper) Name and No.-I. Core Java Practical	
CO1	Build basic programs by using operators.
CO2	Make use of the data types, methods and constructors to write java program.
CO3	Create a program on inheritance, vectors, packages and arrays, multithreading and file handling concepts.
CO4	Design GUI by using Exception handling.

Course (Paper) Name and No.- II. Introduction to Embedded System	
CO1	Define the core components of embedded systems.
CO2	Explain the types of memory and embedded peripherals.
CO3	Make use of 8051 instruction sets.
CO4	Classify different types of operating systems and their characteristics.
Course (Paper) Name and No.-II. Introduction to Embedded System Practical	
CO1	Design a reprogrammable embedded computer using 8051 microcontroller.
CO2	Develop a program to generate given time delay by using timer control registers.
CO3	Make use of components like seven-segment display, Oscilloscope and Stepper motor.
CO4	Create a program to generate traffic signals
Course (Paper) Name and No.- III. Computer Oriented Statistical Techniques	
CO1	Apply measures of dispersion and to apply discrete and continuous probability distribution to various problems.
CO2	Test hypothesis as well as calculate confidence interval for a population parameter and learn the concept to p-value.
CO3	Learn non parametric test such as the Chi- Square test for Independence as well as goodness of fit.
CO4	Interpret the results of bivariate and multivariate regression and correlation analysis and to perform ANOVA. Be able to perform multiple regression using computer software R.
Course (Paper) Name and No.- III. Computer Oriented Statistical Techniques Practical	
CO1	Illustrate basic commands and basic operations of the R tool.
CO2	Make use of R tool commands to calculate summary statistics.
CO3	Evaluate testing of hypothesis estimate probability distribution using R tool.
CO4	Develop the R programme to infer statistical analysis.
Course (Paper) Name and No.-IV. Software Engineering	
CO1	Explain software life cycle model and knowledge about different phases of software life cycle.
CO2	Make use of different methodologies in software engineering.
CO3	Explain current theories, models and techniques that provide a basis for the software life cycle.
CO4	Elaborate techniques and tools necessary for engineering practice.

Course (Paper) Name and No.- IV. Software Engineering Practical	
CO1	Evaluate products-startups implementing software process models in software engineering methods.
CO2	Design the diagram in an open-source tool: Star UML.
CO3	Construct systems using design principles.
CO4	Design the existing software using UML diagram.
Course (Paper) Name and No.- V. Computer Graphics and Animation	
CO1	Define the basic computer graphics applications.
CO2	Classify various 2D and 3D transformation.
CO3	Examine algorithm of visible surface detection.
CO4	Elaborate principle of animation.
Course (Paper) Name and No.- V. Computer Graphics and Animation Practical	
CO1	Make use of the graphics function.
CO2	Create 2D and 3D animation.
CO3	Simplify line drawing, Circle generation with the help of algorithm.
CO4	Design program for circle using flood fill, boundary fill algorithm.
Semester V	
After completing the course, Student will able to;	
Course (Paper) Name and No.- I. Software Project Management	
CO1	Define software project management and project planning.
CO2	Explain risk management and resource allocation.
CO3	Determine the cost of project based on project duration.
CO4	Elaborate the quality of leadership skills and advance project management tools.
Course (Paper) Name and No.-I. Project Dissertation	
CO1	Identify a problem definition.
CO2	Estimate system requirement.
CO3	Design data flow diagram.
CO4	Plan the system design phase in SDLC.

Course (Paper) Name and No.-II. Internet of Things	
CO1	Explain Design Principles for Connected Devices.
CO2	Elaborate the concepts of Prototyping Embedded Devices, its Physical Design and Online Components.
CO3	Classify types of designing 3D modules**.**
CO4	Explain the Market perspective and Ethical concept of IOT.
Course (Paper) Name and No.- II. Internet of Things Practical	
CO1	Make use of Raspberry pi to display LED pattern, Time over 4-digit 7-segment and control whatsapp.
CO2	Build the interfacing of Raspberry pi with Oscilloscope, Fingerprint sensor, GPS Module.
CO3	Create basic Home Automation using Raspberry Pi.
CO4	Construct an application to monitor visitor using Raspberry Pi and Pi Camera.
Course (Paper) Name and No.- III. Advanced Web Programming	
CO1	Explain the basic components concept of C# .NET framework language along with .NET framework.
CO2	Elaborate advanced web concept in ASP.NET.
CO3	Explain dynamic web page using ADO.NET fundamentals.
CO4	Make use of AJAX, XML and Jquary programming skill in ASP.NET.
Course (Paper) Name and No.- III. Advanced Web Programming Practical	
CO1	Build console application in C#.
CO2	Develop web applications with strong object – oriented principles.
CO3	Develop connection between web pages using ASP.NET AJAX.
CO4	Build dynamic web page in ASP. NET, XML and Jquery.
Course (Paper) Name and No.- IV. Linux System Administration	
CO1	Explain various commands to manage system level processes and handle software management on linux platforms.
CO2	Elaborate storage and user management on linux platforms.
CO3	Explain the detailed steps and files for configuration of different types of servers.
CO4	Make use of shell level programming in linux.

Course (Paper) Name and No.- IV. Linux System Administration Practical	
CO1	Make use of administrative level commands for user and storage management and Networking.
CO2	Construct the firewall rules for securing server with iptables and setup cryptographic services on linux machine.
CO3	Create the configuration for different types of servers.
CO4	Develop shell scripting programs on linux platform.
Course (Paper) Name and No.- V. Enterprise Java	
CO1	Define servlet with java applications and database connectivity.
CO2	Elaborate the fundamentals and core concepts of cookies, session, file uploading, file downloading and request dispatcher, EJB applications and JND.
CO3	Explain JSP applications using JSTL and deploy EJB application and JSF applications.
CO4	Make use of knowledge of application using concept of Persistence, Object/Relational Mapping, JPA and Hibernate.
Course (Paper) Name and No.-V. Enterprise Java practical	
CO1	Create applications using servlet with cookies and session.
CO2	Develop the servlet IO, file applications and JSP application.
CO3	Construct JSP, JSTL, EL and EJB applications.
CO4	Build the EJB applications with different types of beans and JPA applications.

Semester VI	
Course (Paper) Name and No.-I. Software Quality Assurance	
CO1	Define quality of software project.
CO2	Explain testing and different testing method.
CO3	Elaborate software verification, validation and v test model.
CO4	Classify level of testing.
Course (Paper) Name and No.- I. Project Implementation	
CO1	Design user interface for input.
CO2	Develop coding for the system.
CO3	Examine various system testing.
CO4	Predict the future scope of project.

Course (Paper) Name and No.- II. Security in Computing	
CO1	Evaluate and contrast computing security issues.
CO2	Explain computing security vulnerabilities and threats.
CO3	Determine alternative countermeasures and controls.
CO4	Classify virtual machines and cloud computing.
Course (Paper) Name and No.- II. Security in Computing Practical	
CO1	Design Routers by OSPF, NTP, SSH.
CO2	Create AAA authentication.
CO3	Apply & verify Extended Numbered ACL.
CO4	Test IPV6 by using firewalls & ACL.
Course (Paper) Name and No.- III. Business Intelligence	
CO1	Explain the framework of the computerized Business Intelligence System and Decision support system.
CO2	Analyse data by choosing relevant model as an algorithm for respective applications.
CO3	Explain classification and clustering algorithms.
CO4	Elaborate the applications of Business Intelligence.
Course (Paper) Name and No.- III. Business Intelligence Practical	
CO1	Import legacy data from sources and apply ETL process on it.
CO2	Apply classification and clustering algorithms.
CO3	Apply linear and logistic regression algorithms.
CO4	Examine what if analysis for data visualization.
Course (Paper) Name and No.- IV. Principles of Geographic Information Systems	
CO1	Define importance of GIS and its use in representation of the real world.
CO2	Explain data capture, storage, analysis and output in GIS.
CO3	Elaborate Map scale, projection and co-ordinate systems in GIS.
CO4	Explain Spatial data analysis and Data visualization.
Course (Paper) Name and No.- IV. Principles of Geographic Information Systems Practicals	
CO1	Utilize QGIS software for managing vector and raster data.
CO2	Build maps with attributes and different data sets.
CO3	Design georeferencing for maps.
CO4	Make use of advanced operations like Nearest Neighborhood analysis, automating map creation etc.

Course (Paper) Name and No.-V. IT Service Management	
CO1	Define IT Service management and its framework.
CO2	Demonstrate four dimensions of service management.
CO3	Explain ITIL service value system, service value chain, and continual improvement model.
CO4	Elaborate ITIL management practices.
Course (Paper) Name and No.- V. Advanced Mobile Programming	
CO1	Demonstrate basic android app.
CO2	Design activity life cycle.
CO3	Evaluate different layouts in android app.
CO4	Make use of intents, events, listeners and menus, dialog in mobile programming.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Information Technology

M.Sc. (Information Technology)

POs		
Sr. No.	Outcome for M.Sc. Program After completion of M.Sc. program students will acquire	Graduate Attribute
PO1	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge
PO2	An ability to demonstrate proficiency in various instrumentation, modern tools, and advanced techniques to meet industrial expectations and research outputs.	Disciplinary knowledge
PO3	Ability to identify problems, formulate, and prove hypotheses by applying theoretical knowledge and skills relevant to the discipline.	Problem-solving
PO4	The ability to articulate thoughts, research ideas, information, scientific outcomes in oral and in written presentation to range of audience.	Communication skills
PO5	A capacity for independent, conceptual, and creative thinking, and critical analysis through the existing methods of enquiry.	Critical thinking
PO6	Acquisition of skills required for cutting edge research, investigations, field study, documentation, networking, and ability to build logical arguments using scholarly evidence.	Research skills
PO7	An ability to portray good interpersonal skills with the ability to work collaboratively as part of a team undertaking a range of different team roles.	Teamwork
PO8	The ability to understand ethical responsibilities and impact of scientific solutions in global, societal, and environmental context and contribute to sustainable development.	Moral and ethical awareness/ multicultural competence
PO9	An openness to and interest in life-long learning through directed and self-directed study.	self-directed learning
PO10	The ability to translate the knowledge and demonstrate the skills required to be employed and successful professional development.	Life-long learning
PO11	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge

PSOs	
PSO1	Apply IT in the field of Data Science, AI, Networking, Security and Cloud Computing.
PSO2	Design solutions for complex IT problems.
PSO3	Develop research, investigation skills and achieve professional competency in the field of I.T.

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Data Science (Major I)	
CO1	Explain layered framework and technology stack in data science.
CO2	Elaborate management layers in data science.
CO3	Explain assess supersteps in data science.
CO4	Utilize transform and report supersteps.
Course (Paper) Name and No.-Image Processing(Major II)	
CO1	Explain basic fundamental concepts of digital image processing.
CO2	Examine the images in the frequency domain using various transforms.
CO3	Evaluate the techniques for image enhancement, restoration & Categorise of various compression techniques.
CO4	Interpret Image compression, image segmentation, and representation techniques.
Course (Paper) Name and No.- Soft Computing Techniques (Major III)	
CO1	Explain soft computing techniques and their roles in building intelligent machines.
CO2	Determine the use of Artificial Intelligence, Fuzzy Login & Genetic Algorithm
CO3	Make use of Fussy Logic Network for classification and regression problems.
CO4	Evaluate soft computing approaches and solutions for a genetic algorithm & given problem

Course (Paper) Name and No.- Practical of Data Science + Practical of Image Processing(Major Practical)	
CO1	Construct program using utilities, auditing and data visualization in data science.
CO2	Build a program to retrieve, assess, process, transform and organise the data in data science.
CO3	Design a program for image transformation.
CO4	Design a program for Colour Image Processing.
Course (Paper) Name and No.- Cloud Computing(Elective)	
CO1	Define cloud computing and various virtualization technique.
CO2	Classify the types of cloud and cloud computing architecture.
CO3	Explain cloud security mechanism.
CO4	Elaborate advanced architecture and cloud delivery model.
Course (Paper) Name and No.- Practical of Cloud Computing + Practical of Soft Computing Techniques (Elective Practical)	
CO1	Create web services using java application (Netbeans).
CO2	Make use of virtualization using VMWare ESXi server and managing with vCenter.
CO3	Design a simple linear neural network model and Back Propagation
CO4	Make use of a program for in fuzzy logic and Genetic Algorithms.
Course (Paper) Name and No.- Research Methodology (Minor)	
CO1	Define the role business research.
CO2	Classify stages of the research and Measurement Sampling and Field work.
CO3	Distinguish different research methods and measurement concepts.
CO4	Explain Different concepts of data analysis
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Big Data Analytics (Major I)	
CO1	Explain concept of Data and Big Data.
CO2	Explain clustering and association algorithm.
CO3	Solve problem based on classification methods.
CO4	Elaborate Data Products and Patterns with Hadoop in Data science

Course (Paper) Name and No.- Modern Networking(Major II)	
CO1	List the elements of Modern Networking
CO2	Classify different levels of Software Define Network
CO3	Explain Network Virtualization Function and VLAN
CO4	Summarizing Quality of Service, Quality of Experience & Modern Network Architecture.
Course (Paper) Name and No.- Natural Language Processing (Major III)	
CO1	Explain the field of natural language processing
CO2	Design various POS tagging techniques and parsers
CO3	Design, implement and test algorithms for semantic and pragmatic analysis.
CO4	Apply NLP techniques to design real world NLP applications.
Course (Paper) Name and No.- Practical of Big Data Analytics + Practical of Modern Networking (Major Practical)	
CO1	Build hadoop and HDFS & develop application in MongoDB
CO2	Construct a program using MapReduce & design an application in Hive
CO3	Build IP SLA Tracking & Path Control & create AS-PATH attribute,
CO4	Construct IBGP & EBGP Session & develop Inter VLAN Routing
Course (Paper) Name and No.- Microservice Architectures (Elective)	
CO1	Define Micro services Architecture & Micro services Boundaries. Elaborate Service Design and Micro Services in Practice.
CO2	Explain ASP.Net Core, Docker and Continuous Integration.
CO3	Explain Data Services & Micro Services Ecosystems.
CO4	Create Data Services.

Course (Paper) Name and No.- Practical of Microservices Architectures + Practical of Natural Language Processing (Elective Practical)	
CO1	Define Micro services Architecture & Micro services Boundaries, Elaborate Service Design and Micro Services in Practice.
CO2	Explain ASP.Net Core, Docker and Continuous Integration.
CO3	Apply various text pre-processing techniques and N-Gram Model for any given text.
CO4	Develop morphological analysis, grammar checker word generation and different POS taggers.
Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- I. Technical Writing and Entrepreneurship Development	
CO1	Define technical documents that meet requirement with standard guidelines.
CO2	Build effective blogs and social media pages.
CO3	Explain effectiveness of innovation and entrepreneurship.
CO4	Make use of graphic functions for writing different types of research proposals.
Course (Paper) Name and No.-I. Project Documentation and viva	
CO1	Apply relevant knowledge & abilities within the main field of study
CO2	Analyze larger problems on the advanced level within the main field of study.
CO3	Estimate system requirement.
CO4	Design data flow diagram & phases in SDLC.
Course (Paper) Name and No.- II. Security Breaches and Countermeasures	
CO1	Classify different security breaches that can occur.
CO2	Identify vulnerabilities in the systems, breach the security of the system, and threats due to malware.
CO3	Develop social engineering and educate people to be Careful from attacks due to it.
CO4	Evaluate vulnerabilities in the Web Servers, Applications and newer technologies like mobiles, IoT and computing

Course (Paper) Name and No.- II. Security Breaches and Countermeasures Practical	
CO1	Make use of tools to perform footprinting and reconnaissance
CO2	Determine use of Enumeration and network scanning tools.
CO3	Test social engineering toolkits and web application scanning.
CO4	Apply different tools for cryptography.
Course (Paper) Name and No.- III. Malware Analysis	
CO1	Define Malware Analysis , Basic Static & Dynamic Analysis Techniques
CO2	Explain IDA Pro, C code construct in assemble & Advance Dynamic Analysis
CO3	Classify OLLYDBG , WINDBG & Malware Functionality
CO4	Elaborate Data encoding, Anti disassembly, debugging, Virtual Machine techniques, Shellcode Analysis.
Course (Paper) Name and No.- III. Malware Analysis Practical	
CO1	Identify the Malware Using Basic & Static Techniques.
CO2	Examine the Malware using IDA Pro.
CO3	Find Malware effect on .exe & .dll file using OLLYDBG.
CO4	Test the Malware Using Advanced Dynamic Technique.
Course (Paper) Name and No.- IV. Robotic Process Automation	
CO1	Define the scope and techniques of robotic process automation using UIPath Studio.
CO2	Explain the concept of sequence, flowchart and control flow used to manipulate data.
CO3	Make use of Exception Handling, Debugging and logging to handle user events and Assistant bots.
CO4	Elaborate the deployment and maintenance of bot along with maintaining the code.

Course (Paper) Name and No.- IV. Robotic Process Automation Practical	
CO1	Define the scope and techniques of robotic process automation using UIPath Studio.
CO2	Explain the concept of sequence, flowchart and control flow used to manipulate data.
CO3	Make use of Exception Handling, Debugging and logging to handle user events and Assistant bots.
CO4	Elaborate the deployment and maintenance of bot along with maintaining the code.
Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- I. Blockchain	
CO1	Define the structure of blockchain system such as bitcoin and ethereum.
CO2	Elaborate the use of different components in Solidity Programming.
CO3	Explain concepts of Hyperledger, Smart Contracts & tokens, Mining Ether and cryptoeconomics.
CO4	Elaborate the development of blockchain, EthereumD, Dapp applications.
Course (Paper) Name and No.-I. Blockchain Practical	
CO1	Design programs for block chain in Python.
CO2	Create block chain and exhibit its use.
CO3	Build Apps with angular.
CO4	Develop different functions in Solidity Programming.
Course (Paper) Name and No.- II. Digital Image Forensics	
CO1	Define the origin of Computer Forensics & relationship between law enforcement & industry.
CO2	Distinguish Digital Still & Digital Video Camera, Color Mode & Channel Blending.
CO3	Classify Multiple Image Techniques, Contrast adjustment Techniques & Advanced Processing Techniques.
CO4	Elaborate Enhancement Strategies for Image Intended for Analysis.

Course (Paper) Name and No.- II. Digital Image Forensics Practical	
CO1	Apply basic Image Forensics Techniques to establish their integrity.
CO2	Categorize different technique for extracting details from images.
CO3	Measure various parameters associated with digital Images.
CO4	Apply various enhancement strategies for digital image.
Course (Paper) Name and No.- III. Security Operations Center	
CO1	Classify different security breaches that can occur.
CO2	Identify vulnerabilities in the systems, breach the security of the system, and threats due to malware.
CO3	Develop social engineering and educate people to be Careful from attacks due to it.
CO4	Evaluate vulnerabilities in the Web Servers, Applications and newer technologies like mobiles, IoT and computing.
Course (Paper) Name and No.- II. Security Operations Center Practical	
CO1	Make use of tools to perform footprinting and reconnaissance
CO2	Determine use of Enumeration and network scanning tools.
CO3	Test social engineering toolkits and web application scanning.
CO4	Apply different tools for cryptography.
Course (Paper) Name and No.- Human Computer Interaction	
CO1	Define HCI principles that influence a system's interface design.
CO2	Explain techniques used for any of the proposed systems.
CO3	Explain the cognitive models and its design.
CO4	Elaborate system resource management techniques and implementing systems.
Course (Paper) Name and No.- Project Implementation and Viva-V voce	
CO1	Design User Interface.
CO2	Develop Coding for the project.
CO3	Examine various system testing.
CO4	Predict the future Scope of Project.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Department: Zoology

B.Sc. (Zoology)

POs		
Sr. No.	**Outcome for B.Sc. Program After completion of B.Sc. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches.	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes.	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

PSOs	
PSO1	Gain the comprehensive knowledge and understanding of major concepts, theoretical principles and experimental findings in Zoology and its different subfields.
PSO2	Learn a wide range of approaches, from genetics to molecular and cellular biology, as well as physiological processes and anatomy, and diseases.
PSO3	Spread awareness about wildlife and ecology as well as the environment and its conservation in the society.
PSO4	Gain knowledge of Agro based Small Scale industries like sericulture, aquaculture and vermicomposting.
PSO5	Develop the interest and employability, program includes learning experiences which offer opportunities for higher studies and research at reputed laboratories.
PSO6	Understand the concept of research and its type along with basic knowledge of qualitative research techniques, data collection and process of scientific documentation.
PSO7	Analyze the ethical aspects of research and evaluate the different methods of scientific writing and reporting by appropriate documentations and presentations.

COs	
Semester I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Animal Diversity (Non-Chordates) Paper I	
CO1	Know the diversity of animals.
CO2	Comprehend the importance of classification.
CO3	Develop insight of group and type study.
Course (Paper) Name and No.- Genetics Paper II	
CO1	Understand the basic concepts of genetics.
CO2	Understand recombination and interaction of Genes.
CO3	Analyse the impact of genetics on diversity of animals.
Course (Paper) Name and No: Introduction of Fishery management Paper- Open Electives 1	
CO1	Demonstrate an inclusive understanding of the importance of fisheries and their role in providing food, livelihoods, and ecological balance and explain the fundamental principles and theories of fishery management.
CO2	Identify and analyze the legal and regulatory frameworks governing fisheries at the national and international levels.
CO3	Evaluate the consequences of overfishing and depletion on fish stocks and marine ecosystems, and recognize the importance of managing fisheries sustainably.
Course (Paper) Name and No. - Ecotourism -I Paper- Open Electives 2	
CO1	Gain the basics of ecotourism.
CO2	Evolve eco-literate society by integrating market-based instruments with eco-cultural knowledge of traditional societies.
CO3	Practice ecological knowledge for wealth generation, environmental conservation, and popularization of Indian traditional knowledge.
Course (Paper) Name and No. - Ornamental Fish Breeding Paper- Vocational Skill Course	
CO1	Identify and describe various species of ornamental fish used in the aquarium trade.
CO2	Demonstrate proficiency in different breeding techniques and ddemonstrate an understanding of sustainable breeding practices.
CO3	Implement proper water quality management practices in ornamental fish breeding setups and manage brood stock effectively.

Course (Paper) Name and No. - Aquarium Fish Keeping Paper-Skill Enhancement Course	
CO1	Recognize and categorize different types of aquarium fish based on their characteristics, behavior, and compatibility with other species.
CO2	Gain knowledge of the essential components and equipment required for a successful aquarium setup.
CO3	Learn to monitor and maintain optimal water quality parameters and understand the dietary requirements of aquarium fish.
CO4	Learn how to design and manage a peaceful and compatible community of fish, considering their behavior, size, and environmental preferences.
Course (Paper) Name and No. - Sericulture Paper- Indian Knowledge System	
CO1	Explore the traditional knowledge and practices associated with sericulture in India.
CO2	Gain an understanding of the historical significance of sericulture in India, its connection to local communities, and the integration of traditional wisdom with modern sericulture practices.
CO3	Gain an understanding of the historical significance of sericulture in India, its connection to local communities, and the integration of traditional wisdom with modern sericulture practices.

Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Animal Diversity (Chordata) Paper -I	
CO1	Learners will be able to comprehend the diversity of animals.
CO2	Learners will be able to understand the importance of classification.
CO3	Learners develop insight of group and type study.
Course (Paper) Name and No.- Cell Biology Paper -II	
CO1	Describe cell as structural and functional unit of life.
CO2	Differentiate prokaryotic and eukaryotic cell and role of various cell organelles.
CO3	Learn to use the various techniques of cell biology.

Course (Paper) Name and No- Basic Concepts of Ecology Paper- Minor Elective Course	
CO1	Introduces the fundamental concepts and principles of ecology and the interactions between organisms and their environment.
CO2	Students will explore key ecological concepts, including the structure and function of ecosystems, population dynamics, community interactions, and the impacts of human activities on the environment.
CO3	Develop a solid foundation in ecological principles and gain an understanding of the interconnections of all living organisms.
Course (Paper) Name and No- Fishery Management-II Paper- Open Electives Elective Course I	
CO1	Demonstrate skill in fishery data collection, analysis, and stock assessment techniques to make informed management decisions.
CO2	Evaluate the socio-economic and ecological impacts of fishery management decisions on fishing communities and the marine environment interactions, and the impacts of human activities on the environment.
CO3	Apply various fishery management tools and strategies, such as fishing quotas, size limits, and gear regulations, to promote sustainable fishing practices.
CO4	Critically assess the role of stakeholders in fishery management and the importance of collaborative approaches in decision-making.
Course (Paper) Name and No. Ecotourism -II Paper- Open Electives Elective Course II	
CO1	Develop next-generation ecological entrepreneurs.
CO2	Evolve eco-literate society by integrating market-based instruments with eco-cultural knowledge of traditional societies.
CO3	Practice ecological knowledge for wealth generation, environmental conservation, and popularization of Indian traditional knowledge.
Course (Paper) Name and No. By-Products And Value-Added Fish Products Paper- Vocational Skill Course	
CO1	Identify and classify various by-products generated during fish processing understanding their potential value and applications.
CO2	Explore good manufacturing practices while manufacturing these products
CO3	Demonstrate proficiency in various techniques for developing value-added fishery products, including processing, preservation, and packaging methods.

Course (Paper) Name and No.- Vermicomposting Technology Paper- Skill Enhancement Course	
CO1	Prepare a vermicomposting setup and select appropriate containers and bedding materials and describe the potential for using vermicomposting for small-scale food production and commercial farming.
CO2	Analyze cutting-edge techniques and equipment for vermicomposting and develop a plan for implementing vermicomposting in a specific setting, such as a garden, farm, or community.
CO3	Demonstrate critical thinking and problem-solving skills by applying vermicomposting concepts to real-world scenarios. The course is structured at the basic level for the benefit of the students coming from different discipline having broad scope for employability.

Semester III	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Fundamentals of Genetics, Chromosomes and Heredity, Nucleic acids. Paper I	
CO1	Describe the structure of chromosomes and its types and mechanisms of sex determination.
CO2	Differentiate the autosomes and sex chromosomes, euchromatin and heterochromatin.
CO3	Apply the principles of inheritance to study heredity.
CO4	Analyze the Pedigree chart.
Course (Paper) Name and No.- Nutrition and Excretion, Respiration and Circulation, Nervous system in Invertebrates, Control and Coordination, Locomotion and Reproduction Paper II	
CO1	Recognize the increasing complexity of nutritional, excretory and osmoregulatory physiology in evolutionary hierarchy and correlate the habit and habitat with nutritional, excretory and osmoregulatory structures.
CO2	Explain the increasing complexity of respiratory and circulatory physiology in evolutionary hierarchy and correlate the habit and habitat with nutritional, excretory and osmoregulatory structures.
CO3	Analyze the cause and effect of alterations in chromosome number and structure.
CO4	Compare the process of control and coordination by nervous and endocrine regulation.
Course (Paper) Name and No.- Developmental Biology, Ethology and Parasitology Paper III	
CO1	Develop critical understanding relates with single cell fertilized egg become embryo.
CO2	Compare different developmental stages.
CO3	State different types of animal behavior.
CO4	Describe the life cycle of specific parasites, the symptoms of the disease and its treatment.

Semester IV	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Origin and Evolution of Life, Population Genetics, Scientific Attitude, Methodology, Scientific Writing and Ethics in Scientific Research Paper -I	
CO1	Develop critical understanding relates with single cell fertilized egg become embryo.
CO2	Compare different developmental stages.
CO3	State different types of animal behavior.
CO4	Describe the life cycle of specific parasites, the symptoms of the disease and its treatment.
Course (Paper) Name and No.- Cell Biology, Endo membrane System and Biomolecules Paper - II	
CO1	Describe the functioning of nucleus, extra nuclear organelles and understand the intricate cellular mechanisms involved.
CO2	Explain composition of the transport mechanisms adopted by the cell and its organelles for its maintenance and composition of cell.
CO3	Discuss intricacy of endomembrane system and the interlinking of endomembrane system for functioning of cell.
CO4	Summarize the biological significance of carbohydrates, amino acids, proteins, lipids and nucleic acids.
Course (Paper) Name and No.- Economic Zoology Paper -III	
CO1	Describe basics of sericulture and its scope in India.
CO2	Identify varieties of silkworms, host-plants and aspects on silk extraction and the diseases afflicting silk-worms.
CO3	Apply the culture techniques of prawn, pearl and fish.
CO4	Discuss dairy animals' management, the breeds and diseases.

Semester V	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Principles of Taxonomy, Modern Trends in Taxonomy and study of invertebrates Paper -I	
CO1	Learners will understand the basics concept of taxonomy and learn to classify animals on the basis of their relation to other animals by body structure, external characters and development.
CO2	Apply the International rules of Nomenclature to give a scientific name to animals which are found during research.
CO3	Understand the gradual development and evolutionary history of different kinds of living organisms from earlier forms over several generations.
Course (Paper) Name and No.- Principles of Taxonomy, Modern Trends in Taxonomy and study of invertebrates Paper -II	
CO1	Achieve proficiency in the skills necessary for the study of haematology. Identify the major cellular and tissue components which comprise the innate and adaptive immune system.
CO2	Get familiar with different terminologies and diagnostic tests performed in a pathological laboratory and equipped for taking any further pathological course or working in a diagnostic laboratory.
CO3	Comprehend the types of immunity and the components of immune system and realize the significant role of immune system in giving resistance against diseases.
CO4	Understand immune related pathologies and the principles and applications of vaccines and develop basic understanding of immunology of organ transplantation.
Course (Paper) Name and No.- Histology, Toxicology, Enzymology and Biostatistics Paper -III	
CO1	Describe the well- planned organization of tissues and cells in the organ system.
CO2	Recall the principles of toxicology with particular emphasis on toxic responses to chemical exposures, nature and effect of toxicity and toxicity testing.
CO3	Develop introductory understanding of regulatory affairs in toxicology.
CO4	Describe basics of enzyme structure, function and variations in enzyme activity and kinetics.
Course (Paper) Name and No.- Biotechniques and Introduction to Endocrinology Paper -IV	
CO1	Learn the theoretical basis of technique, its principle of working and its correct application.
CO2	Learn the construction repair and adjustment of any equipment required for a technique.
CO3	Learn the maintenance laboratory equipment's/ tools, safety hazards and precautions.
CO4	Understand the technique of cell and tissue culture.

Course (Paper) Name and No Oceanography, Aquaculture Practices, Marketing and Finance Paper - V	
CO1	Describe breeding techniques and skills for culture of major carps.
CO2	Comprehend hatchery and nursery management of major carps and also learn about breeding techniques, hatchery and management of fin-fish and crustaceans and shell fishes.
CO3	Develop the knowledge about how to breed and rear ornamental fishes and commercially viable fish species.
CO4	Explain the value of maintaining and taking sanitary precautions during the processing and packaging operations.

Semester VI	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.- Phylum Chordata, Group Euchordata- I, Group Euchordata II and Type study – Shark Paper -I	
CO1	Classify the Chordates up to class with reference to phylogeny and their special features.
CO2	Outline the taxonomy of division Gnathostomata with the distinguishing characters.
CO3	Demonstrate the characteristic features and examples of class of Reptilia, Aves and Mammalia.
CO4	Compare the vertebrate animal life after studying one representative animal Shark.
Course (Paper) Name and No.- Molecular Biology, Genetic Engineering, Human Genetics and Bioinformatics Paper -II	
CO1	Illustrate the intricacies of chemical and molecular processes that affect genetic material and related areas in relatively new fields of genetic engineering and biotechnology.
CO2	Describe the vast array of techniques used to manipulate genes which can be applied in numerous fields like medicine, research, etc. for human benefit.
CO3	Discuss the impact of changes occurring at gene level on human health and its diagnosis.
CO4	Outline the computational point of view of studying the genomes.

Course (Paper) Name and No.- Developmental biology Paper - III	
CO1	Review the embryo development and important processes of cell differentiation, stages of development and morphogenesis.
CO2	Illustrate the process of early and late embryonic development in animals.
CO3	Explain the post Embryonic Development and Implications of Developmental Biology.
CO4	Discuss the processes involved in embryonic development and its application.
Course (Paper) Name and No.- Wild life conservation and Management Paper - IV	
CO1	Develop an understanding of how animals interact with each other and their natural.
CO2	Environment and ability to use the fundamental principles of wildlife ecology to solve local, regional and national conservation and management issues.
CO3	Develop the ability to work collaboratively on team-based projects and demonstrate.
Course (Paper) Name and No Marine resources, Post-harvest, and Farm Engineering Paper -V	
CO1	Describe the deep sea and coastal fishes and commercial potential and know about the major landing centres of the fishes.
CO2	Demonstrate crustacean and molluscan fisheries and the performance of landing centres of above fisheries.
CO3	Apply the knowledge and practice the preservation and processing techniques for commercial ventures.
CO4	Review the knowledge with the knowledge of fish by-products, value-added products and good manufacturing practices.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

B.Sc. (Fashion & Apparel Design)

POs		
Sr. No.	**Outcome for B.Sc. Program** **After completion of B.Sc. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

PSOs	
PSO1	The students will have sound understanding of fundamental and application-based principles and theories in Physical, Inorganic, Organic and Analytical Chemistry
PSO2	Students will learn various techniques to perform scientific experiments as well as accurately record and analyse the results of such experiments
PSO3	Student will learn the usage of analytical instruments, select, and apply appropriate techniques and resources for the analysis
PSO4	Extensive laboratory and classroom work will skill the students with in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
PSO5	Students will be acquainted with new areas in both chemistry and allied fields of science and technology
PSO6	Students will understand the applications and impact of the chemistry in societal, and environmental contexts, and demonstrate its knowledge and need for sustainable development
PSO7	Students will learn to apply ethical practices such as limited and safe use of hazardous chemicals, responsibility toward environmental and health safety
PSO8	solving, critical thinking and analytical reasoning as applied to scientific problems
PSO9	Students will be able to work in team and thus get prepared as a perfect professional chemist with respect to knowledge, responsibility and teamwork

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Garment construction-USG1GC	
CO1	You will learn how to sew, cut patterns and assemble garments.
CO2	Gain knowledge about different fabrics, threads and tools used in construction.
CO3	Learn to create and adjust patterns to fit different body types.
CO4	Exploring different types of fabric modifying tools.
Course (Paper) Name and No.- Art Foundation-USG1AF	
CO 1	Students develop fundamental skills in drawing and painting.
CO 2	Course encourage student to explore and experiment to different artistic approaches.
CO 3	Learn how to apply different elements on different clothing styles.
CO 4	Learn how to balance all design elements.
Course (Paper) Name and No.- Surface Ornamentation-UVSC1SO	
CO 1	Acquire practical skills in various techniques such as embroidery, applique, beadwork
CO 2	Student explore their creativity through different printing methods.
CO 3	Develop fabric painting techniques.
CO 4	Students create expressions o different surfaces like fabric, wood, or metal.
Course (Paper) Name and No- Fundamentals of Textile-USEC1FT	
CO 1	Understanding different textiles and fabrics allows fashion artists to choose materials.
CO 2	Experiment with textures, patterns and draping techniques in their designs
CO 3	Learning about textile properties helps designer to create garments not only good look but also fit well and feel comfortable.
CO 4	Encourage artists to innovate by combing different fabrics to create unique designs.
Course (Paper) Name and No—History of Indian Costumes- UIKS1HIC	
CO1	Learning about the time where people and surrounding has no names.
CO2	It is amazing to see how people travelled so long to explore their knowledge.
CO3	Offering insights in to past civilization and their lifestyle.
CO 4	Understand the revolutionary changes happened during each era.
Course (Paper) Name and No—Effective Communication Skills –English-UAEC1CSE	
CO1	To apply various types of sentences in Communication.
CO2	To distinguish between Verbal and Non Verbal elements of Communication.
CO3	To perceive the significance of Presentation Skills.

CO4	To justify importance of Communication and Soft Skills.
Course (Paper) Name and No Environmental Studies- UVEC1EVS	
CO1	Describe the significance of protein, carbohydrates, fats, vitamins, minerals and fibre in human diet.
CO2	Explain the functions of proteins, carbohydrates, fats, vitamins, minerals and fibres in human diet and the plat sources from which they are obtained.
CO3	Differentiate between essential and non- essential amoni acid, and types of proximate principles.
CO4	Compare the different deficiency symptoms of various neutrients.
Course (Paper) Name and No—Personality Development-UOE1FA	
CO1	Learners will be able to describe how personality develops.
CO2	Learners will be able to define stages of personality development and basic personality traits.
CO3	Learners will be able to describe how morals are developed.
CO4	Learners will be able to describe personality theories about development.
Course (Paper) Name and No- Film Appreciation- UOE1FA	
CO 1	To demonstrate characters, plot, setting and dialogues represented in the film in the context of fashion.
CO 2	To analyse various thematic and cinematic attributes reflected in the film.
CO 3	To compare the challenges and opportunities of the fashion protagonist reflected in the film with the actual fashion situation.
CO 4	To develop the skill of film appreciation for better understanding the nuances of fashion and human life.

Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No-Garment Construction – USC2GC	
CO 1	Mastery of intricate stitching techniques.
CO 2	Ability to create unique and innovative garment designs direct on bodice block.
CO 3	Preparation of fabric before cutting and draping.
CO 4	Understanding quality control of advanced stitching affects garment durability and overall quality.
Course (Paper) Name and No--- Art Foundation- USC2AF	
CO 1	Understanding different parts of body and how they vary.
CO 2	To improve your figure drawing.
CO 3	Experiment with different stylization technique.
CO 4	How to apply different textures on different styles.
Course (Paper) Name and No—Surface Ornamentation – UVSC2SO	
CO1	Learn New Embroidery technics using different mediums.
CO2	To study using diff material using in surface ornamentation like jardozi.
CO3	Develop fabric painting techniques.
CO4	Creating textured fabric using different means.
CO5	Learning tie n dye,fabric painting,smocking,weaving.
Course (Paper) Name and No—Fundamentals of Textile- USEC2FT	
CO1	Understanding different textiles and fabrics allows fashion artists to choose materials.
CO2	Experiment with textures, patterns and draping techniques in their designs.
CO3	Learning about textile properties helps designer to create garments not only good look but also fit well and feel comfortable.
CO4	Encourage artists to innovate by combing different fabrics to create unique designs.
CO5	Textile study enhance a deep knowledge of materials and their applications.
Course (Paper) Name and No—Basics of Fashion – USC2BFM	
CO1	Better understanding of trends.
CO2	Learning selection of outfits that suit your body types and occasion.
CO3	Learning how ancient styles serve as a rich source of inspiration for modern costume designers.
CO4	Understanding industry dynamics.
CO5	Understanding how the doors open to career in fashion design, merchandising, retail industry, fashion journalism, and many other textile related industries.

Course (Paper) Name and No—Effective Communication Skills- English- UAEC2ECS	
CO1	To perceive the significance of Presentation Skills.
CO2	To justify importance of Communication and Soft Skills.
Course (Paper) Name and No—Environmental Studies-II- UVEC2EVS	
CO1	Describe types of pytoconstituents, medicinal uses of plant
CO2	Explain tridosh concept of Ayurveda, prakriti skin
CO3	Identify various plats used in the preparation of tribal cosmetics and for aromatherapy
CO4	Identify various plants in Grandma'a pouch and plants used asnutraceluticals
Course (Paper) Name and No—Personality Development – UOE2PD	
CO1	Learners will be able to describe how personality develops.
CO2	Learners will be able to define stages of personality development and basic personality traits.
CO3	Learners will be able to describe how morals are developed.
CO4	Lerners will be able to describe personality theories about development.
Course (Paper) Name and No—Film Appreciation- UOE2FA	
CO1	To demonstrate characters, plot, setting and dialogues represented in the film in the context of fashion.
CO2	To analyse various thematic and cinematic attributes reflected in the film.
CO3	To compare the challenges and opportunities of the fashion protagonist reflected in the film with the actual fashion situation.
CO4	To develop the skill of film appreciation for better understanding the nuances of fashion and human life.

Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No-Pattern Making Garment Construction	
CO 1	Enhance technical skills in drafting and manipulating patterns.
CO 2	Understanding to translate ideas in to precise pattern.
CO 3	Pattern making ensures designer about correct proportions fit, and detailing to higher quality finished products.
CO 4	Educate cutting, and stitching of different styles of garments.
Course (Paper) Name and No--- Designing	
CO 1	Design course enhance skills in conceptualization and visual communication.
CO 2	Through project and assignments, students build a portfolio.
CO 3	Prepare students for entry level positions in design studios.
CO 4	Brand study teach how to manage whole project.
CO5	Give them confidence to start their own design businesses.
Course (Paper) Name and No—State Embroideries	
CO1	Helps to preserve and promote traditional embroidery.
CO2	Highlights the artistic skill.
CO3	Enhance the community values, and traditions.
CO4	Knowledge of different state embroidery.
CO5	Embroider enhance our understanding of cultural diversity.
Course (Paper) Name and No- Draping & Grading	
CO1	Learn how to develop three dimensional garments.
CO2	Learn the art of transferring draped designs in to flat patterns.
CO3	Gain insights in to garment fit, proportion and silhouette through grading techniques.
CO4	How to translate design ideas in to wearable garments.
CO5	Build a strong portfolio showcasing your draping and grading skills.
Course (Paper) Name and No—World Costume	
CO1	Understanding of different cultures, their traditions, and social values.
CO2	Offering insights in to past civilizations and their lifestyles.
CO3	Introduction of material and craftsmanship of ancient era.
CO4	Provide rich material for academic study in art history, and fashion design.
CO5	Enriches our appreciation of diversity and contributes to global culture dialogue.
Course (Paper) Name and No—Merchandising	
CO1	Learn to create appealing and marketing products that meet consumer demands.
CO2	Learn marketing strategies.

CO3	Learn brand management.
CO4	Learn finance management and forecasting of brand styles.
CO5	Learn overall contribution to business growth and profitability.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Botany

POs		
Sr. No.	**Outcome for B.Sc. Program** **After completion of B.Sc. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyse and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Plant Preservation Techniques-I	
CO1	Explain the basic principles of Herbarium and dry preservation.
CO2	Describe the significance and designing of Botanical gardens, different steps involved in dry preservation of plant materials.
CO3	Differentiate between the different methods of dry preservation, and herbaria.
CO4	Classify the herbaria on the basis of taxonomy and morphological features.
Course (Paper) Name and No.- Plants in Health care and Cosmetics-I	
CO1	Describe types of phytoconstituents, medicinal uses of plants from Grandma's pouch.
CO2	Explain concept and current scope of Nutraceuticals, Herbals and Dietary Supplements.
CO3	Identify various plants in Grandma's pouch, and plants used as nutraceuticals.
CO4	Differentiate between the different types of phytochemicals, nutraceuticals and dietary supplements.
Course (Paper) Name and No.- Plants in Human Nutrition-I	
CO1	Describe the significance of proteins, carbohydrates, fats, vitamins, minerals and fibre in human diet.
CO2	Explain the functions of proteins, carbohydrates, fats, vitamins, minerals and fibre in human diet and the plant sources from which they are obtained.
CO3	Differentiate between essential and non-essential amino acids, and types of proximate principles.
CO4	Compare the different deficiency symptoms of various nutrients.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Botany-I (Plant Diversity and Structure)	
CO1	Explain Ecological significance and Economic importance of Algae, Fungi, Bryophytes.
CO2	Differentiate between the different plant groups namely Algae and Bryophyta, as well as Fungi, simple and complex tissues.
CO3	Identify various types of plant types, plant cell organelles and plant tissues.
CO4	Describe structure and functions of plant cell organelles.

Semester II	
Course (Paper) Name and No.- Plants in Human Nutrition-II	
CO1	Describe the significance of balanced diet, non-conventional food, and healthy lifestyle to avoid lifestyle diseases.
CO2	Explain the concept of malnutrition, fast and junk foods, empty calories, loss of nutritive value through food processing and anti-nutritional factors.
CO3	Differentiate between anti and non-nutritional factors, deficiency symptoms of various nutrients.
CO4	Compare the different non-conventional and conventional food sources, malnutrition in urban and rural context.
Course (Paper) Name and No.- Plants in Health care and Cosmetics-II	
CO1	Describe common plants used in preparation of cosmetics for face, body and hair. (Chandan, Manjistha, Turmeric, Saffron, Aloe, Reetha, Shikakai, Hibiscus, Brahmi, Bhringraj), structure of human skin.
CO2	Explain tridosh concept of Ayurveda, prakriti nidaan.
CO3	Identify various plants used in the preparation of herbal cosmetics and for aromatherapy.
CO4	Differentiate between the different types of prakriti as per Ayurved, herbal cosmetics.
Course (Paper) Name and No.- Plant Preservation Techniques-II	
CO1	Explain the basic principles of wet and dry preservation and making permanent slides.
CO2	Describe the different steps involved in wet preservation of plant materials and preparation of permanent slides.
CO3	Differentiate between different types of preservatives.
CO4	Classify the museum specimen and permanent slides on the basis of taxonomy and morphological or anatomical features.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Physics

POs		
Sr. No.	**Outcome for B.Sc. Program** **After completion of B.Sc. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership

PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Classical Physics, Mathematical Physics	
CO1	Summarize properties of matter, vectors algebra.
CO2	Apply laws of vector algebra, elasticity, fluid dynamics concepts in various physical situations.
CO3	Explain crystal system, crystal planes and its direction, different coordinate system and interconversion between them, mechanical properties of matter and fluid with its application.
CO4	Solve sums based on miller indices, Bravais lattices, vector algebra, elasticity, fluid dynamics.
Course (Paper) Name and No.- D. C. Circuits and Digital Electronics	
CO1	Apply Thevenin's Theorem and Norton's Theorem to simplify complex circuits and calculate equivalent circuits with respect to a specific load.
CO2	Develop critical thinking skills by analyzing various circuit configurations and choosing appropriate methods to solve complex circuit problems.
CO3	Differentiate between series and parallel D.C. circuits, calculating equivalent resistances and current/voltage distribution.
CO4	Develop strong problem-solving skills in circuit analysis, enabling them to approach complex D.C. circuit problems methodically and confidently.
CO5	Analyse logic gates (AND, OR, NOT, XOR, etc.).
CO6	Design combinational logic circuits using logic gates.
Course (Paper) Name and No.- Practical	
CO1	Understand measuring devices such as Vernier Calliper, Screw Gauge, and Travelling Microscope.
CO2	Measure different mechanical properties of Solids like the Moment of Inertia, Modulus of Elasticity, Coefficient of Viscosity, temperature coefficient of resistance of Thermistor and Joule’s Constant.
CO3	Demonstrate experiments related to mechanics & crystal.
Course (Paper) Name and No.- Practical	
CO1	Analyse complex circuits and simplify them using thevenin equivalents.

CO2	Analyse the rectification process in AC to DC conversion.
CO3	Understand the basic concepts of logic gates, including their types (AND, OR, NOT, NAND, NOR, XOR, etc.) and how they function.
CO4	Design voltage regulation circuits using Zener diodes.
Course (Paper) Name and No.- Ancient Indian Astronomy	
CO1	Analyze ancient Indian astronomical sources, evaluating the accuracy of observations, theories, and calculations based on the available historical records.
CO2	Compare contrast ancient Indian astronomical theories with those from other civilizations, understanding the cultural and scientific contexts.
CO3	Develop skills in analyzing ancient Indian astronomical observations,including star positions, planetary motions, eclipses, and celestial events.
Course (Paper) Name and No.- Fundamentals of Arduino using simulations	
CO1	Explain basic components used with Arduino kit like breadboard, various basic electrical Components & Arduino.
CO2	Acquire basic of basic electrical circuits, basic Arduino programs using simulations.
CO3	Design the basic Arduino programs for practical applications.
Course (Paper) Name and No.- Fundamentals of Arduino using simulations	
CO1	Acquire hands-on experience in the usage of breadboard, various basic electrical Components.
CO2	Design and trouble shoots the basic electrical circuits, basic Arduino programs using simulations.
CO3	Design the basic Arduino programs for practical applications and execute it.
Course (Paper) Name and No.- Instrumentation Techniques in Physics	
CO1	Learn and acquire the knowledge of various measuring instruments and their uses.
CO2	To acquire basic working knowledge of Oscillation, fluid dynamics.
CO3	Learn and acquire skill to use mechanical tools to make simple measurement of length, height, time, area and volume & to use spectrometer, lens.
Course (Paper) Name and No.- Instrumentation Techniques in Physics	
CO1	To get hands-on experience in usage of optical devices.
CO2	To acquire basic working knowledge of Oscillation, fluid dynamics.
CO3	Learn and acquire skill to use mechanical tools to make simple measurement of length, height, time, area and volume & to use spectrometer, lens.

Course (Paper) Name and No.- Computer Hardware-1	
CO1	Analyse simple electronic circuits using Ohm's law and Kirchhoff's laws, calculating voltages, currents, and resistances.
CO2	Develop critical thinking skills by diagnosing and rectifying common electronic circuit issues and malfunctions.
CO3	Measure voltage and current accurately using appropriate tools such as multimeters.
Course (Paper) Name and No.- Basics of Electricity for wiring	
CO1	Learn and acquire hands-on experience in the usage of multimeters, soldering iron, oscilloscopes, and power supplies.
CO2	Design and trouble shoots the basic electrical circuits through hands-on mode.
CO3	Identify the basic components used for Electronic & Electrical experiments.
Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Optics, Applied Mathematics	
CO1	Apply lens maker equation, concepts of differential equation in circuits.
CO2	Deduct current, charge in LR, RC circuit in terms of equation and graph, equivalent focal length, cardinal points for thin and thick lens.
CO3	Discuss natural physical processes related to light waves, lens system, aberration
CO4	Solve numerical problems related to homogenous and inhomogenous equations, lens, Aberration.
Course (Paper) Name and No.- A.C.Circuits and Modern Physics	
CO1	Compare quantum mechanics with classical mechanics, recognizing the limitations of classical physics and the novel concepts introduced by quantum mechanics.
CO2	Explain how the Compton Effect is applied in fields such as X-ray crystallography, where it contributes to understanding the structure of materials.
CO3	Analyse AC circuits, including phasor representation, impedance, admittance, and the concept of complex numbers.
CO4	Understand the working principles of AC bridges and their significance in precise measurement of resistance, capacitance, and inductance.
Course (Paper) Name and No.- Practical	
CO1	Utilise Optical Instruments such as the Spectrometer, Prism, and Lenses for finding Optical properties like the Refractive Index of the material of the Prism, equivalent focal length.
CO2	Determine moment of inertia & acceleration due to gravity.
CO3	Apply skills experiment to optics and mechanics practicals.

Course (Paper) Name and No.- Practical	
CO1	Understand the working principle of Light Dependent Resistors (LDRs).
CO2	Calculate the angular and spatial distribution of light intensity in the diffraction pattern.
CO3	Measure the frequency of the AC mains using appropriate equipment.
CO4	Measure the unknown capacitance using de Sauty's bridge and compare it with theoretical values.
Course (Paper) Name and No.- Solar Energy- Fundamentals & Its Applications-I	
CO1	Learn and acquire knowledge the solar energy and its relevance.
CO2	Design basic solar systems.
CO3	Identify the basic components used for Solar systems.
CO4	Learn and acquire hands-on experience in the handling Solar / PV cells.
CO5	Design and trouble shoots the basic electrical circuits through hands-on mode.
CO6	Familiarize Learners To determine the effect of several variables on the output of a photovoltaic cell.
CO7	Learners explores energy from the sun in terms of radiant energy to expand on the concept of electricity generation.
Course (Paper) Name and No.- Computer Hardware- 2	
CO1	Develop problem-solving skills to diagnose and troubleshoot common hardware issues, both in hardware and software interactions.
CO2	Understand the fundamental concepts of computer architecture, including the organization and structure of various hardware components.
CO3	Explain recent advancements in computer hardware, including trends in processors, memory technologies, storage solutions, and energy-efficient designs.
Course (Paper) Name and No.- Practical Applications Of Arduino based device -I	
CO1	Explain various Sensors, program code of Arduino.
CO2	Acquire basic working knowledge of program code of Arduino UNO.
CO3	Design program code in practical life using various basic sensors, various electronic outputs devices.
Course (Paper) Name and No.- Practical Applications Of Arduino based device -I	
CO1	To get hands-on experience in usage of various Sensors.
CO2	To acquire basic working knowledge of program code of Arduino UNO.
CO3	Learn and acquire skill to apply program code in practical life using various basic sensors.

Course (Paper) Name and No.- Basic of Electronics	
CO1	Learn and acquire hands-on experience in the usage of multimeters, soldering iron, oscilloscopes, and power supplies.
CO2	Design and trouble shoots the basic electrical circuits through hands-on mode.
CO3	Identify the basic components used for Electronic & Electrical experiments.
Course (Paper) Name and No.- Basic of Electronics	
CO1	Learn and acquire hands-on experience in the usage of multimeters, soldering iron, oscilloscopes, and power supplies.
CO2	Design and trouble shoots the basic electrical circuits through hands-on mode
CO3	Identify the basic components used for Electronic & Electrical experiments
Course (Paper) Name and No.- Digital Electronics	
CO1	Comprehend the fundamental principles of logic gates, including AND, OR, NOT, NAND, NOR, and XOR gates. They will grasp the concept of digital logic and its applications in various electronic devices and systems.
CO2	Gain a thorough understanding of different number systems, including binary, octal, decimal, and hexadecimal. They will learn to convert numbers between these systems and understand their significance in computer programming and digital electronics.
CO3	Perform basic arithmetic operations (addition, subtraction, multiplication, and division) using binary numbers. They will also learn about binary-coded decimal (BCD) and its applications.
Course (Paper) Name and No.- Digital Electronics	
CO1	Construct truth tables of basic logic gates and understand their behavior.
CO2	Design combinational logic circuits using logic gates.

Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Mechanics and Thermodynamics	
CO1	Explain the laws of conservation of momentum & energy, compound pendulum, damped & forced harmonic oscillator, basics of theory of measurement.
CO2	Formulate equations for the motion of the rocket, conditions for forced & damped harmonic oscillator, time period of compound pendulum, The Normal Distribution.
CO3	Solve numerical problems based on laws of conservation of momentum & energy, compound pendulum, damped harmonic oscillator, forced harmonic oscillator, Fractional Uncertainty ,Significant Digits, The Estimation of Errors in means and in Single Measurement.
CO4	Distinguish between thermodynamic processes, Otto Engine & Diesel Engine, Simple Pendulum & Compound Pendulum, Damped Oscillations & Forced Oscillations, Absolute Errors and Relative Errors.
Course (Paper) Name and No.- Mathematical Physics, Analog Electronics	
CO1	Solve vector calculus and Fundamental Theorem of Line Integrals, Green's Theorem, Divergence Theorem to evaluate integrals.
CO2	Determine the operating point, stability factor for different transistor biasing methods, frequency of oscillator, and voltage gain of opamp in different applications.
CO3	Discuss basics of Semiconductor and its Application, Transistors, Oscillators, Opamp, Gradient, Curl, Divergence terms & its applications.
CO4	Design basic circuits using Op-amp, transistor, oscillator.
Course (Paper) Name and No.- Applied Physics & Background of Special theory of relativity	
CO1	Explain the factors affecting Acoustics of buildings, Principle of operation of LASER and Propagation of light through Optical Fiber, variation of Physical and Chemical properties in the interior of the Earth, Continental drift, Plate tectonics, Types of plates and Cause of Earthquake.
CO2	Understand the concept of relativistic simultaneity, how events that are simultaneous in one frame of reference may not be simultaneous in another frame.
CO3	Discuss the concept of mass-energy equivalence as introduced by the Special Theory of Relativity, including the famous equation $E=mc^2$.
CO4	Compare the materials on the basis of Electrical conductivity and relative magnetic permeability.
Course (Paper) Name and No.- Practicals III	
CO1	Experiment with bridge rectifiers, oscillators, Ballistic galvanometers.
CO2	Inspect Stefan's law, Brewster's law, e/m by Thomson's method, passive filters, applications of op-amp, CE amplifier, NAND & NOR as Universal Building Block.
CO3	Construct electronic circuits using resistor, capacitor, diode, transistor, IC-741 (Op-Amp), logic gates.
CO4	Estimate physical constants related to solids.

Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- Wave Optics	
CO1	Understand the laws of electrodynamics and be able to perform calculations using them and explain the Construction and Working of Michelson's Interferometer, Fresnel's class of Diffraction and the phenomenon of polarization.
CO2	Develop quantitative problem solving skills of Electrostatics, solve numerical problems related to Michelson's Interferometer, Fresnel's Diffraction and Brewster's law.
CO3	Formulate equations for Coulomb & Gauss Law, Gauss Law in Dielectrics, the wavelength of light, difference in wavelength of light, refractive index of gases using Michelson's Interferometer, separation between diffraction minima & maxima in Fresnel's class of Diffraction.
CO4	Distinguish between the Poisson's Equation and Laplaces's Equation, Interference and Diffractions, unpolarised light, plane polarized light, circularly polarized light & elliptically polarized light.
Course (Paper) Name and No.- Quantum Mechanics	
CO1	Explain postulates of quantum mechanics, operators, expectation values in quantum mechanics and Schrodinger's equation.
CO2	Apply boundary conditions to calculate the transmission and reflection coefficients for free & bound states.
CO3	Solve the Schrodinger steady state equation in free and bound state.
CO4	Elaborate Schrodinger's equation to radioactive decay and harmonic oscillator.
Course (Paper) Name and No.- Digital Electronics & 8085 microprocessor	
CO1	Determine physical constants of solids, the Resolving power of telescope & grating, wavelength of the monochromatic light, refractive index.
CO2	Design & construct MS-JK flip flop (IC 7476), Latch (IC 7400/IC 7402) , 8:3 Priority Encoder (IC 74LS148) and 3:8 Decoder (IC 74LS138), shift register, oscillator, Half adder and full adder using EX-OR gate, Op-amp as a Differentiator and Integrator.
CO3	develop a programme using 8085 microprocessor.
CO4	Experiment with IC-7486, IC-7408, IC-7476, IC-7400, IC-7402, IC-74148, IC-74138, IC-74194, IC-741, spectrometer, telescope.
Course (Paper) Name and No.- Practicals IV	
CO1	Perform measurements of the resolving power using the experimental setup and analyze the data obtained.
CO2	Construct truth tables and logic diagrams for different flip flop configurations, enabling students to analyze and design sequential logic circuits.
CO3	Learn about binary addition and subtraction and the use of encoders and decoders in binary arithmetic operations.
CO4	Write assembly language programs for the 8085 microprocessor to perform various tasks and operations.

॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Mathematics

POs		
Sr. No.	**Outcome for B.Sc. Program After completion of B.Sc. program students will acquire**	**Graduate Attribute**
PO1	The knowledge of the disciplines and in-depth and extensive knowledge, understanding and skills in a specific field of interest.	Disciplinary knowledge
PO2	An ability to develop and conduct experiments, analyze, and interpret data and use scientific judgment to draw conclusions	Scientific reasoning
PO3	An ability to use current technology, and modern tools necessary for creation, analysis, dissemination of information.	Digital literacy
PO4	Innovative, professional, and entrepreneurial skills needed in various disciplines of science.	Life-long learning
PO5	An ability to achieve high order communication skills.	Communication skills
PO6	An ability to collect, analyze and evaluate information and ideas and apply them in problem solving using conventional as well as modern approaches	Problem solving
PO7	A sense of social responsibility; intellectual and practical skills and demonstration of ability to apply it in real-world settings.	Reflective thinking
PO8	An ability to engage in independent and life-long learning through openness, curiosity, and a desire to meet new challenges.	Life-long learning
PO9	A capacity to relate, collaborate, and lead others, and to exchange views and ideas to work in a team to achieve desired outcomes	Teamwork
PO10	An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Leadership
PO11	An ability to understanding values, ethics, and morality in a multidisciplinary context.	Moral and ethical awareness

COs	
Semester I	
After completing the course, Student will able to;	
Course (Paper) Name and No.- USC1MT1: Calculus-I	
CO1	Define Bounded set, Supremum and Infimum of a set.
CO2	Determine the convergence of sequences of real numbers.
CO3	Examine the properties of sequences of real numbers.
CO4	Classify the first order differential equation.
Course (Paper) Name and No.- USC1MT2: Algebra-I	
CO1	Explain the basic concepts of set theory.
CO2	Examine the properties of functions and relations.
CO3	Apply well-ordering properties, Induction theorems and Binomial theorem.
CO4	Analyse properties of the divisibility.
Course (Paper) Name and No.- USC1MTP: Mathematics Practical-I	
CO1	Explain the properties of real number.
CO2	Solve the first order first degree differential equation.
CO3	Examine the properties of sets, functions and relations.
CO4	Solve the problems by using Induction theorems, well ordering principle, binomial theorems and congruence relations.
Course (Paper) Name and No.- UVSC1NA1 : Numerical Analysis – I	
CO1	Solve algebraic, transcendental and simultaneous systems of equations using numerical methods.
CO2	Find numerical solutions of interpolating methods.
Course (Paper) Name and No.- UIKS1VM1 : Introduction to Vedic Mathematics	
CO1	Solve basic maths speedily.
CO2	Explain the contributions of Indian Mathematicians.
CO3	Understand the concept of mathematical operations using various sutras.
CO4	Find squares and cubes using Vedic sutras.

Course (Paper) Name and No.- USEC1DA1: Data Analytics-I	
CO1	Describe various data and its types.
CO2	Describe the measures of central tendency and dispersion.
CO3	Classify discrete and continuous probability distribution to various problems.
Course (Paper) Name and No.- UCM1MST: Business Mathematics	
CO1	Find the derivatives of the functions.
CO2	Determine the interest and annuity.
CO3	Solve the problems by using matrices.
CO4	Find the determinant, inverse of the matrices.
Course (Paper) Name and No.- UOE1MSC1: Mathematics and statistics for competitive exams- I	
CO1	Develop quantitative skills.
CO2	Interpret logical reasoning.
Course (Paper) Name and No.- UVSC1IST: Introduction to Statistics	
CO1	Recall measure of central tendency.
CO2	Describe the measures of dispersion.
CO3	Classify discrete and continuous probability distribution.
CO4	Solve various problems with help of probability.
Course (Paper) Name and No.- UVSC1IST: Statistics for Data Science	
CO1	Recall measure of central tendency.
CO2	Describe the measures of dispersion.
CO3	Classify discrete and continuous probability distribution.
CO4	Solve various problems with help of probability.

Semester II	
After completing the course, Student will able to;	
Course (Paper) Name and No.- USC2MT1: Calculus-II	
CO1	Evaluate limit of a function.
CO2	Examine Continuity of a function.
CO3	Identify the differentiable function
CO4	Find successive differentiation.
Course (Paper) Name and No.- USC2MT2: Discrete Mathematics	
CO1	Analyse the properties of functions, relations and recurrence relations.
CO2	Solve the recurrence relations.
CO3	Make use of the preliminary counting to solve the problems.
CO4	Apply the advanced counting methods to solve the problems.
Course (Paper) Name and No.- USC2MTP: Mathematics Practical-II	
CO1	Evaluate limit and continuity of a function.
CO2	Apply second derivative test to find local extrema.
CO3	Make use of the preliminary counting to solve the problems.
CO4	Apply the advanced counting methods to solve the problems.
Course (Paper) Name and No.- UVSC2NA1 : Numerical Analysis – II	
CO1	Solve differential equations by using numerical methods.
CO2	Solve integration by using numerical methods.
CO3	Apply triangularization method, LU decomposition, cholesky method, power and inverse power method.
Course (Paper) Name and No.- USC2DE1M: Differential Equations	
CO1	Understand basic concepts of Differential Equations
CO2	Classify the first order differential equation.
CO3	Solve second order linear differential equations by using variation of parameter.
Course (Paper) Name and No.- USEC2DA2: Data Analytics-II	
CO1	Apply sampling techniques.
CO2	Estimate the parameters.
CO3	Apply testing of hypothesis tools.

Course (Paper) Name and No.- UCM2MST: Business Statistics	
CO1	Explain the data by using graphs.
CO2	Apply Summarization Measures to solve the examples.
CO3	Predict the future values by using time series methods and will able to find index numbers.
CO4	Determine the probability.

Course (Paper) Name and No.- UOE2MSC2: Mathematics and statistics for competitive exams- II	
CO1	Solve numerical problems for competitive exams.
CO2	Apply logical thinking.

Course (Paper) Name and No.- UVSC2LAT: Linear Algebra	
CO1	Define vector spaces and subspaces.
CO2	Relate matrices and linear transformation.
CO3	Find kernel and image of linear transformation.
CO4	Explain matrix representation.
Course (Paper) Name and No.- UVSC2LAT: Linear Algebra: Application in Computer Science	
CO1	Define vector spaces and subspaces.
CO2	Relate matrices and linear transformation.
CO3	Find kernel and image of linear transformation.
CO4	Explain matrix representation.

Semester III	
After completing the course, Student will able to;	
Course (Paper) Name and No.- USC3MT1: Calculus-III	
CO1	Evaluate limit of a functions of several variables.
CO2	Examine continuity of a functions of several variables.
CO3	Identify the differentiable functions.
CO4	Apply multivariable calculus in optimization problems.
Course (Paper) Name and No.- USC3MT1: Linear Algebra-I	
CO1	Define vector spaces and subspaces.
CO2	Relate Matrices and linear transformations.
CO3	Find basis and dimension of a vector space over R.
CO4	Evaluate the determinant.
Course (Paper) Name and No.- USC3MT3: Discrete Mathematics	
CO1	Define the basic concepts of graph theory.
CO2	Examine the properties and applications of graph.
CO3	Analyse the properties of permutation functions, Pascal's Identity, Circular Permutation and Stirling numbers.
CO4	Apply Pigeonhole Principle, Binomial Theorem, Inclusion and Exclusion Principle.
Course (Paper) Name and No.- USC3MTP: Mathematics Practical	
CO1	Evaluate limit, continuity and differentiability of functions of several variables.
CO2	Explain properties of vector space, linear transformation and determinant.
CO3	Classify the different types of graphs and trees according to their properties.
CO4	Solve the problems by using algorithms.

Semester IV	
After completing the course, Student will able to;	
Course (Paper) Name and No.- USC4MT1: Calculus-IV	
CO1	Identify Riemann integrability of functions.
CO2	Apply fundamental theorem to definite integrals.
CO3	Define Beta and Gamma functions.
CO4	Examine convergence of Improper Integrals.
Course (Paper) Name and No.- USC4MT2: Linear Algebra-II	
CO1	Explain properties of inner product space.
CO2	Determine orthogonality in inner product space.
CO3	Find eigenvalues and eigenvectors.
CO4	Identify diagonalizable matrix.
Course (Paper) Name and No.- USC4MT3: Ordinary Differential Equation	
CO1	Recall the methods to solve the first order differential equations.
CO2	Solve second order linear differential equations by using variation of parameter, reduction method and method of undetermined coefficients.
CO3	Apply the power series method to find the solution of second order differential equations.
CO4	Solve second order differential equations by using Laplace Transform.
Course (Paper) Name and No.- USC4MTP: Mathematics Practical	
CO1	Determine properties of Riemann integration, indefinite and improper integrals.
CO2	Explain properties of inner product space, eigenvalues, eigenvectors and diagonalizable.
CO3	Apply power series method and different techniques to find the solution of second order differential equations.
CO4	Solve the differential equations by using Laplace Transform.

II विद्या विनयेन शोभते II

Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

P.G. Diploma in Analytical Instrumentation

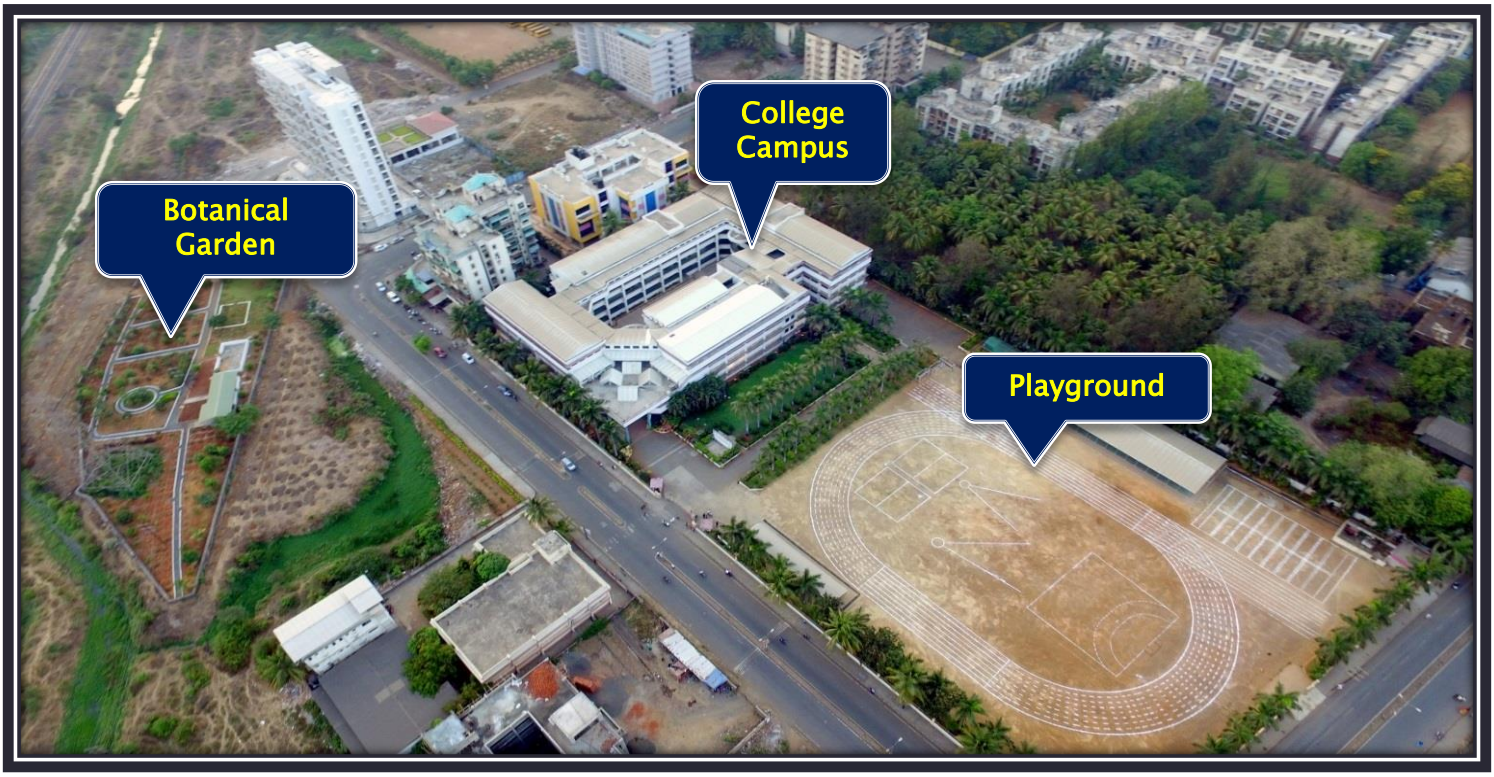
POs		
Sr. No.	**Outcome for P.G. Diploma in Analytical Instrumentation Program** **After completion of P.G. Diploma in Analytical Instrumentation program students will acquire**	**Graduate Attribute**
PO1	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge
PO2	An ability to demonstrate proficiency in various instrumentation, modern tools, and advanced techniques to meet industrial expectations and research outputs.	Disciplinary knowledge
PO3	Ability to identify problems, formulate, and prove hypotheses by applying theoretical knowledge and skills relevant to the discipline.	Problem-solving
PO4	The ability to articulate thoughts, research ideas, information, scientific outcomes in oral and in written presentation to range of audience.	Communication skills
PO5	A capacity for independent, conceptual, and creative thinking, and critical analysis through the existing methods of enquiry.	Critical thinking
PO6	Acquisition of skills required for cutting edge research, investigations, field study, documentation, networking, and ability to build logical arguments using scholarly evidence.	Research skills
PO7	An ability to portray good interpersonal skills with the ability to work collaboratively as part of a team undertaking a range of different team roles	Teamwork

PO8	The ability to understand ethical responsibilities and impact of scientific solutions in global, societal, and environmental context and contribute to sustainable development	Moral and ethical awareness/ multicultural competence
PO9	An openness to and interest in life-long learning through directed and self-directed study	self-directed learning
PO10	The ability to translate the knowledge and demonstrate the skills required to be employed and successful professional development.	Life-long learning
PO11	The ability to identify and describe broadly accepted methodologies of science, and different modes of reasoning.	Disciplinary knowledge

PSOs	
PSO1	Students will get the basic knowledge about Pharma API, Pharma Formulations & Speciality Chemical Industries & Basic Manufacturing operations & QC/QA functions in these industries.
PSO2	It will be easier for the students to get the jobs in Quality Control/Quality Assurance Sections & Analytical Method Development (ADL) sections, since the skills required in these jobs i.e Handling of sophisticated analytical instruments like UV-Visible Spectrophotometer,FT-IR,GC,HPLC,AAS.
PSO3	During the Internship in Industries i.e Pharma API, Pharma Formulations & speciality Chemical Industries students will get the actual knowledge about the working environment in the Industries and will also get the knowledge about analysis of Pharma API, Pharma Formulations & Speciality Chemicals samples.
PSO4	Students will get the knowledge about the Quality Control/Quality Assurance function in the Industries like Pharma API, Formulations & Speciality Chemical Industries, Importance of Documentation and Good Laboratory Practices in the Industries.
PSO5	Students will get the knowledge about how to face the Technical Interviews when they will go to face the interviews in Pharma API, Pharma Formulations & Speciality Chemical Industries.
PSO6	Students will get knowledge about various Pharmaceutical dosage forms manufactured in Pharma Formulations Industries & will also get the additional knowledge about how to use different pharmacopoeias like IP/BP/USP/JP.

COs	
Semester I	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-Paper 1- Basic Understanding of Chemical & Pharmaceutical Analysis	
CO1	Prepare the solutions of various Normalities, Molarities used for Chemical & Instrumental analysis.
CO2	Explain about the various dosage forms that are manufactured in Pharmaceutical Formulation Industries.
CO3	Describe about the different pharmacopoeias used in the Pharma API, Formulations i.e IP, BP, USP & Introduction to pharmacopoeial monographs.
CO4	Analyse samples of Method validation by explaining Guidelines used for Analytical Method Validation i.e ICH Guidelines Q 2A & Q2B.
Course (Paper) Name and No.-Paper II – Advanced Spectroscopic Techniques	
CO1	Analyse the real samples (Pharma formulations samples like Paracetamol Tablets, Meformin HCl tablets on UV-Visible Spectrophotometer using SOP's.
CO2	Explain the trouble shooting abilities while doing analysis on UV-Spectrophotometer, FT-IR and will able to describe about the interpretation of Spectroscopic analytical data.
CO3	Describe Theory about the technique like Flame Photometry & will able to analyse samples by knowing basic operation of the Instrument Flame Photometer.
CO4	Describe about theoretical aspects of the technique like Atomic Absorption Spectroscopy.

Semester II	
After Completion of the course the learner will be able to;	
Course (Paper) Name and No.-Paper I –Quality Management System,Sample Management, & Safety in Industry	
CO1	Describe about the importance of Quality Assurance in the industries, importance of Documentation prevalent in the industries & explain about importance of SOP's, Log Books, Manuals, & Test Reporting.
CO2	Differentiate between Reference Standards & Working Standards used at the time of analysis of Pharma API & Formulations. Sample Management i.e Flow, Storage and Destruction of the samples after analysis.
CO3	Describe about the importance of Safety while working in the Industries & Use of personnel protective equipments, Environment, Safety & Hazards (HSE) in Industries.
CO4	Explain about the importance of Good Laboratory Practices (GLP) while working in the laboratory.
Course (Paper) Name and No.-Paper II – Advanced Chromatographic Techniques	
CO1	Explain theoretically about the Basic chromatographic techniques and differentiate between Thin Layer Chromatography & Paper Chromatography.
CO2	Explain theoretically about the Advanced chromatographic techniques like GC,GC-HS,HPLC,GC-MS,LC-MS and will able to differentiate between GC.HPLC & GC-HS and between GC-MS & LC-MS
CO3`	Describe & explain about the trouble shooting & maintenance of sophisticated analytical instruments like GC, HPLC & will able to analyse the samples on these instrument without any hassle.
CO4	Differentiate between the interpretations of chromatographic analytical Data of techniques like GC & HPLC.



Janardan Bhagat Shikshan Prasarak Sanstha's

Changu Kana Thakur

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