

CERTIFICATE COURSES (2026-2027)

CENTRE FOR DISTANCE AND ONLINE EDUCATION



INFORMATION BROCHURE



**MAHARAJA SRIRAM CHANDRA BHANJA DEO UNIVERSITY
SRIRAM CHANDRA VIHAR, TAKATPUR, BARIPADA,
MAYURBHANJ, ODISHA- 757003**

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THE CREST OF THE UNIVERSITY

The Crest of Maharaja Sriram Chandra Bhanja Deo (MSCB) University, Takatpur, Baripada, reflects the institution's commitment to knowledge, regional heritage, and social development. It features a ship symbolizing Odisha's rich maritime tradition, an inkpot and 'pen' representing the pursuit and dissemination of higher education, a tribal couple carrying firewood depicting the cultural heritage and livelihoods of the tribal communities, a mining 'pulley' signifying the region's abundant mineral resources, and a mineral transport vehicle representing industrial and economic progress. Together, these symbols embody the University's vision of academic excellence, inclusivity, cultural preservation, and sustainable regional development.

ABOUT THE MSCB UNIVERSITY

The Maharaja Sriram Chandra Bhanja Deo University (MSCB University), formerly North Orissa University (NOU) was established by the Government of Orissa, under the Section 32 of the Odisha University Act, 1989 (Act 5 of 1989), vide notification No. 880 dated 13th July 1998. It was carved out of the Utkal University and became operational since 1999 at Takatpur (98.84 acres) of Baripada in the Mayurbhanj District of Odisha as an affiliating university. The University is recognized by the University Grants Commission under Sections 2(f) and 12(B) of UGC Act, 1956 with effect from 15th February 2000 and 21st June 2006, respectively. MSCBU is accredited with an 'A' grade by NAAC in its 3rd cycle (valid until April 10, 2028). It is also recognized by the Bar Council of India, DEC, IGNOU, NCTE, and is a member of the Association of Indian Universities and the Association of Commonwealth Universities. The university's campus, Sriram Chandra Vihar, spans 98.84 acres, located 250 km from Kolkata and 260 km from Bhubaneswar. MSCBU's jurisdiction covers 56 colleges including 2 Autonomous Colleges, 1 Medical College, 1 Teachers' Education (B.Ed.) College along with 26 P.G. Departments running in the University campus and imparting education to a large number of students at the graduate and post-graduate levels.

ABOUT CDOE OF MSCB UNIVERSITY

The Centre for Distance and Online Education (CDOE), formerly the Directorate of Distance and Continuing Education, was established in 2003 to provide accessible, high-quality education to distant learners. It has evolved into a leading hub for distance education in Odisha, offering flexible postgraduate programmes supported by modern technology and comprehensive study materials. By the 2019–20 academic year, CDOE had educated 14,496 students. After a brief hiatus, it resumed operations with UGC-DEB approval, offering 12 postgraduate Programmes, 30 certificate courses and 27 diploma courses. M.A. in Economics, English, Odia, Sanskrit, and Master of Social Work (MSW) for the 2025–26 academic year, with admissions commencing in July–August 2025. Based on the latest recommendations of the Distance Education Bureau (DEB), UGC, CDOE is further expanding its academic portfolio by introducing additional postgraduate Programmes M.A. in Santali, M.A. in Political Science, M.A. in Education,

M.A. in Anthropology & Tribal Studies, M.A. in History, Master of Commerce (M.Com.), and Master of Library & Information Science (M.Lib.I.Sc.), subject to the final approval and notification of the competent authorities. These additions will strengthen CDOE's commitment to providing inclusive, multidisciplinary, and career-oriented higher education through the Open and Distance Learning (ODL) mode.

ABOUT THE CERTIFICATE COURSES

Certificate Courses are short-term academic and skill-oriented programs designed to provide focused knowledge and practical training in specific disciplines. These courses equip learners with specialized competencies that enhance professional expertise, career readiness, and employability. They offer flexible learning opportunities for students, working professionals, and lifelong learners seeking to upgrade their skills without committing to long-term degree programs. By integrating industry-relevant content, practical exposure, and hands-on learning experiences, certificate courses bridge the gap between academic knowledge and workplace requirements. They also promote continuous learning, support career advancement, and create pathways for higher education and professional development in emerging fields. In CDOE, MSCB University, we are providing 36 hours certificate courses in the below mentioned subjects.

LIST OF CERTIFICATE COURSES AND CO-ORDINATORS

Sl. No.	Offering Department	Total Credits	Name of The Certificate Course
1	Yoga Course Co-ordinator Dr Sujata Panda :9625702236 Dr Himanshu Parida :9124061366	2	Food And Nutrition
			Yoga Therapy
			Caregivers /Geriatric Care
			Community Health & Wellness Educator
2	Political Science Course Co-ordinator Dr Dhananjay Nayak : 7008990085 Satyanarayan Mandal : 6370374696	2	Human Rights: Ideas And Concepts
3	History	2	Feminist Thought And Historical

	Course Co-ordinator Ms. Anjana Mohanty : 7847053309		Movement
			Travel & Tourism Operations
4	ATS Course Co-ordinator Mrs. Santana Maity : 8927176873	2	Tribal Development
			Dermatoglyphic Analysis
5	Education Course Co-ordinator Mrs Laxmipriya Mohanty : 7438848228 Mr Pranabkanti Dutta : 8144738811 Mr Snehashish Mohanty : 7008702881	2	Innovative Pedagogy And Educational Practices
6	Commerce Course Co-ordinator Ms Diksha Kumari : 8327753764 Mr Biswajit Das : 8260757359	2	Consumer Protection
7	Social Work Course Co-ordinator Dr Sujoy Kundu 9234462619	2	NGO Management
			Anti Human Trafficking & Criminal Justice System
			Adolescent Health And Counseling
			Social Work Counseling
8	Sanskrit Course Co-ordinator Dr. Debabrata Panda :9438472261 Mrs. Anisha Mishra : 9348817632	2	Manuscriptology
9	Odia Course Co-ordinator Dr. Bindheswari Kalia : 7008175675 Mr. Hrushikesh Mohanta : 6370434624	2	Folk Literature
10	Santali Course Co-ordinator Ms. Nangi Marandi : 9328362873	2	Santali Language

11	English Course Co-ordinator Ms. Abhipsa Pattanayak : 8249343819 Ms. Pritilagna S. Mahakud : 7787975069	2	Communication Skills
12	Economics Course Co-ordinator Ms. Sujata Mohakud : 7606890732	2	Research Methodology For Social Science Data Base And Data Analysis In Research
13	Computer Science	2	Core JAVA Programming
14	MBA	2	Health Insurance Business Environment and Law
15	Biotechnology	2	Clinical Biochemistry and Molecular Diagnostic
16	Botany	2	Assessment of Biodiversity & Conservation
17	Chemistry	2	Analytical Instrumentation Technique
18	Computer Application	2	“C”
19	Library & Information Science Course Co-ordinator Dr. Nabin Ku. Sahu : 9861453541 Mrs. Sashmita Nayak : 7377595005	2	Organization and Processing of Library Resources
20	Mathematics	2	Operations Research
21	Physics	2	Physics with SCILAB
22	RS and GIS	2	Basic Principles of Remote Sensing and Applications
23	WLBC	2	Environmental Impact Assessment (EIA) and Management Plan (EMP)
24	Zoology	2	Advanced Molecular Biology

STANDARD OPERATING PROCEDURES OF CERTIFICATE COURSES

01. Purpose of Certificate Courses

Certificate Courses are short-term academic or skill-based programs designed to:

- Provide specialized knowledge or practical skills on a specific subject.
- Offer flexible learning opportunities to students, professionals, and the public.
- Provide short-term, focused training in specific academic or professional fields.
- Enhance skill development and employability.
- Offer a good learning pathways for students and working professionals.
- Promote industry collaboration and hands-on learning opportunities.

02. Eligibility Criteria

The eligibility criteria for taking admission into the certificate courses are as follows

- Open for all learners, depending on program design.
- Minimum educational qualification is Graduate/Post Graduate in the concern subjects/Allied subjects.
- Relevant background experience, where applicable.
- One candidate is eligible for multiple certificate courses
- Special provisions for working professionals or students depending upon the course.

03. Duration of the Course

- Minimum 25 candidates per batch to start any certificate course
- Minimum duration: **36 hours** (Must be completed within: **4-6 months duration**)
- May be offered full-time, part-time, weekend, holidays or online with due approval

04. Course Structure

Each certificate course include:

- Unit wise syllabus.
- Theory/Practical balance based on discipline.

- Assessment formats through final exam/practical.

05. Mode of Delivery

Certificate Courses may be delivered through

- Classroom-based learning/Offline classroom teaching
- Blended/Hybrid /Online (If required).
- Workshops/Lab visit/Field visit, where relevant
- Practical/Instrument Handling where relevant
- The **Course Coordinator** will contact the respective HODs of the department and fix time. Students will conduct/observe the practical in the fixed time slot.

06. Admission Procedure

- Notification through university website.
- Online application form submission.
- Verification of eligibility.
- Full Payment of Course fee. No instalment payment is allowed
- The **Course Coordinator in association with CDOE official staff** will verify the admission process.

07. Attendance Requirements

- Minimum **75% attendance** is required for final assessment and evaluation.
- Flexibility for online learners may be allowed through participation tracking.

08. Fees Structure and Bank Details

- The course fee is **₹ 1000** /- per candidate per course. Students required to deposit the course fee at a time during the online payment/ NEFT/ Bank Challan.

Account Name	CERTIFICATE COURSE CDOE
Account Number	551010210000202
IFSC Code	BKID0005510

09. Assessment & Evaluation

Final assessment shall be done by a written exam/practical/project depending on course type. The **Course Coordinator** will finalise the date of exam with due consultation with course faculty in each course. The date of exam may be same or different depending upon the course completion.

Exam Types

- **Fill in the blanks/MCQs (Multiple Choice Questions)** – Most common.
- **Descriptive/Short Answer Questions** – For theoretical understanding.
- **Practical/Project Work** – Especially for IT, programming, or skill-based courses.
- **Internal Assessment (Assignments/Quiz)** – Some courses give grades based on assignments or quizzes throughout the course.

Marks Distribution (Typical)

- | | |
|--|-------|
| • Theory (Long/Short type/Fill in the blanks/MCQs) | : 60% |
| • Practical/Project | : 30% |
| • Internal Assessment (Quiz/assignment/MCQs) | : 10% |

Passing Criteria

- Minimum passing percentage is 50% individually for theory and practical.

Mode

- **Online** – Assignment.
- **Offline** – Written exams in MSCB University (Quiz and Theory Examination)

1. FOOD & NUTRITION

Course objective:

This course provides fundamental knowledge of food, nutrients, balanced diets, and their role in maintaining health and preventing diseases. It develops an understanding of nutritional requirements across different stages of the life cycle while promoting healthy eating habits and lifestyle practices. The course also introduces the principles of food hygiene, food safety, and scientific meal planning for individuals and communities. It enhances awareness of nutrition-related health issues and encourages community participation in promoting health, well-being, and disease prevention through appropriate nutritional practices.

Contents

Unit – I: Fundamentals of Food and Nutrition

Food and Nutrition: Meaning, importance and relationship between food, nutrition and health; functions of food; basic food groups; concept of balanced diet; factors affecting food habits; nutritional status and methods of nutritional assessment; introduction to malnutrition; role of nutrition in health promotion and disease prevention. **Practical:** Identification of food groups, preparation of simple healthy meals, and assessment of dietary habits.

Unit – II: Nutrients and Balanced Diet

Nutrients and Balanced Diet: Carbohydrates, proteins and fats sources, functions and nutritional significance; vitamins and minerals; water and dietary fiber; energy requirements of the body; Recommended Dietary Allowances (RDA); principles of meal planning; preparation of balanced diets for different age groups.

Practical: Preparation of balanced diet charts, calculation of calorie and nutrient requirements, and nutrient identification activities.

Unit – III: Nutrition Across the Life Cycle

Nutrition Across the Life Cycle: Nutritional requirements during infancy, childhood, adolescence, adulthood, old age, pregnancy and lactation; nutrition in special physiological

conditions; common nutritional deficiency disorders; obesity and lifestyle disorders; role of nutrition in immunity, wellness and healthy lifestyle management.

Practical: Preparation of diet plans for different age groups, nutrition awareness activities, and case discussions on nutritional deficiency disorders.

Unit – IV: Food Hygiene, Safety and Community Nutrition

Food Hygiene, Safety and Community Nutrition: Principles of food hygiene and sanitation; food contamination, spoilage and preservation methods; kitchen sanitation and personal hygiene; safe food handling practices; nutrition education and communication; community nutrition programmes in India; overview of Mid-Day Meal Scheme and Integrated Child Development Services (ICDS); role of nutrition in public health.

Practical: Demonstration of hygienic food preparation, community nutrition awareness programmes, and visit to a community health or nutrition centre (where feasible).

Course Outcome:

- Understand the importance of nutrition in maintaining health.
- Identify major nutrients and their functions.
- Prepare balanced diet plans for different age groups.
- Apply principles of food hygiene and sanitation.
- Understand nutritional deficiencies and preventive measures.
- Promote healthy dietary practices in daily life.

2. YOGA THERAPY

Course objective:

This course introduces the principles and foundations of Yoga Therapy while developing a comprehensive understanding of the therapeutic applications of yogic practices for the prevention and management of common physical, mental, and lifestyle-related disorders. It equips learners with practical skills in therapeutic yoga techniques, relaxation methods, and holistic approaches to promote physical, mental, and emotional well-being. The course will add significant value to academics by fostering professional ethics, human values, clinical understanding, diagnostic skills, and essential life skills. It also enhances self-employability and creates career opportunities in healthcare, hospitals, wellness centres, yoga therapy clinics, diagnostic centres, the medical, pharmaceutical and nutraceutical industries, as well as teaching and research in academic institutions.

Contents

Unit – I: Foundations of Yoga Therapy

Meaning, concept, scope and importance of Yoga Therapy; history and development of yoga; concept of holistic health; principles of Yoga Therapy; Eight Limbs of Yoga (Ashtanga Yoga); role of yoga in the prevention and management of diseases; yogic concept of body and mind; introduction to Panchakosha; contraindications and safety precautions in yoga practices.

Practical: Introduction to basic yogic postures, practice of simple breathing techniques (Pranayama), and demonstration of relaxation practices.

Unit – II: Yogic Practices for Therapeutic Benefits

Therapeutic importance of Asanas; classification of yogic postures (standing, sitting, prone and supine); Surya Namaskar and its health benefits; Pranayama and its therapeutic applications; fundamentals of Mudras and Bandhas; overview of Shatkarma (cleansing techniques); relaxation techniques in yoga; importance of correct posture and breathing; yoga practices for improving flexibility, strength and endurance.

Practical: Practice of selected therapeutic asanas, pranayama techniques, guided relaxation sessions, and demonstration of Surya Namaskar.

Unit – III: Yoga Therapy for Common Disorders

Yoga-based management of stress, anxiety and mental health disorders; yoga for obesity and lifestyle diseases; therapeutic applications of yoga in diabetes, hypertension and cardiovascular health; yoga for back pain, musculoskeletal and joint disorders; yoga for respiratory and digestive disorders; yoga for women's health; role of yoga in promoting mental well-being and quality of life.

Practical: Therapeutic yoga sessions for selected disorders, preparation of condition-specific yoga modules, case discussions, and practical demonstrations of therapeutic protocols.

Unit – IV: Relaxation, Meditation and Lifestyle Management

Concept and importance of relaxation in health promotion; meditation techniques and their therapeutic benefits; Yoga Nidra and deep relaxation practices; stress management through yogic techniques; yogic lifestyle and positive living; diet and nutrition according to yogic principles; Dinacharya (daily routine) for healthy living; mental hygiene, emotional balance, and community awareness programmes for yoga and wellness.

Practical: Practice of meditation, Yoga Nidra, stress management techniques, preparation of personalized yogic lifestyle plans, and community-based yoga awareness activities.

Course Outcome

- Understand the concept and scope of Yoga Therapy.
- Apply yogic practices for health promotion and disease prevention.
- Demonstrate therapeutic yoga techniques for common health conditions.
- Practice relaxation and stress management techniques.
- Develop awareness regarding holistic health and wellness.
- Promote healthy lifestyle practices through yoga.

3. CAREGIVER & GERIATRIC CARE

Course objective:

This course provides fundamental knowledge and practical skills in caregiving and geriatric care, enabling learners to understand the physical, psychological, emotional, and social needs of older adults. It equips students with the competencies required to deliver compassionate, supportive, and person-centered care while promoting healthy ageing and overall well-being. The course emphasizes ethical and professional caregiving practices, effective communication, and dignity in elder care. It also prepares learners for employment opportunities in hospitals, old-age homes, rehabilitation centres, community health services, home healthcare, and geriatric care facilities.

Contents:

Unit – I: Introduction to Caregiving and Aging

Theory: Introduction to caregiving and its importance, concept of geriatric care, aging process and age-related physical, psychological, and social changes, physical, emotional, and social needs of older adults, principles of healthy and active aging, rights, dignity, and quality of life of elderly individuals, ethics, professional responsibilities, and role of caregivers, common health and social problems faced by senior citizens, role of family, community, and healthcare systems in elderly care.

Practical: Observation and interaction with elderly individuals, assessment and identification of elderly care needs, preparation of caregiver responsibility chart, group discussion and case-based learning on geriatric care.

Unit – II: Basic Caregiving Skills and Daily Assistance

Theory: Personal hygiene and grooming care, bathing, dressing, toileting assistance, mobility support and transfer techniques, bed making, positioning and pressure sore prevention, nutritional care and feeding assistance, medication assistance and safety, maintaining a safe home environment, prevention of falls and injuries, infection prevention, sanitation, and universal precautions in caregiving.

Practical: Demonstration and practice of personal hygiene care, patient handling and transfer techniques, bed making and positioning, feeding assistance, mobility support, infection control measures, and safe caregiving practices.

Unit – III: Health Care and Emergency Support for Elderly

Theory: Overview of common geriatric diseases including hypertension, diabetes mellitus, arthritis, osteoporosis, dementia, Parkinsonism, and stroke, monitoring of vital signs, first aid and emergency response, prevention and management of bed sores, basics of pain management, rehabilitation and physiotherapy support, importance of regular health check-ups, palliative care, supportive care, and referral services for elderly patients.

Practical: Measurement of vital signs, demonstration of first aid techniques, emergency response drills, bed sore prevention methods, basic rehabilitation exercises, and role-play for emergency caregiving situations.

Unit – IV: Communication, Mental Health and Elderly Wellness

Theory: Effective communication skills with elderly individuals, emotional support and basic counselling techniques, mental health issues in old age including stress, anxiety, loneliness, depression, and dementia, recreational and social engagement activities, role of yoga, meditation, relaxation, and breathing practices in healthy aging, lifestyle modification for senior citizens, community-based elderly support services, caregiver self-care, stress management, and prevention of caregiver burnout.

Practical: Communication skill development, counselling demonstrations, relaxation and meditation practices, preparation of individualized elderly wellness plans, caregiver stress management activities, and community awareness programmes on healthy aging.

Course Outcome:

- Understand the process of aging and common health problems in elderly people.
- Provide basic caregiving support to senior citizens.
- Assist in maintaining personal hygiene, nutrition, and mobility of elderly individuals.
- Apply basic first aid and emergency care techniques.
- Communicate effectively and empathetically with elderly individuals.

4. Community Health & Wellness Educator

Course objective:

This course provides fundamental knowledge of community health and wellness, emphasizing the principles of preventive, promotive, and holistic healthcare. It develops learners' understanding of health education, disease prevention, and community awareness programmes while enhancing communication, leadership, and interpersonal skills for effective community health promotion. The course also encourages the adoption of healthy lifestyle practices and wellness education to improve the health and well-being of individuals and communities. It adds value to academics by promoting professional ethics, social responsibility, public health competencies, and life skills, while creating opportunities for employment and community service in public health organizations, NGOs, hospitals, wellness centres, educational institutions, and government health programmes.

Contents:

Unit – I

Foundations of Community Health and Wellness: Meaning and importance of community health, concept of health and wellness, dimensions and determinants of health, principles of public health, role of community health workers, common health problems in communities, preventive, promotive and curative healthcare, and an overview of national health programmes.

Practical: community health survey techniques, identification of major community health problems, group discussions on public health issues, and preparation of health awareness and educational materials.

Unit – II

Health Education and Preventive Healthcare: Principles and methods of health education, communication skills for health promotion, immunization and vaccination awareness, maternal and child health, prevention and control of communicable and non-communicable

diseases, first aid and basic emergency care, and the role of community participation in health promotion.

Practical: demonstration of health education methods, role play on effective communication and counselling skills, first aid and basic life support practices, and organization of preventive health awareness activities.

Unit – III

Nutrition, Hygiene and Lifestyle Management: Fundamentals of nutrition and balanced diet, malnutrition and nutritional deficiency disorders, personal hygiene and sanitation, safe drinking water and environmental hygiene, prevention and management of lifestyle disorders, physical activity and fitness, stress management, mental wellness, yoga and relaxation techniques, and promotion of healthy lifestyles.

Practical: preparation of balanced diet and nutrition awareness charts, demonstration of personal and environmental hygiene practices, assessment of healthy lifestyle behaviours, yoga-based wellness sessions, and stress management activities.

Unit – IV

Community Participation and Wellness Promotion: Community mobilization and participation, leadership and teamwork in community health, planning and implementation of wellness awareness programmes, basics of health counselling, women and child welfare programmes, adolescent and geriatric health, school and workplace wellness programmes, role of government agencies and NGOs in community health, and ethics and professionalism in community health practice.

Practical: organization of community health and wellness awareness programmes, preparation of community wellness education plans, health counselling demonstrations, community outreach activities, and group presentations on contemporary community health issues.

Course Outcome:

- Understand the principles of community health and wellness.

- Identify common health problems in communities.
- Conduct basic health awareness and educational activities.
- Promote hygiene, sanitation, nutrition, and healthy lifestyle practices.
- Apply communication skills in community health education.
- Support public health and wellness initiatives at community level.

5. HUMAN RIGHTS: IDEAS AND CONCEPTS

Course Objectives:

The course aims to introduce students to global and Indian human rights frameworks, fostering understanding of fundamental rights, international conventions, and mechanisms protecting dignity, equality, and justice in society.

Contents:

Unit-I: Introduction

Meaning, nature, and scope of human rights, Historical development of human rights: Magna Carta, American Revolution, French Revolution, Universal Declaration of Human Rights (UDHR)

Unit-II: Evolution of Human Rights

Three generations of human rights: Civil and political rights, Economic, social, and cultural rights, Collective/solidarity rights, Human dignity, equality, and justice

Unit-III: International Covenants: ICCPR, ICESCR

UN Human Rights Council, UNICEF, UNHCR, UNESCO, International Humanitarian Law (Geneva Conventions), Enforcement mechanisms & challenges, Role of international NGOs: Amnesty International, Human Rights Watch

Unit-IV: Human Rights in India

Human rights in the Indian Constitution, Fundamental Rights & Duties, Directive Principles of State Policy, National Human Rights Commission (NHRC) & State commissions, Human rights courts & legal aid services, Major issues: custodial violence, trafficking, bonded labour, women's rights, child rights, tribal rights

Course Outcome :

This course enables learners to understand the foundations of human rights, key international

conventions, and Indian constitutional safeguards. It develops awareness, analytical skills, and the ability to identify violations while promoting respect, equality, and justice in society through informed participation and responsible citizenship.

6. FEMINIST THOUGHT AND HISTORICAL MOVEMENT

Course objective:

The present course aims to develop a comprehensive understanding of the meaning, evolution, concepts, and major theories of feminism while examining the historical development of women's movements in India and across the world. It also enables learners to analyze feminist historiography and gender perspectives in historical research for a deeper understanding of the role of women in history. Furthermore, the course seeks to create awareness of women's rights, constitutional safeguards, gender equality, and social justice. It encourages students to apply feminist perspectives in interpreting contemporary social, political, cultural, and economic issues and to promote inclusive and gender-sensitive approaches in academic and professional contexts.

UNIT–I: Introduction to Feminism and Feminist Thought

Meaning, Nature and Scope of Feminism, Concepts of Gender, Patriarchy and Equality, Evolution of Feminist Thought, Waves of Feminism, Major Feminist Theories: Liberal, Marxist, Socialist, Radical and Ecofeminism

UNIT–II: Historical Development of Women's Movements

Women's Movements in Europe and America, Women's Reform Movements in Colonial India, Contributions of Savitribai Phule, Pandita Ramabai, Rokeya Sakhawat Hossain and Sarojini Naidu, Women in the Indian National Movement, Post-Independence Women's Movements in India

UNIT–III: Feminist Historiography and Gender Studies

Feminist Historiography: Meaning and Development, Gender as a Category of Historical Analysis, Women in Ancient, Medieval and Modern Indian History, Women's Labour, Family and Society, Feminist Research Methodology and Oral History

UNIT–IV: Contemporary Feminism and Women's Empowerment

Constitutional Rights and Legal Safeguards for Women, Gender Equality and Human Rights, Women and Sustainable Development Goals (SDGs), Contemporary Gender Issues: Violence, Representation, Employment and Digital Spaces, Women Empowerment Programmes, NGOs and Government Initiatives

Course Outcomes

- Explain the evolution, concepts, and major theories of feminist thought.
- Analyze the historical development of women's movements in India and globally.
- Apply feminist historiography and gender perspectives in historical interpretation.
- Understand constitutional provisions, legal rights, and policies related to women.
- Evaluate contemporary gender issues and propose inclusive approaches for women's empowerment and social justice.

7. TRIBAL DEVELOPMENT

Course objective:

This course provides a comprehensive understanding of the concept of Adivasis, their historical evolution, socio-cultural identity, and contemporary status in India, with special reference to Odisha. It develops critical knowledge of tribal development policies, state interventions, tribal rights, identity movements, and the socio-political transformations during the colonial and post-colonial periods. The course enhances analytical, research, and problem-solving skills to address issues affecting tribal communities while promoting social justice and inclusive development. It also equips learners with transferable life skills and professional competencies, creating career opportunities in government departments, NGOs, research organizations, development agencies, and community-based initiatives.

Contents

Unit – I

Tribes as a category Tribes and Tribal: Nomenclature and Conceptual discourse; Distribution and Classification of Tribes in India and Odisha; Tribes/ adivasi as indigenous people: contemporary discourse; Particularly Vulnerable Tribal Group (PVTGs) of India and Odisha; Non-Scheduled category of Tribes: De-notified tribe, Nomadic tribes, criminal tribes; Pseudo-tribalism; Indigeneity.

Unit – II

Tribal situations in India and Odisha; Major tribal problems: land-alienation, indebtedness, Illiteracy, unemployment, migration, health and nutrition, displacements and rehabilitation, shifting-cultivation, Deforestation and its impact on tribal population

Unit – III

History of tribal administration; Constitutional safeguards for scheduled tribes; Mandal Commission, Dhebar Commission, Draft National Tribal Policy, Issues of acculturation assimilation and integration; Neheruvian approach to tribal development; Development Programmes in Five Year Plans, Tribal Sub Plan; Tribal Rights on Forest and Land; Forest Policies and Tribals; Impact of development

programmes on tribal life.

Unit – IV

Ethnic Group; Ethnicity: Concept and Theories; Tribal Assertion and Question of Indigeneity: Demand for scheduled tribe status (Teagarden communities, Meena and Gurjar agitation; Movement for livelihood: Kalinga Nagar Incident; Niyamgiri Movement; Kashipur agitation; Pathalgadi movement; Tribal Autonomy movements in India: Naga movement, Bodo movement, Gorkha movement; Ethnic problems and quest for identity formation

Course Outcome :

- Critically analysis the concept of tribes and Adivasi in India
- Demonstrate knowledge about the situation of the tribal people.
- Influence the state for the cause of tribal society.

8. DERMATOGLYPHIC ANALYSIS (CC-DA)

Course objective:

This course provides a comprehensive understanding of the meaning, concept, scope, and historical development of dermatoglyphic analysis in anthropology and allied sciences. It develops knowledge of the principles of fingerprint, palm print, and sole print formation, classification, and pattern identification while equipping learners with practical skills in the observation, recording, measurement, and analysis of dermatoglyphic traits. The course emphasizes the application of dermatoglyphic techniques in anthropological, genetic, medical, and forensic investigations for identification and comparative analysis. It also enhances analytical and interpretative skills for studying population variation, hereditary traits, congenital disorders, and human biological diversity using dermatoglyphic evidence.

Content

UNIT - I: Foundations of Dermatoglyphics

Definition and concept of dermatoglyphics, Historical development of dermatoglyphic studies, Scope and significance of dermatoglyphics, Relationship with anthropology and biology, Factors affecting dermatoglyphic variation

UNIT II: Classification and Techniques of Dermatoglyphics

Fingerprint pattern types, Loops, whorls, and arches, Ridge counting and pattern interpretation, Qualitative and quantitative traits, Ink and inkless methods, Ridge count and atd angle analysis

UNIT III: Applied Dermatoglyphics

Dermatoglyphics and human variation, Biological markers and inheritance, Dermatoglyphics and hereditary traits, Chromosomal abnormalities and syndromes, Dermatoglyphics in medical diagnosis, Genetic counseling and research applications

UNIT IV: Forensic and Practical Applications

Fingerprints in personal identification, Crime investigation and forensic analysis, Classification systems in forensic science, Biometric identification systems, Fingerprint collection and classification, Palm print analysis

Course Outcome :

- Explain the meaning, concept, scope, and historical development of dermatoglyphic analysis.
- Identify and classify various fingerprint, palm print, and sole print patterns and ridge characteristics.
- Understand the anatomical and genetic basis of dermatoglyphic formations and variations.
- Apply standard methods and techniques for recording, observing, and measuring dermatoglyphic traits.
- Analyze dermatoglyphic data for anthropological, medical, genetic, and forensic purposes.
- Develop practical skills in fingerprint collection, ridge counting, pattern interpretation, and chart preparation.
- Prepare analytical reports and interpret dermatoglyphic evidence with scientific accuracy and practical relevance.

9. INNOVATIVE PEDAGOGY AND EDUCATIONAL PRACTICES

Course objective:

This course enables learners to compare traditional teacher-centered approaches with modern constructivist paradigms by understanding the influence of information processing, social interaction, and behaviour modification models on learning. It develops the ability to design effective lesson plans using systematic instructional design frameworks such as ADDIE and ASSURE, while selecting appropriate teaching methodologies to suit diverse curricular objectives and learner needs. The course also enhances competencies in integrating digital tools, online platforms, and virtual learning environments to create effective flipped and blended classrooms while promoting ethical digital citizenship. Furthermore, it equips learners to design inclusive, differentiated instructional strategies and innovative Continuous and Comprehensive Evaluation (CCE) practices that support diverse learning profiles, foster active engagement, and improve educational outcomes.

Content

Unit – I: Foundations of Innovative Pedagogy and Instructional Design

Concept, nature, scope and significance of innovative pedagogy; pedagogical shift from traditional to modern teaching approaches; learner-centered education and constructivist learning; theories and models of teaching including Information Processing Models, Social Interaction Models, Personal Development Models and Behaviour Modification Models; instructional design frameworks with systematic lesson planning using the ADDIE and ASSURE models.

Practical related to lesson planning, preparation of instructional objectives, development of teaching-learning materials, classroom simulations, microteaching, and designing lesson plans using ADDIE and ASSURE models.

Unit – II: Instructional Methods and Specialized Teaching Frameworks

Direct and teacher-led instructional methods including lecture, storytelling, textbook, tutorial, demonstration and deductive methods; active and learner-centered approaches such as

inductive method, brainstorming, project method, questionnaire method, problem-solving method, laboratory method and heuristic (inquiry-based) method; alternative and progressive educational systems including Montessori Method, Kindergarten Method, Dalton Plan and Play-Way Teaching Method.

Practical related to demonstration of different teaching methods, project planning, inquiry-based learning activities, classroom presentations, development of instructional resources, and comparative analysis of traditional and innovative teaching approaches.

Unit – III: Digital Ecosystems and Technology-Enhanced Learning (TEL)

ICT integration in teaching-learning processes; smart classrooms and digital infrastructure; e-resources and digital educational repositories; blended learning, hybrid learning and flipped classroom models; online teaching platforms, Virtual Learning Environments (VLEs) and Learning Management Systems (LMS); digital citizenship including ethical, legal and responsible use of educational technologies.

Practical related to creation of digital learning resources, use of LMS platforms, online classroom management, preparation of multimedia teaching materials, conducting virtual classes, and implementation of flipped classroom strategies.

Unit – IV: Inclusive Pedagogy, Innovative Assessment and Reflective Teaching

Differentiated instruction and inclusive pedagogy for diverse learners; innovative techniques of assessment and evaluation; continuous and comprehensive evaluation (CCE); reflective teaching practices; action research; professional development and lifelong learning for educators.

Practical related to preparation of assessment tools and rubrics, formative and summative assessment techniques, reflective teaching journals, classroom observation, action research proposal development, and preparation of inclusive lesson plans and evaluation strategies.

Course Outcome

After completion of the course, learners will be able to apply innovative pedagogical strategies, integrate educational technologies, design learner-centered classroom practices, and implement inclusive and reflective teaching methods to improve student participation, critical thinking, and overall educational effectiveness in diverse learning environments.

10. CONSUMER PROTECTION

Course objective:

This course provides a comprehensive understanding of the concept, scope, and significance of consumer protection in modern society while creating awareness of consumer rights, responsibilities, and welfare measures. It enables learners to acquire knowledge of the Consumer Protection Act, 2019, related legal provisions, and the structure and functioning of consumer dispute redressal agencies at different levels. The course also develops the ability to identify unfair trade practices, misleading advertisements, consumer exploitation, and digital frauds, while promoting informed decision-making and safe consumer practices in both traditional and digital marketplaces. It further enhances legal awareness, ethical values, critical thinking, and practical skills required for responsible consumer citizenship.

Contents:

Unit I: Introduction to Consumer Protection and Consumer Rights

- Meaning, Nature and Scope of Consumer Protection
- Consumerism : Concept and Development
- Importance of Consumer Awareness
- Consumer Rights and Responsibilities
- Role of Government, Consumer Organizations and NGOs in Consumer Welfare
- Standardization and Quality Marks : ISI, AGMARK, Hallmark, FSSAI

Unit II: Consumer Protection Laws and Unfair Trade Practices

- Introduction to Consumer Protection Act, 2019
- Defective Goods and Deficiency in Services
- Unfair Trade Practices and Restrictive Trade Practices
- Product Liability and Consumer Safety
- Misleading Advertisements and Consumer Exploitation
- Rights of Consumers in the Marketplace

Unit III: Consumer Dispute Redressal Mechanism

- Consumer Disputes Redressal Commissions : District, State and National Levels
- Jurisdiction and Powers of Consumer Commissions

- Procedure for Filing Consumer Complaints
- Reliefs and Remedies Available to Consumers
- Mediation and Settlement of Consumer Disputes
- Online Consumer Grievance Redressal Systems

Unit IV: Digital Consumer Protection and Consumer Awareness Practices

- E-Commerce and Consumer Rights in Digital Markets
- Online Shopping Risks and Digital Fraud
- Cyber Awareness and Safe Digital Payment Practices
- Data Privacy and Protection of Consumer Information
- Consumer Awareness Campaigns and Ethical Consumerism
- Sustainable Consumption Practices

Course Outcome

- Explain the fundamental concepts, principles, and significance of consumer protection.
- Demonstrate knowledge of consumer rights, responsibilities, and legal safeguards available to consumers.
- Interpret the major provisions of the Consumer Protection Act, 2019 and related consumer laws.
- Identify and analyze unfair trade practices, defective goods, deficient services, and misleading advertisements.
- Understand the process of consumer grievance redressal and the functioning of consumer commissions.
- Apply safe and responsible consumer practices in offline and digital marketplaces.

11. NGO MANAGEMENT

Course Objectives :

This course provides an understanding of the essential features, structure, and functioning of Non-Governmental Organizations (NGOs) while examining the key issues and challenges involved in NGO management. It develops learners' analytical skills to evaluate the role, performance, and impact of NGOs in society. The course emphasizes the significance of effective governance, leadership, strategic planning, and accountability for successful NGO management. It also enhances professional competencies, ethical values, and managerial skills required for working with voluntary organizations, community development initiatives, and the social sector.

Contents :

Unit-I : NGO: An Introduction

Definition, Kinds of NGOs functioning in India, Role of NGOs in Social Reformation : Formation of NGO, Working of NGOs, Government recognize NGOs.

Unit-II : NGO Management

Understanding the context, Aid to development, Poverty & Development, Poverty & Vulnerability, Poverty & powerlessness, Dependency to sustainability, Development Indicators, Leadership, Need for Leadership with values.

Unit-III : Problem Identification and governance

Problem Identification, Problem of NGOs, strengthening voluntary efforts, Managing People, Fund Raising, Fund Utilization, Concept, Governance and Management, Need for good Governance for NGOs, Ethical Challenges.

Unit- IV : NGO Management and social Work

Resources Mobilization, Funding agencies: Type & Patterns of funding, Records, Records, Problem of Organization, PRA (Participatory Rural Approaches).

Course Outcome :

- To understand the concept NGO
- To know about the voluntary organizations work
- To gain knowledge on Project and Planning
- To implement skills of fundraising applications

12. MANUSCRIPTOLOGY (पाण्डुलिपि-विज्ञानम्)

Course Objectives

This course introduces students to the science of Manuscriptology (पाण्डुलिपि-विज्ञानम्) and its significance in preserving India's rich intellectual and cultural heritage. It develops the knowledge and practical skills required to identify, read, interpret, catalogue, and prepare descriptive listings of Sanskrit manuscripts. The course also provides an understanding of traditional and modern techniques for manuscript preservation, conservation, and documentation. It promotes appreciation of India's manuscript heritage while enhancing research, archival, and conservation skills essential for academic and heritage institutions.

Course Contents :

Unit-I: Introduction to Manuscriptology पाण्डुलिपि-विज्ञानस्य भूमिका

- पाण्डुलिपि-विज्ञानस्य परिभाषा स्वरूपं च (Meaning and Scope of Manuscriptology)
- भारतस्य पाण्डुलिपि-परम्परा (History of Manuscripts in India)
- पाण्डुलिपिनां सांस्कृतिकं शास्त्रीयं च महत्त्वम् (Importance of Manuscripts in Indian Knowledge Systems)
- पाण्डुलिपिनां प्रकाराः (Types of Manuscripts)
 - तालपत्र-पाण्डुलिपयः (Palm-leaf)
 - भूर्जपत्र-पाण्डुलिपयः (Birch-bark)
 - कर्गद-पाण्डुलिपयः (Paper Manuscripts)

Unit-II: लेखन-सामग्री तथा लिपयः (Scripts and Writing Materials)

भारतस्य प्रमुखा लिपयः (Major Indian Scripts) :

- ब्राह्मी (Brāhmī)
- गुप्त (Gupta)
- शारदा (Śāradā)

- नागरी (Nāgarī)
- ग्रन्थ (Grantha)
- नन्दिनागरी (Nandināgarī)
- ओडिया, बाङ्ला-लिपी च (Bengali, Oriya)
- लिप्याक्षराणां विकास

Unit-III : लिपिविज्ञानम् (Paleography)

- लिपीनां ऐतिहासिक-विकासः (Evolution of Indian Scripts)
- अक्षर-रूप-भेदाः (Letter forms and variations)
- लिप्या आधारेण पाण्डुलिपि-काल-निर्णयः (Dating of manuscripts based on script)
- विविध-लिपिषु पठन-अभ्यासः (Practice in reading different scripts)

Unit-IV: पाण्डुलिपि-भौतिकविज्ञानम् (Codicology)

- पृष्ठ-सङ्ख्याङ्कनम् (Physical features of manuscripts)
- सीमालेखाः, टिप्पण्यः च (Foliation, Pagination, and Marginal notes)
- पाठ-दोषाः – लोप, अधिक, विपर्यय (Errors in manuscripts)
- डिजिटलीकरणम् (अङ्क-रूपान्तरणम्) (Digitization of manuscripts)

Course Outcome:

After completing this course, the learners will be able to :

- Identify various types of Sanskrit manuscripts
- Read and analyse basic manuscript scripts
- Prepare descriptive catalogue entries
- Apply preservation and Digitization methods

13. FOLK LITERATURE

Course objective:

The course adds value to enhance human values and develops skills to grasp knowledge on Folk Literature of Odia. It helps the students to get employability in institutes and organization which deals with conservation and propagation of culture, tradition and literature along with a scope in academics.

Contents

Unit – I

ଲୋକ ସାହିତ୍ୟର ସଂଜ୍ଞା, ସୂତ୍ର ଓ ପ୍ରକାରବିଭିନ୍ନ

Unit – II

ଲୋକ ଗୀତ ଓ ଲୋକ କାହାଣୀ

Unit – III

ଲୋକ ନାଟକ ଓ ଲୋକୋକ୍ତି

Unit – IV

ବିଦଗ୍ଧ ସାହିତ୍ୟ ରୂପରେ ଲୋକ ସାହିତ୍ୟର ପ୍ରାଧିକାର

Course Outcome

- Enables the student to skills learning folk literature
- Promotes skill in comparing folk literature with modern literature of Odia
- Helps the students to admire and conserve human values, Odia folk culture and literature

14. SANTALI LANGUAGE

Course objective:

[illegible][illegible]

Contents:

Unit – I	ଏଞ୍ଜିଓଭାଷୀ ପଞ୍ଜି.ସଂସ୍ଥା ସଞ୍ଜୋଗେ ଗଠିତହୁଏ (Introduction of Santali Language)
Unit – II	ଏଞ୍ଜିଓଭାଷୀ ଏଞ୍ଜିଓସଂସ୍କୃତି- ସଞ୍ଜିତ ଏଞ୍ଜିଓସଂସ୍କୃତି ଓ ସଞ୍ଜିତ ଏଞ୍ଜିଓସଂସ୍କୃତି (Santali Literature- Oral Literature and Written Literature)
Unit – III	ସଞ୍ଜିତସଂସ୍କୃତି ଓ ସଞ୍ଜିତସଂସ୍କୃତି (Grammar and Composition)
Unit – IV	ପଞ୍ଜି.ସଂସ୍ଥା ଏଞ୍ଜିଓସଂସ୍କୃତି (Linguistics)

Course Outcome

[illegible]

15. COMMUNICATION SKILLS (CC-CS)

Course objective:

This course provides a comprehensive understanding of the meaning, nature, process, and significance of communication in education and society while developing proficiency in English language skills, including listening, speaking, reading, and writing (LSRW). It enhances learners' vocabulary, grammar, pronunciation, and comprehension for effective personal, academic, and professional communication. The course equips students with functional English skills for note-taking, letter writing, report writing, CV preparation, group discussions, presentations, and workplace communication. It also fosters advanced communication competencies such as public speaking, debates, interviews, anchoring, argumentation, and creative expression, thereby improving confidence, employability, and professional effectiveness.

Contents

UNIT-I : Basics of Communication and English Language

- Meaning, Nature and Process of Communication
- Domains of Communicative English
- Importance of English in Academic and Social Contexts
- Learning Strategies for Language Acquisition
- Basic English Pronunciation

UNIT- II : Development of Language Skills (LSRW)

- Listening Skills and Strategies
- Speaking Skills and Conversational English
- Reading Skills and Techniques
- Writing Skills and Mechanics of Writing
- Vocabulary Development and Functional Grammar
- Comprehension Skills

UNIT- III: Functional English for Academic and Professional Use

- Note Taking and Memo Writing
- Letter Writing and CV/Resume Writing
- Assignment and Report Writing
- Meeting Proceedings and Minutes Writing
- Group Discussion and Presentation Skills

UNIT-IV: Advanced Communication and Creative Expression

- Speech Delivery v/s Debate
- Anchoring and Compering
- Interviews and Personality Development
- Literary Activities and Creative Communication

Course Outcome :

- Describe the mechanics of communication and use English confidently and correctly in social and academic situations with enhanced pronunciation and language acquisition techniques.
- Use LSRW skills effectively, such as conversational language, reading, Writing mechanics, Vocabulary development, Functional grammar and comprehension.
- Create professional documents (notes, memos, letters, CVs/Resumes, assignments, reports, meeting minutes); give effective group discussions and presentations.
- Identify and deliver sophisticated communication tasks such as speeches vs. debates, anchoring/compering, interviews and personality development activities.
- Engage in creative and literary communication, developing confidence in real world professional and social communication.

16. RESEARCH METHODOLOGY FOR SOCIAL SCIENCE

Course objective:

The primary objective of this course is to develop skill of the students for handling of data related to the social issues, challenges and to improve analytical expertise. The course is a value-added course that will help the students to get employability scope in Government, Quasi-Government and Non -Government Organizations

Contents

Unit – I

Social Science Research; Meaning, Objectives, Types, PAPA Model. Criteria of a Good research and researcher, Problems in Social Science Research. Research Process from Problem Statement to Report Writing. Research Design ; Meaning, Types and Its different Criteria. Literature Review; Meaning, Objectives, Types, Sources, Precautions, and Steps in Literature Review. Training in Linear, Tabular, Integrated and Systematic Literature Review.

Unit – II

Data; Meaning, Types of data based on entity and interval (*Cross-Sectional, Time Series, Panel & Pool*), Quantitative and Qualitative Data (*NOIR Scales, Likert, Thurstone, Guttman, Stapel, and Semantic Differential Scale*), Geospatial and Geostatistical Data (*Vector, Raster, Lattice, Point Pattern, Attribute, Topological, Temporal and Network*).

Primary and Secondary data; Methods of collecting Primary data, Questionnaire Vs Schedule. Steps in Questionnaire Preparation, Probability and Non-Probability Sampling Techniques. Optimal Sample Size Determination Methods, Sampling and Non-Sampling Error.

Sources of Secondary & Large-Scale Survey Data with Extraction Training (*IMF, WDI, RBI, ABDI, MoSPI, NASA Power Data, PLFS, and NSSO*).

Unit – III

Testing of Hypothesis ; Null & Alternative, Goodness of fit, Confidence Interval, Power of test, α , Type I & II errors, Procedure for Testing of hypothesis, Properties of a good

estimator. Data Import, Data Sorting, Data Transformation, Data Visualisation, and Data Tabulation. Cross tabulation, descriptive statistics, correlation, regression, t, Z, F and χ^2 test.

Unit – IV

Research Ethics; Meaning, Types, Ethical Guidelines in Social Science Research. Ethical Publication and Impact Factor (*h*, *g* & *i10*) Calculation. Plagiarism; Meaning, Types, Why do People Plagiarise?, How to Avoid Plagiarism?, Do's and Don'ts.

Report Writing; Types of Reports, Steps in Report Writing, Format of the Research Report, Principles of Writing, Referencing Using APA & MLA Style, Do's and Don'ts of Report.

Course Outcome

- Enable students to understand the basics of research, the tools and techniques to be employed for computation and analysis of data.
- Train the students to prepare comprehensive research report.
- It will help the students to enhance the skill as researcher for undertaking independent research work.

17. DATA BASE AND DATA ANALYSIS IN RESEARCH

Course objective:

This course provides a comprehensive understanding of the concepts of data, databases, and database management systems while developing practical skills in data collection, coding, cleaning, storage, and management. It equips learners to access and utilize Indian and international economic databases and apply statistical and analytical techniques for research and evidence-based decision-making using software such as Excel, SPSS, R, Stata, and Python. The course also enhances competencies in data visualization, interpretation, research report writing, referencing, citation, and ethical research practices, including plagiarism awareness. It fosters analytical, problem-solving, and quantitative research skills essential for academic, professional, and policy-oriented research.

UNIT-1 : Introduction to Data and Databases

Meaning and Types of Data, Primary and Secondary Data, Qualitative and Quantitative Data, Introduction to Database and DBMS, Importance of Databases in Research, Indian and International Economic Databases, Data Formats (CSV, Excel, SPSS)

Practical : Accessing and downloading datasets from databases

UNIT-2 : Database Management and Data Collection Tools

Data Organization and Coding, Data Cleaning and Storage, Data Security and Ethics, Introduction to Excel and SPSS, Data Entry and Database Management

Practical : Creating databases, Importing and exporting datasets, Sorting and filtering data

UNIT 3 : Data Analysis Techniques and Software

Introduction to Data Analysis, Descriptive Statistics, Correlation and Regression, Hypothesis Testing, Basics of Econometrics, Introduction to Excel, SPSS, R and Python

for Data Analysis

Practical : Data coding, Statistical analysis, Charts and graphs, Interpretation of outputs

UNIT 4 : Data Presentation, Interpretation and Report Writing

Presentation of Data Using Tables and Graphs, Interpretation of Statistical Results, Research Report Writing, Findings and Conclusions, Referencing and Citation Styles, Basics of Plagiarism, Citation Tools such as Mendeley and Zotero

Practical : Preparation of research report and presentation of findings

COURSE OUTCOMES:

1. Understand economic databases and their applications.
2. Access and manage secondary data sources.
3. Use software for database management and data analysis.
4. Apply statistical techniques for research.
5. Present and interpret research findings.
6. Prepare basic research reports using economic databases.

18. CERTIFICATE COURSE ON CORE JAVA

Course objective:

- To become familiar with the features of Java Language.
- To discover how to write Java code according to Object-Oriented Programming principles.
- To become comfortable with concepts such as Classes, Objects, Inheritance, Polymorphism
- and Interfaces.
- To learn Java APIs for Collections, I/O Streams.
- To design GUI applications and Applets using AWT and Swing.
- To develop Multithreaded and Networking applications.

Contents

Unit – I

Introduction to Java: History of Java, Features of Java, Concepts of OOP, Java Development Kit (JDK), Security in Java. Java Basics: Keywords; Working of Java; Including Comments; Data Types in Java; Primitive Data Types; Abstract / Derived Data Types; Variables in Java; Using Classes in Java; Declaring Methods in Java, Code to Display Test Value; The main () Method, invoking a Method in Java; Saving, Compiling and Executing Java Programs. Operators and Control Statements: Operators, Arithmetic Operators, Increment and Decrement Operators, Comparison Operators, Logical Operators, Operator Precedence; Control Flow Statements, If-else Statement, Switch Statement, For Loop, While Loop, Do...While Loop, Break Statement Continue Statement.

Unit – II

Arrays and Strings: Arrays; String Handling; Special String Operations; Character Extraction; String Comparison; Searching Strings; String Modification; String Buffer. Inheritance, Package and Interface: Inheritance, Types of Relationships, what is Inheritance? Significance of Generalization, Inheritance in Java, Access Specifiers, The Abstract Class; Packages,

defining a Package, CLASSPATH; Interface, Defining an Interface, Some Uses of Interfaces, Interfaces versus Abstract Classes.

Unit – III

Exception Handling: Definition of an Exception; Exception Classes; Common Exceptions; Exception Handling Techniques. Streams in Java: Streams Basics; Abstract Streams; Stream Classes; Readers and Writers; Random Access Files; Serialization. Applets: What are Applets?; The Applet Class; The Applet and HTML; Life Cycle of an Applet; The Graphics Class; Painting the Applet; User Interfaces for Applet; Adding Components to user interface; AWT (Abstract Windowing Toolkit) Controls.

Unit – IV

Event Handling: Components of an Event; Event Classes; Event Listener; Event-Handling; Adapter Classes; Inner Classes; Anonymous Classes. Swing: Concepts of Swing; Java Foundation Class (JFC); Swing Packages and Classes; Working with Swing- An Example; Swing Components. Java Data Base Connectivity: Java Data Base Connectivity; Database Management; Mechanism for connecting to a back-end database; Loading the ODBC driver.

Course Outcome

- Enable the students to understand the basic principles of the object-oriented programming.
- To show competence in the use of the Java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard.
- Enable the students to demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming.
- Enhance analytical skills of object-oriented programming.
- Provides opportunity to get employability as Software Developer or Programmer in software industries and academics.

19. TRAVEL & TOURISM

Course objective:

This course provides a comprehensive understanding of the basic concepts, nature, scope, and significance of travel and tourism operations in the modern world. It develops knowledge of the structure and functioning of travel agencies, tour operations, transportation systems, and hospitality services while equipping learners with practical skills in itinerary planning, ticketing, reservation systems, customer service, and tour packaging. The course enhances communication, managerial, and problem-solving skills required in tourism-related professional environments. It also promotes understanding of tourism marketing, sustainable tourism practices, digital tourism services, and entrepreneurship, preparing students for diverse career opportunities in the travel, tourism, and hospitality industries.

Contents

UNIT-I: Introduction to Travel and Tourism

- Meaning, Nature and Scope of Tourism
- Types and Components of Tourism
- Tourism Products and Services
- Growth and Importance of Tourism Industry
- Travel Motivation and Tourist Behaviour

UNIT-II: Travel Agency and Tour Operations

- Functions of Travel Agencies and Tour Operators
- Tour Packaging and Itinerary Preparation
- Ticketing and Reservation Systems
- Airline, Rail, Road and Water Transport Services
- Customer Care and Travel Documentation

UNIT-III: Tourism Management and Hospitality Services

- Basics of Hospitality Management
- Accommodation and Hotel Operations
- Tourism Marketing and Promotion
- Communication Skills in Tourism
- Sustainable and Responsible Tourism Practices

UNIT-IV : Practical Applications in Tourism Operations

- Tour Planning and Tour Guiding
- Event and Destination Management
- Digital Tourism and Online Travel Services
- Entrepreneurship Opportunities in Tourism
- Field Visit and Practical Training

Course Outcomes

- Describe the fundamentals of travel and tourism operations and explain the role of tourism in economic and cultural development.
- Use operational skills such as itinerary preparation, reservation systems, ticketing, customer handling, and travel documentation effectively.
- Apply tourism management concepts in Hospitality services, destination management, tourism marketing, and sustainable tourism practices.
- Identify professional opportunities in travel agencies, tour operations, hotels, transport organizations, and digital tourism services.
- Engage confidently in practical tourism activities including tour planning, guiding, event management, and tourism entrepreneurship.

20. HEALTH INSURANCE

Course Objective

This course provides a comprehensive understanding of the concepts, principles, scope, and significance of health insurance in the modern healthcare system. It develops knowledge of various health insurance schemes, insurance products, risk management, policy provisions, and the regulatory framework governing health insurance in India. The course equips learners with practical skills in policy selection, claim processing, documentation, customer support, and health insurance administration. It also enhances understanding of healthcare financing, digital health insurance services, ethical practices, and emerging trends, preparing students for career opportunities in insurance companies, hospitals, Third Party Administrators (TPAs), healthcare organizations, and public health agencies.

Contents

UNIT–I: Introduction to Health Insurance

- Meaning, Nature and Scope of Health Insurance
- Principles and Objectives of Health Insurance
- Types of Health Insurance Policies
- Health Insurance in India: Evolution and Growth
- Healthcare Financing and Risk Management

UNIT–II: Health Insurance Policies and Regulatory Framework

- Individual, Family Floater and Group Health Insurance
- Government Health Insurance Schemes (Ayushman Bharat, CGHS, ESI and State Health Schemes)
- Policy Terms, Coverage, Exclusions and Premium Determination
- Insurance Regulatory and Development Authority of India (IRDAI)
- Rights and Responsibilities of Policyholders and Insurers

UNIT–III: Health Insurance Operations and Claims Management

- Health Insurance Underwriting and Risk Assessment
- Cashless and Reimbursement Claim Procedures
- Hospital Empanelment and Third Party Administrators (TPAs)
- Health Insurance Documentation and Customer Service
- Fraud Prevention, Ethical Practices and Grievance Redressal

UNIT–IV: Digital Health Insurance and Emerging Trends

- Digital Health Insurance Platforms and E-Insurance Services
- Health Information Systems and Electronic Health Records
- Artificial Intelligence and Data Analytics in Health Insurance
- Health Insurance Marketing and Customer Relationship Management
- Career Opportunities, Entrepreneurship and Practical Training in Health Insurance

Course Outcomes

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

- Explain the concepts, principles, scope, and significance of health insurance and its role in healthcare financing and financial risk protection.
- Apply knowledge of health insurance policies, government health schemes, regulatory provisions, and claim settlement procedures in real-life situations.
- Demonstrate practical skills in policy documentation, underwriting, claim processing, customer service, and digital health insurance operations.
- Analyze ethical, legal, and operational aspects of health insurance, including fraud prevention, grievance redressal, and healthcare quality management.
- Explore career and entrepreneurial opportunities in insurance companies, hospitals, TPAs, healthcare organizations, public health agencies, and health insurance consulting.

21. BUSINESS ENVIRONMENT AND LAW

Course objective:

To give orientation about Business Environments different forms of Business organisations along with an exposure to elements of business laws and entrepreneurship.

Contents

Unit – I

Introduction to the Concepts of Vision & Mission Statements; Types of Business Environment: Internal and External Environment to the Enterprise, Comparative Analysis of Business Environment: India and Other Countries. Forms of Business Organization Concept and Features in relation to following business models-Sole Proprietorship; Partnership; Company.

Unit – II

Scales of Business Micro, Small and Medium Enterprises; Large Scale Enterprises and Public Enterprises; MNCs. Emerging Trends in Business Concepts, Advantages and Limitations Franchising, Aggregators, Business Process Outsourcing (BPO) & Knowledge Process Outsourcing (KPO); E-Commerce, Digital Economy.

Unit – III

Introduction to Law Meaning of Law and its Significance; Relevance of Law to Modern Civilized Society; Sources of Law. Meaning and Nature of Company; Promotion and Incorporation of a Company; Familiarization with the Concept of Board of Directors, Shareholders.

Unit – IV

Law relating to Contract Meaning of Contract; Essentials of a Valid Contract; Nature and Performance of Contract; Termination and Discharge of Contract; Law of Agency Definition of a Negotiable Instrument; Instruments Negotiable by Law and by Custom; Types of Negotiable Instruments; Parties to a Negotiable Instrument. Cyberspace; Cyber laws; Scope of Cyber Laws; Classification of Cyber Crime.

Course Outcome

- Enable the students to know about different types of business, their ethics
- Development of business environment and laws at national and international levels
- Get a comprehensive knowledge on business and cyber laws
- Generate self-employability, entrepreneurship and professionals in industries and academics.

22. CLINICAL BIOCHEMISTRY AND MOLECULAR DIAGNOSTICS

Course objective:

This course will add value in academics promote professional ethics, human values, skills in clinical diagnostics and life skills. It will generate self-employability, services in medical, pharma and neutraceutical industries, hospitals, clinics, diagnostic centres and in academics.

Contents

Unit – I

Clinical Microbiology: Overview of diseases, Triodes of the disease (Host, pathogens, environment and their interaction), Common pathogenic bacteria, virus, fungi, protozoan diseases. Emerging infectious diseases and Clinical diagnosis, Antimicrobial Sensitivity Testing - Antimicrobials and their mode of action -Mechanisms of drug resistance Practical related to collection of samples/specimen, Culture Media & Transport Media, isolation and culture Techniques of microorganisms, microscopic examination of bacteria, yeast and mould, Identification of microorganisms. Staining procedures, Antimicrobial susceptibility testing, pooling of samples, test for diagnostic performances (Sensitivity, specificity)

Unit – II

Clinical Biochemistry: Overview of the functioning of Clinical Biochemistry, Clinical importance of Enzymes and Isoenzymes in pathological disorders, Composition of blood, Hematological parameters and their significance in disease diagnosis (Anemia, thrombocytopenia and others). Biochemical parameters in diagnosis (Level of sugar and HbA1C, HDL, LDL, cholesterol, and amino acids in blood and urine) Nutritional disorders. Practical related to collection of blood, Sputum, throat swab, nasopharyngeal swab, Swabs (pus, wound) CSF and other body fluids, pooling of samples, blood film preparation and identification of cells; blood grouping (forward and reverse), diagnosis of G6PD deficiency, Sickle-cell hemoglobin (Paper electrophoresis), thalassemia (dot blots and other methods).

Unit – III

Diagnostic Immunology: Antigen, Allergen, Antibody, Basic principles of antigen antibody reactions, Applications of immunological techniques in the diagnosis of microbial infections, and immunological diseases, agglutination, precipitation reaction, immunodiffusion, immunoelectrophoresis, ELISA. Practical related to antigen based rapid diagnostic tests, immunofluorescence antibody test (IFAT), western blotting.

Unit – IV

Molecular diagnostics: past, present, and future, history & scope, PCR-based diagnosis (conventional PCR, nested-PCR, RT-PCR, PET-PCR, CLIP-PCR, NALFIA), Isothermal amplification methods (LAMP, NASBA), signal amplification molecular technique (b-HCR, aptamer), biosensor and CRISPR-based identification. Practical related to the principles of Colorimetry, Spectrophotometry, Fluorescence photometry, Advanced Microscopy, PCR.

Course Outcome

1. Describe disciplines and specimen types within the field of medical diagnostics
2. Select appropriate diagnostics tools for specific scenarios
3. Name the most common clinical chemistry and hematology analyses and understand the science behind the analyses
4. Give examples of how to diagnose common infections
5. Describe molecular diagnostics tools and their relation to precision medicine
6. Describe the most common imaging technologies and their utility in the clinic

23 ASSESSMENT OF BIODIVERSITY AND CONSERVATION

Course objective:

This course will add value in academics promote awareness for environment and its sustainability, human values and ethics. It will help in developing skills in plant classification, assessment and conservation of biodiversity and ecosystems of the plants and generate employability in research institutes, forestry, horticulture, botanical gardens and in academics

Contents

Unit – I

Principles of nomenclature, Salient features of ICN, Major rules of ICN: Author citation, Type method, Rules of Priority and its limitations, Effective and Valid publications. Plant identification and use of Botanical keys.

Unit – II

Plant exploration, herbarium methodology, functions of herbarium, management, changing concept of herbarium, important herbaria and gardens of the world with special reference to Central National Herbarium Plant exploration, herbarium methodology, functions of herbarium, management, changing concept of herbarium, important herbaria and gardens of the world with special reference to Central National Herbarium.

Unit – III

Biodiversity: Concept and significance; Rare, Endemic and Threatened (RET) Taxa, Prioritization of Taxa; Biodiversity indices (Species Richness Index, Shannon-Weiner diversity Index, Simpson's Index and Evenness Index); Phytogeographical zones of India; Indian Biological Diversity Act.

Unit – IV

Biodiversity Conservation: In situ conservation (Wildlife Sanctuaries; National Parks; Biosphere Reserve and Sacred groves), Ex situ conservation (Botanic Garden; Gene Bank;

Seed Bank; Cryopreservation); Biotechnological approaches for conservation: Tissue culture technique; Micropropagation; Marker assisted breeding; Haploid culture and Transgenic crops.

Course Outcome

- Enable to learn the concept of plant nomenclature, the techniques of correct identification, exploration and preservation of plants.
- Students will get an insight into the assessment of biodiversity and prioritization of taxa.
- Imbibe skills on the application of biotechnological approaches in conserving biodiversity.

23. ANALYTICAL INSTRUMENTATION TECHNIQUES

Course objective:

- To provide concepts on the several instrumentation techniques at the structural and chemical level which has become essential tools for chemical research.
- To understand and describe the fundamental principles behind the methods of characterization which are included in the course.
- To acquire skills in the use and selection of instrumental techniques for characterization of molecules, materials and application of these techniques to solving problems.
- To develop tools for analysis and methodologies that promotes multidisciplinary research for better understanding of composition-structure-properties correlation.

Contents

Unit – I

General Introduction: Instrumentation methods of analysis, classification, advantage of instrumental methods, limitations, sensitivity and detection limit, precision and accuracy

Unit – II

Basic principles, general instrumentation and applications: UV-Visible spectroscopy and IR
Basic principles, general instrumentation and applications of Fluorescence Spectrophotometer: relationship between excitation spectra and fluorescence spectra, factors affecting fluorescence emission. Basic principles, instrumentation and applications of Atomic Absorption Spectroscopy (AAS).

Unit – III

Basic principles, general instrumentation and applications: TGA (Thermo Gravimetric Analysis), DTA (Differential Thermal Analysis), DSC (Differential Scanning Calorimetry).

Unit – IV

Basic principles, general instrumentation and applications: X-ray powder diffraction (XRD), Zeta Sizer and Surface Area Analyzer.

Course Outcome

- To provide a general understanding of instrumental techniques & will prepare students for advanced research or development in industry.

- To provide opportunity to undertake guided reading and to develop their own portfolio of learning to enhance transferable skills and knowledge.
- To recognize the characterization techniques, capabilities and limitations, allowing them to identify and select the most appropriate methods for their research needs.

24. CERTIFICATE COURSE ON ‘C’

Course objective:

- To know how to solve computational problems using C language
- To understand the process of compiling and executing C program
- To understand the language elements of C language and use them for problem solving
- To start a career in programming which is almost a mandatory skill for employability in Software Industries and academics.

Contents

Unit – I

Introduction to Programming, Introduction to C Language, C Program Compilation & Execution, Language Elements, Operators, Control Statements, Looping Structures

Unit – II

Arrays, Multidimensional Arrays, String Handling, User-defined functions

Unit – III

Storage classes, Pointers, Structures, Unions, Typedef and Enumeration

Unit – IV

Dynamic Memory Allocation, Pre-processor directives, File Handling, Command Line Arguments

Course Outcome

- Write code in C and execute programs
- Understand the flow of data and instructions in programming
- Get an in-depth understanding of the language elements

25. ORGANISATION AND PROCESSING OF LIBRARY RESOURCES

Course objective:

- To develop an understanding of the concept of library classification, theoretical and practical aspects of classification in the library.
- To develop an understanding of the concept of library cataloguing, theoretical and practical aspects of cataloguing in the library.
- To help in getting job in Government and Private Libraries and academics.

Contents

Unit – I

- i. Definition, need and purpose of classification
- ii. Notational technique- Structures, Types and qualities
- iii. Call Number- basic concept and different parts

Unit – II

- i. Definition, need and purpose of cataloguing
- ii. Forms of catalogue- Inner and Outer forms
- iii. Kinds of entries and their functions according to AACR-II

Unit – III

- i. Dewey Decimal Classification (DDC)- Basic concept, Main classes, Tables
- ii. Design of class number of the documents related to simple subjects
- iii. Design of class number of the documents related to compound subjects

Unit – IV

- i. Anglo American Cataloguing Rules, 2nd edition (AACR-II)- Basic concept, rules for making cataloguing entries.
- ii. Preparation of main entry and added entries according to AACR-II of book materials relating to Personal Authors, Pseudonymous Authors and Corporate Authors.
- iii. Preparation of main entry and added entries according to AACR-II of Periodicals.

Course Outcome

- Enables the students to understand the general theory of classification and universe of knowledge.
- To learn basic concept and importance of library cataloguing.
- Makes the students skilled in designing class number and shelving books in the library in a classified manner.
- Makes students skilled in methods of preparing catalogue of documents in the library.

26. OPERATIONS RESEARCH

Course objective:

- Operations research is often concerned with determining the extreme values of some real-world objective: the maximum (of profit, performance, or yield) or minimum (of loss, risk, or cost).
- It is the scientific study of operations for the purpose of making better decisions and improve professional ethical consideration

Contents

Unit – I

Origin, Development, Nature, Features, and Applications of Operations Research. General Solution Methods for OR Models. Introduction to LPP, Graphical Solution Method of LPP, Simplex Method, Two Phase and Big M Simplex Method, Dual simplex Method, Post-Optimal Analysis.

Unit – II

Integer Programming: Fractional Cut Method-All Integer, Fraction Cut Method-Mixed Integer, Branch and Bound Method. Transportation Problem: Introduction, Solution of TP (North-West Corner Method, Least-Cost Method, Vogel's Approximation Method), Test for Optimality, Degeneracy in TP, Transportation Algorithm (MODI Method).

Unit – III

Assignment Problem, Travelling Salesman Problem, Sequencing Problem: Introduction, Processing N Jobs Through Two Machines, Processing Two Jobs Through K Machines. Games & Strategies: Introduction, Two-Person Zero-Sum Games, The Maximin-Minimax Principle. Games Without Saddle Points-Mixed Strategies, Dominance Property.

Unit – IV

Network Scheduling by PERT/CPM: Introduction, Network and Basic Components, Logical Sequencing, Rules of Network Construction, Critical Path Analysis. Non-Linear Programming Methods: Introduction, General Non-Linear Programming Problem, Constrained Optimization with Equality Constraints, Constrained Optimization with Inequality Constraints.

Course Outcome

- Enables the student to develop skills in Finance, Budgeting and Investments: Credit policy analysis, Cash flow analysis, Dividend policies, and Investment portfolios.
- It will enhance skill in Marketing, and Distribution policy, Production scheduling, Optimum product mix, Project scheduling and allocation of resources.
- Generates scope to get employed in various industries and academics as well as in research institutes.

27. PHYSICS WITH SCILAB

Course objective:

- To enhance skill in solving different computational problems pertaining to physics and its allied subject
- To increase scope to find employability in research institutes, industries and academics.

Contents

Unit-I

Introduction to Scilab environment, Scilab data types, Scilab environment, Command window, Figure window, Edit window, Variables and arrays, Initialising variables in Scilab, Variable passing in Scilab, optional arguments, preserving data between calls to a function, Complex and Character data.

Unit-II

String function, Multidimensional arrays, Sub-array, Special values, Displaying output data, data file, Scalar and array operations, Hierarchy of operations, Introduction to Scilab functions Built in Scilab functions, User defined functions, Branching Statements and program design, Relational & logical operators, the while loop, for loop, details of loop operations, break & continue statements, nested loops, logical arrays and vectorization. An introduction to Scilab file processing, file opening and closing, Binary I/o functions, comparing binary and formatted functions, Numerical methods and developing the skills of writing a program, Introduction to plotting, 2D and 3D plotting.

Unit-III

Curve fitting, least square fit, Ohms law to calculate R, Solution of Linear system of equations by Gauss elimination method and Gauss Seidal method, Solution of mesh equations of electric circuits (3 meshes), Diagonalization of matrices, Inverse of a matrix, Eigen vectors, Eigen values problems. Solution of ODE First order Differential equation, Euler, modified Euler and Runge-Kutta second order methods Second Order differential equation. Fixed difference method. Radioactive decay, Current in RC, LC circuits with DC

source, second order Differential Equation, Harmonic oscillator (no friction), Damped Harmonic oscillator, over damped, Critical damped, Oscillatory, Forced Harmonic oscillator.

Unit-IV

Solve boundary value differential equations; solve problems related to Dirac Delta Function, Fourier series, Frobenius method and special functions and Related problems Calculation of error from each data point of observations recorded in experiments, Calculation of least square fitting manually without giving weightage to error, Evaluation of trigonometric functions, complex analysis (integration), Integral transform Solve s-wave Schrodinger equation for the ground state and the first excited state of the hydrogen atom, Solve the s-wave radial Schrodinger equation for an atom influenced by screened Coulomb potential (With suitable parameters).

Course outcome:

- It provides all basic operations on matrices through built-in functions required to understand Physics.
- Its ability to plot 2D and 3D graphs helps in visualizing the data we work with (both theoretical and laboratory work).
- All these make Scilab an excellent tool for calculation, especially that involve matrix operations.

28. BASIC PRINCIPLES OF REMOTE SENSING AND APPLICATIONS

Course objective:

- To congregate the basic concepts and fundamentals of physical principles of remote sensing
- To impart the knowledge of fundamental of Thermal & Microwave Remote sensing and its applications
- To create a firm basis for successful integration of remote sensing in any field of application.
- To enhance the employability scope in Government, Non-Government and Quasi-Government Organizations, research institutes, industries engaged in developing Remote sensing devices and software and in academics.

Contents

Unit – I

Fundamental & concept of Remote sensing, Basic Principle of electromagnetic radiation, basic laws of EMR, Interaction of EMR with Atmosphere and terrain features, Spectral reflectance curves, Spectral indices.

Unit – II

Remote sensing satellite, Concept of platforms and sensors, Types of sensors, Resolution of Sensors-spatial, spectral, radiometric and temporal.

Unit – III

Fundamental and concept of Thermal remote sensing, and Microwave Remote Sensing.

Unit – IV

Applications of RS for land use and land cover monitoring, water resources management.

Course Outcome

- Enable students to gain knowledge in Concept and fundamental of Remote sensing, EMR and basic laws of EMR.
- Enhance skills in understanding the fundamentals of thermal & Microwave Remote Sensing.
- Develops skill of the students on application of remote sensing data separately and in combination with GIS techniques for Land use Land cover & water resource management and generates employability in different Government and Non-Government sectors.

29. ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

AND MANAGEMENT PLAN (EMP)

Course objective:

- To add values and skills in the minds of young students towards environmental protection, conservation and sustainability conservation, and make them the future guardians of nature.
- To promote skill of students to understand, think and evolve strategies for management and conservation of the environment for sustaining life on earth.
- To generate employability scope in various industries, Government and Non-Government Organizations to carry out research studies on EIA and EMP and during Project Feasibility Report preparation and their implementation.

Contents

Unit – I

General Introduction of EIA: Definition, purpose and characteristics of EIA, origin and evolution of EIA, participants in EIA process, stages of EIA, types of EIA, EIA regulations in India, National Environmental Policy (NEP), 2006 (objectives, principle and, strategies and action), Risk Assessment v/s Environmental Impact Assessment, Environmental Impact Statement (EIS) and Environmental Management Plan (EMP), Procedure of EIA

Unit – II

EIA Process and Methodologies: Screening, Scoping, Baseline data on EIA (environmental data, project data and project alternative data), Measurement of impact (physical, social, economic, natural), Impact Identification (Adhoc method, Checklist Method, Interaction Matrices- Network and overlays approach), Impact Prediction (positive and negative impacts, primary and secondary impacts, Impact on physical, social and biotic environments), Criteria and standards for assessing significant Impact, Cost- Benefit Analysis and Valuation of Environmental Impacts, Public Participation in environmental decision making,

Documentation, presentation and review, Project Implementation, EIA monitoring and auditing

Unit – III

EIA Practice: Assessment of air, water and soil quality, Biodiversity in impact assessment (monitoring and mapping of biodiversity, guiding and operating principles of biodiversity), Social impact assessment (activities, guidelines, principles and core values), Landscape and visual impact assessment, Cumulative effects assessment, Major limitations of environmental impact assessment.

Unit – IV

Environmental Monitoring and Management: Management of physical, social, and economic environment, Concepts and scope of environmental planning, regional planning and management, Basic laws of Ecology and their relevance for ecosystems management, Management practices for various ecosystems (grasslands, forests, mountains, wetlands and coastal areas), Environmental planning and management of wastelands, reclaimed lands, mining areas, human settlements, industrial lands and agricultural lands, Eco restoration/remediation using local and scientific knowledge.

Course Outcome

- Students gain specific skills for monitoring the health of environmental systems.
- Students learn skills required to analyze environmental issues scientifically and to solve those issues using the analytical skills learned.

30. ADVANCED MOLECULAR BIOLOGY

Course objective:

- To add values and helps in developing skills in the minds of young students on various concepts and techniques involved in carrying out research in the field of molecular biology, biotechnology and allied fields.
- To have employability scope in various pharmaceutical, nutraceutical industries, research institutes, and in academics.

Course Contents:

Unit – I

Introduction to Molecular Biology and techniques, methods of sterilization for microbial and animal cell culture experiments, Bacterial growth Curve, Antibiotic Sensitivity, Phage Titration., CRISPERCAS Pathway, FACS and Centrifugation Techniques for animal cell isolation, Primary cell culture and established cell lines, Cytotoxicity assays for drug efficacy.

Unit – II

Electrophoresis techniques (Horizontal and Vertical), Isolation, visualization and quantification of nucleic acids (RNA and DNA), Blotting Techniques (Southern, Northern, Western), Molecular Markers and DNA fingerprinting, Primer Designing, PCR, qPCR and DNA Sequencing.

Unit – III

Protein Purification through Chromatographic techniques and their estimation, Immunoelectrophoresis, Double Diffusion, Radial Immunodiffusion, ELISA and its types; Protein sequencing, Protein engineering.

Unit – IV

Introduction to Histology, Microtomy, Stains and Staining methods, Enzyme histochemistry,

Immunohistochemistry, Probe preparation, in situ hybridization, Image processing and analysis using various software.

Course Outcome

- Students gain specific skills for drug designing, isolation, purification and characterization of different biomolecules.
- Students increase their skill in developing antibodies and other immunological processes and products.
- Helps in the enhancement employability scope in various government and private research institutes, pharmaceutical industries and in academics.

IMPORTANT DATES AND LINK

Starting date of Application cum Admission	22 nd July, 2026
Last date of Application cum Admission	1 st September, 2026
Fee and Mode of Payment	Online/ NEFT/ Bank Challan
Link for Admission	https://forms.gle/T5YbxFheXoVA5fTaA