

Akal College of Health & Allied Sciences
M.Sc Nursing Programme

Programme outcome

On completion of the programme M.Sc Nursing graduates assume responsibilities as nurse specialists, consultants, educators, administrators in a wide variety of professional settings

Programme specific outcomes

1. Utilize/apply the concepts, theories and principles of nursing science
2. Demonstrate advance competence in practice of nursing
3. Practice as a nurse specialist.
4. Demonstrate leadership qualities and function effectively as nurse educator and manager.
5. Demonstrate skill in conducting nursing research, interpreting and utilizing the findings from health related
6. Demonstrate the ability to plan and effect change in nursing practice and in the health care delivery system.
7. Establish collaborative relationship with members of other disciplines
8. Demonstrate interest in continued learning for personal and professional advancement.

Courses in M.Sc Nursing Programme

First year

Nursing education

Advance nursing practice

Nursing Research and statistics

Clinical speciality- 1

Second year

Nursing Management

Clinical speciality -II

Course outcome- Nursing Education

- CO 1. Explain the aims of education, philosophies, trends in education and health: its impact on nursing
- CO 2. Describe the teaching learning process.
- CO 3. Prepare and utilize various instructional media and methods in teaching learning process.
- CO 4. Demonstrate competency in teaching, using various instructional strategies.
- CO 5. Critically analyze the existing nursing educational programs, their problems, issues and future trends.
- CO 6. Describe the process of curriculum development, and the need and methodology of curriculum change,
- CO 7. Plan and conduct continuing nursing education programs.
- CO 8. Critically analyze the existing teacher preparation programs in nursing.
- CO 9. Demonstrate skill in guidance and counseling.
- CO 10. Describe the problems and issues related to administration of nursing curriculum including selection and
- CO 11. Explain the development of standards and accreditation process in nursing education programs.
- CO 12. Identify research priorities in nursing education.
- CO 13. Discuss various models of collaboration in nursing education and services.
- CO 14. Explain the concept, principles, steps, tools and techniques of evaluation
- CO 15. Construct, administer and evaluate various tools for assessment of knowledge, skill, and attitude.

Course outcome - Advance nursing practice

- CO 1. Appreciate and analyze the development of nursing as a profession.
- CO 2. Describe ethical, legal, political and economic aspects of health care delivery and nursing practice.
- CO 3. Explain bio- psycho- social dynamics of health, life style and health care delivery system.
- CO 4. Discuss concepts, principles, theories, models, approaches relevant to nursing and their application.
- CO 5. Describe scope of nursing practice.
- CO 6. Provide holistic and competent nursing care following nursing process approach.
- CO 7. Identify latest trends in nursing and the basis of advance nursing practice.
- CO 8. Perform extended and expanded role of nurse.
- CO 9. Describe alternative modalities of nursing care.
- CO 10. Describe the concept of quality control in nursing.
- CO 11. Identify the scope of nursing research.
- CO 12. Use computer in patient care delivery system and nursing practice.
- CO 13. Appreciate importance of self-development and professional advancement.

Course outcome: Nursing Research and statistics

- CO 1. Define basic research terms and concepts.
- CO 2. Review literature utilizing various sources
- CO 3. Describe research methodology
- CO 4. Develop a research proposal.
- CO 5. Conduct a research study.
- CO 6. Communicate research findings
- CO 7. Utilize research findings
- CO 8. Critically evaluate nursing research studies.
- CO 9. Write scientific paper for publication.
- CO 10. Explain the basic concepts related to statistics
- CO 11. Describe the scope of statistics in health and nursing
- CO 12. Organize tabulate and present data meaningfully.
- CO 13. Use descriptive and inferential statistics to predict results.
- CO 14. Draw conclusions of the study and predict statistical significance of the results.
- CO 15. Describe vital health statistics and their use in health related research.
- CO 16. Use statistical packages for data analysis

Course outcome: Clinical Speciality 1- Medical - Surgical Nursing

- CO 1. Appreciate the trends & issues in the field of Medical - Surgical Nursing as a speciality.
- CO 2. Apply concepts & theories related to health promotion.
- CO 3. Appreciate the client as a holistic individual.
- CO 4. Perform physical, psychosocial assessment of Medical - Surgical patients.
- CO 5. Apply Nursing process in providing care to patients.
- CO 6. Integrate the concept of family centered nursing care with associated disorder such as genetic, congenital
- CO 7. Recognize and manage emergencies with Medical- Surgical patients.
- CO 8. Describe various recent technologies & treatment modalities in the management of critically ill patients.
- CO 9. Appreciate the legal & ethical issues relevant to Medical - Surgical Nursing.

- CO 10. Prepare a design for layout and management of Medical - Surgical Units.
- CO 11. Appreciate the role of alternative systems of Medicine in care of patients.
- CO 12. Incorporate evidence based Nursing practice and identify the areas of research in the field of Medical -
- CO 13. Recognize the role of Nurse practitioner as a member of the Medical -Surgical health team.
- CO 14. Teach Medical - Surgical Nursing to undergraduate nursing students & in-service nurses.

Course outcome: Clinical Speciality 1 - Obstetric and Gynecologic Nursing

- CO 1. Appreciate the trends in the field of midwifery, obstetrics and gynaecology as a speciality.
- CO 2. Describe the population dynamics and indicators of maternal and child health
- CO 3. Describe the concepts of biophysical, psychological and spiritual aspects of normal pregnancy, labor and
- CO 4. Provide comprehensive nursing care to women during reproductive period and newborns.
- CO 5. Integrate the concepts of family centered nursing care and nursing process approach in obstetric and
- CO 6. Identify and analyze the deviations from normal birth process and refer appropriately.
- CO 7. Describe the pharmacological agents, their effects during pregnancy, child birth, puerperium, lactation and
- CO 8. Counsel adolescents, women and families on issues pertaining to pregnancy, child birth and lactation
- CO 9. Describe the role of various types of complementary and alternative therapies in obstetric and
- CO 10. Incorporate evidence based nursing practice and identify the areas of research in the field of obstetric and
- CO 11. Describe the recent advancement in contraceptive technology and birth control measures
- CO 12. Appreciate the legal and ethical issues pertaining to obstetric and gynaecological nursing

Course outcome: Clinical Speciality 1- Child Health Nursing

- CO 1. Appreciate the history and developments in the field of pediatrics and pediatric nursing as a specialty
- CO 2. Apply the concepts of growth and development in providing care to the pediatric clients and their families.
- CO 3. Appreciate the child as a holistic individual
- CO 4. Perform physical, developmental, and nutritional assessment of pediatric clients
- CO 5. Apply nursing process in providing nursing care to neonates & children
- CO 6. Integrate the concept of family centered pediatric nursing care with
- CO 6. Related areas such as genetic disorders, congenital malformations and long term illness.
- CO 8. Recognize and manage emergencies in neonates
- CO 9. Describe various recent technologies and treatment modalities in the management of high risk neonates
- CO 10. Appreciate the legal and ethical issues pertaining to pediatric and neonatal nursing
- CO 11. Prepare a design for layout and management of neonatal units
- CO 12. Incorporate evidence based nursing practice and identify the areas of research in the field of
- CO 13. Recognize the role of pediatric nurse practitioner and as a member of the pediatric and neonatal health
- CO 14. Teach pediatric nursing to undergraduate students & in-service nurses

Course outcome: Clinical Speciality 1- Mental Health Nursing

- 1. Appreciate the trends and issues in the field of psychiatry and psychiatric nursing.
- 2. Explain the dynamics of personality development and human behaviour.
- 3. Describe the concepts of psychobiology in mental disorders and its implications for psychiatric nursing
- 4. Demonstrate therapeutic communications skills in all interactions
- 5. Demonstrate the role of psychiatric nurse practitioner in various therapeutic modalities
- 6. Establish and maintain therapeutic relationship with individual and groups

7. Uses assertive techniques in personal and professional actions
 1. Promotes self-esteem of clients, others and self
 2. Apply the nursing process approach in caring for patients with mental disorders
 3. Describe the psychopharmacological agents, their effects and nurses role
 4. Recognize the role of psychiatric nurse practitioner and as a member of the psychiatric and mental health team
 5. Describe various types of alternative system of medicines used in psychiatric settings
 6. Incorporate evidence based nursing practice and identify the areas of research in the field of psychiatric

Course outcome: Clinical Speciality 1- Community Health Nursing

1. Appreciate the history and development in the field of Community Health and Community Health Nursing.
2. Appreciate role of individuals and families in promoting health of the Community.
3. Perform physical, developmental and nutritional assessment of individuals, families and groups.
4. Apply the concepts of promotive, preventive, curative and rehabilitative aspects of health while providing care
5. Apply nursing process approach while providing care to individuals, families, groups and community.
6. Integrate the concepts of family centered nursing approach while providing care to the community.
8. Recognize and participate in the management of emergencies, epidemics and disasters.
9. Apply recent technologies and care modalities while delivering community health nursing care.
10. Appreciate legal and ethical issues pertaining to community health nursing care.
11. Conduct community health nursing care projects.
12. Participate in planning, implementation and evaluation of various national health and family welfare
13. Incorporate evidence based nursing practice and identify the areas of research in the community settings.
14. Participate effectively as a member of Community Health team.
15. Coordinate and collaborate with various agencies operating in the community by using inter-sectoral
16. Teach community health nursing to undergraduates, in-service nurses and the community health workers.
17. Demonstrate leadership and managerial abilities in community health nursing practice

Course outcome: Nursing Management

1. Describe the philosophy and objectives of the health care institutions at various levels.
2. Identify trends and issues in nursing
3. Discuss the public administration, health care administration vis a vis nursing administration
4. Describe the principles of administration applied to nursing
5. Explain the organization of health and nursing services at the various levels/institutions.
6. Collaborate and co-ordinate with various agencies by using multisectoral approach
7. Discuss the planning, supervision and management of nursing workforce for various health care settings.
8. Discuss various collaborative models between nursing education and nursing service to improve the quality of
9. Identify and analyse legal and ethical issues in nursing administration
10. Describe the process of quality assurance in nursing services.
11. Demonstrate leadership in nursing at various levels

Course outcome: Clinical Speciality II- Medical Surgical Nursing (Cardio vascular and thoracic Nursing)

1. Appreciate trends and issues related to cardio vascular and thoracic Nursing.
2. Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of cardio vascular and
3. Participate in national health programs for health promotion, prevention and rehabilitation of patients with

4. Perform physical, psychosocial & spiritual assessment
5. Assist in various diagnostic, therapeutic and surgical procedures
6. Apply nursing process in providing comprehensive care to patients with cardio vascular and thoracic conditions
7. Demonstrate advance skills/competence in managing patients with cardio vascular and thoracic conditions
8. Describe the various drugs used in cardio vascular and thoracic conditions and nurses responsibility
9. Demonstrate skill in handling various equipments/gadgets used for critical care of cardio vascular and thoracic
10. Appreciate team work & coordinate activities related to patient care.
11. Practice infection control measures.
12. Identify emergencies and complications & take appropriate measures
13. Discuss the legal and ethical issues in cardio vascular and thoracic nursing
14. Assist patients and their family to cope with emotional distress, grief, anxiety and spiritual needs.
15. Appreciate the role of alternative system of medicine in care of patient
16. Incorporate evidence based nursing practice and identify the areas of research in the field of cardio vascular
17. Identify the sources of stress and manage burnout syndrome among health care providers.
18. Teach and supervise nurses and allied health workers.
19. Design a layout of ICCU and ICTU and develop standards for cardio vascular and thoracic nursing practice.

Course outcome: Clinical Speciality II- Medical Surgical Nursing (Critical Care Nursing)

1. Appreciate trends and issues related to Critical Care Nursing.
2. Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of critically ill patients
3. Describe the various drugs used in critical care and nurses responsibility
4. Perform physical, psychosocial & spiritual assessment
5. Demonstrate advance skills/competence in managing critically ill patients including Advance Cardiac Life
6. Demonstrate skill in handling various equipments/gadgets used for critical care
7. Provide comprehensive care to critically ill patients.
8. Appreciate team work & coordinate activities related to patient care.
9. Practice infection control measures.
10. Assess and manage pain .
11. Identify complications & take appropriate measures.
12. Discuss the legal and ethical issues in critical care nursing
13. Assist patients and their family to cope with emotional distress, spiritual, grief and anxiety
14. Assist in various diagnostic, therapeutic and surgical procedures
15. Incorporate evidence based nursing practice and identify the areas of research in the field of critical care
16. Identify the sources of stress and manage burnout syndrome among health care providers.
17. Teach and supervise nurses and allied health workers.
18. Design a layout of ICU and develop standards for critical care nursing practice.

Course outcome: Clinical Speciality II- Medical Surgical Nursing (Oncology Nursing)

1. Explain the prevention, screening and early detection of cancer
2. Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of oncological disorders of
3. Describe the psychosocial effects of cancer on patients and families.
4. Demonstrate skill in administering/assisting in various treatment modalities used for patients with cancer
5. Apply nursing process in providing holistic care to patients with cancer.
7. Apply specific concepts of pain management
8. Appreciate the care of death and dying patients and value of bereavement support.

9. Describe the philosophy, concept and various dimensions of palliative care
10. Appreciate the role of alternative systems of medicine in care of cancer patients
11. Appreciate the legal & ethical issues relevant to oncology nursing
12. Recognize and manage Oncological emergencies
13. Counsel the patients with cancer and their families
14. Incorporate evidence based nursing practice and identify the areas of research in the field of oncology nursing
15. Recognize the role of oncology nurse practitioner as a member of oncology team
16. Collaborate with other agencies and utilize resources in caring for cancer patients.
17. Teach and supervise nurses and allied health workers.
18. Design a layout and develop standards for management of oncology units/hospitals and nursing care.

Course outcome: Clinical Speciality II - Obstetric and Gynecologic Nursing

1. Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of women with obstetric and
2. Perform physical, psychosocial, cultural & spiritual assessment
3. Demonstrate competence in caring for women with obstetrical and gynaecological conditions
4. Demonstrate competence in caring for high risk newborn.
5. Identify and Manage obstetrical and neonatal emergencies as per protocol.
6. Practice infection control measures
7. Utilize recent technology and various diagnostic, therapeutic modalities in the management of obstetrical ,
8. Demonstrate skill in handling various equipments/gadgets used for obstetrical, gynaecological and neonatal
9. Teach and supervise nurses and allied health workers.
10. Design a layout of speciality units of obstetrics and gynecology
11. Develop standards for obstetrical and gynaecological nursing practice.
12. Counsel women and families
13. Incorporate evidence based nursing practice and identify the areas of research in the field of obstetrical and
14. Function as independent midwifery nurse practitioner

Course outcome: Clinical Speciality II - Child Health Nursing

1. Apply the nursing process in the care of ill infants to pre adolescents in hospital and community
2. Demonstrate advanced skills/competence in nursing management of children with medical and surgical
3. Recognize and manage emergencies in children
4. Provide nursing care to critically ill children
5. Utilize the recent technology and various treatment modalities in the management of high risk children
6. Prepare a design for layout and describe standards for management of pediatric units/hospitals
7. Identify areas of research in the field of pediatric nursing

Course outcome: Clinical Speciality II - Mental Health Nursing

1. Apply the nursing process in the care of patients with mental disorders in hospital and community
2. Demonstrate advanced skills/competence in nursing management of patients with mental disorders
3. Identify and care for special groups like children, adolescents, women, elderly, abused and neglected, people
4. Identify and manage psychiatric emergencies.
5. Provide nursing care to critically ill patients with mental disorders
6. Utilize the recent technology and various treatment modalities in the management of patients with mental
7. Demonstrate skills in carrying out crisis intervention.

8. Appreciate the legal and ethical issues pertaining to psychiatric nursing.
6. Identify areas of research in the field of psychiatric nursing.
7. Prepare a design for layout and describe standards for management of
8. Psychiatric units/emergency units/hospitals
9. Teach psychiatric nursing to undergraduate students & in-service nurses.

Course outcomes: Clinical Speciality II- Community Health Nursing

1. Appreciate trends and issues related to community health Nursing reproductive and child health, school health, Occupational health, international health, rehabilitation, geriatric and mental health.
2. Apply epidemiological concepts and principles in community health nursing practice
3. Perform community health assessment and plan health programmes
4. Describe the various components of Reproductive and child health programme.
5. Demonstrate leadership abilities in organizing community health nursing services by using inter-sectoral
6. Describe the role and responsibilities of community health nurse in various national health and family welfare
7. Participate in the implementation of various national health and family welfare programme
8. Demonstrate competencies in providing family centered nursing care independently
9. Participate/Conduct research for new insights and innovative solutions to health problems
10. Teach and supervise nurses and allied health workers.
11. Design a layout of sub center/Primary health center/Community health centre and develop standards for

B.Sc Nursing Programme

Programme outcome

1. Apply knowledge gained in providing nursing care to individuals, families and communities.
2. Provide systematic nursing care based on scientific knowledge.
3. Demonstrate proficient skill in decision making in all situations to provide standard nursing care.
4. Utilize latest technology and trends in providing nursing care.
5. Provide promotive, preventive and restorative health services in line with the national health policies and
6. Practice the professional skills within the framework of code of ethics and professional conduct within the
7. Communicate effectively with individuals and groups and other members of the health team to develop
8. Gain skills in health teaching to individuals and groups in clinical/Community health settings.
9. Participate effectively as members of the health care delivery system.
10. Demonstrate leadership and managerial skills in clinical/community health settings
11. Learn to conduct need based research studies in various settings and utilize the research findings to improve
12. Develop awareness, interest and contribute towards advancement of self and of the profession.

Course outcomes

FIRST YEAR

Anatomy

Acquire knowledge of the normal structure of various human body systems and understand the alterations in

1. Describe the anatomical terms, organization of human body and structure of cell, tissues, membranes and

2. Describe the structure & function of bones and joints
3. Describe the structure and function of muscles
4. Describe the structure & function of nervous system
5. Explain the structure & functions of sensory organs
6. Describe the structure and function of circulatory and lymphatic system
7. Describe the structure & functions of respiratory system
8. Describe the structure & functions of digestive system
9. Describe the structure and functions of excretory system
10. Describe the structure and functions of endocrine system
11. Describe the structure and functions of reproductive system

Physiology

Acquire knowledge of the normal physiology of various human body systems and understand the alterations in

1. Describe the physiology of cell, tissues, membranes and glands
2. Describe the bone formation and growth and movements of skeleton system
3. Describe the muscle movements and tone and demonstrate muscle contraction and tone
4. Describe the physiology of nerve stimulus, reflexes, brain, cranial and spinal nerves, Demonstrate reflex action
5. Describe the physiology of blood and functions of Heart Demonstrate blood cell count, coagulation, grouping,
6. Describe the physiology and mechanisms of respiration
7. Demonstrate blood cell count, coagulation, grouping, Hb: BP and pulse monitoring
8. Describes the physiology of digestive system Demonstrates BMR
9. Describe the physiology of excretory system
10. Describe the physiology of sensory organs
11. Describe the physiology of endocrine glands
12. Describe the physiology of male and female reproductive system
13. Describe the physiology of Lymphatic and Immunological system

Nutrition

Acquire knowledge of nutrition for maintenance of optimum health at different stages of life and apply this

1. Describe the relationship between nutrition & Health
2. Describe the classification, functions, sources and recommended Daily allowances (RDA) of carbohydrates
3. Describe the classification, functions, sources and recommended daily allowances (RDA) of fats
4. Describe the classification, functions, sources and recommended daily allowances (RDA) of proteins
5. Describe the daily calorie requirement for different categories of people
6. Describe the classification, functions, sources and recommended daily allowances (RDA) of vitamins
7. Describe the classification, functions, sources and recommended daily allowances (RDA) of minerals
8. Describe the sources, functions and requirements of water & electrolytes
9. Describe the cookery rules and preservation of nutrients
10. Prepare and serve simple beverages and different types of foods
11. Describe and plan balanced diet for different categories of people
12. Describe various national programmes related to nutrition
13. Describe the role of nurse in assessment of nutritional status and nutrition education

Biochemistry

Acquire knowledge of the normal biochemical composition and functioning of human body and understand the alterations in biochemistry in diseases for practice of nursing.

1. Describe the structure Composition and functions of cell
2. Differentiate between prokaryote and Eukaryote cell
3. Identify techniques of Microscopy
4. Describe the structure and functions of Cell membrane
5. Explain the metabolism of carbohydrate
6. Explain the metabolism of Lipids
7. Explain the metabolism of Amino acids and proteins
8. Describe Immunochemistry

Nursing Foundations

Develop an understanding of the philosophy, objectives, theories and process of nursing in various Supervised Clinical settings. It is aimed at helping the students to acquire knowledge, understanding and skills in techniques

1. Describe the concept of health, illness and health care agencies
2. Explain concept and scope of nursing
3. Describe values, code of ethics and professional conduct for nurses in India
4. Explain the admission and discharge procedure
5. Performs admission and discharge procedure
6. Communicate effectively with patient, families and team members and maintain effective human Relations
7. Appreciate the importance of patient teaching in nursing
8. Explain the concept, uses, format and steps of nursing process
9. Documents nursing process as per the format
10. Describe the purposes, types and techniques of recording and reporting
11. Describe principles and techniques of monitoring and maintaining vital signs
12. Monitor and maintain vital signs
13. Describe purpose and process of health assessment
14. Describe the health assessment of each body system
15. Perform health assessment of each body system
16. Identifies the various machinery, equipment and linen and their care
17. Describe the basic, physiological and psychosocial needs of patient
18. Describe the principles and techniques for meeting basic, physiological and psychosocial needs of patient
19. Perform nursing assessment, plan, implement and evaluate the care for meeting basic, physiological and
20. Describe principles and techniques for infection control and biomedical waste management in supervised
21. Explain the principles, routes, effects of administration of medications
22. Calculate conversions of drugs and dosages within and between systems of measurements
23. Administer drugs by the following routes-oral, Intradermal, subcutaneous Intramuscular, Intra Venous
24. Describe the pre and post operative care of patients
25. Explain the process of wound healing
26. Explain the principles and techniques of wound care]
27. Perform care of wound
28. Explain care of patients having alterations in body functioning
29. Explain care of terminally ill patient
30. Explain the basic concepts of conceptual and theoretical models of nursing
31. Performs admission and discharge procedure
32. Prepares nursing care plan as per the nursing process format

33. Communicate effectively with patient, families and team members and Maintain effective human relations

Psychology

Acquire knowledge of fundamentals of psychology and develop an insight into behavior of self and others. Further it is aimed at helping them to practice the principles of mental hygiene for promoting mental health in nursing

1. Describe the history, scope and methods of psychology
2. Explain the biology of Human behavior
3. Describe various cognitive processes and their applications
4. Describe motivation, emotions, stress, attitudes and their influence on behavior
5. Explain the concepts of personality and its influence on behavior
6. Describe psychology of people during the life cycle
7. Describe the characteristics of Mentally healthy person
8. Explain ego defense mechanism
9. Explain the psychological assessments and role of nurse

Microbiology

Acquire understanding of fundamentals of Microbiology and identification of various micro-organisms. It also provides opportunities for practicing infection control measures in hospital and community settings.

1. Explain concepts and principles of microbiology and their importance in nursing
2. Describe structure, classification morphology and growth of bacteria
3. Describe the methods of infection control
4. Identify the role of nurse in hospital infection Control programme
5. Describe the different disease producing organisms
6. Explain the concept of immunity, hyper sensitivity and immunization

Introduction to computers

Develop basic understanding of uses of computer and its applications in nursing.

1. Describe structure, classification morphology and growth of bacteria
2. Describe the methods of infection control
3. Identify the role of nurse in hospital infection Control programme
4. Describe the different disease producing organisms
5. Explain the concept of immunity, hyper sensitivity and immunization
6. Identify & define various concepts used in computer
7. Identify application of computer in nursing
8. Describe and use the disk operating system
9. Demonstrate skill in the use of MS office
10. Demonstrate skill in nursing multi-media
11. Identify features of computer aided teaching and testing
12. Demonstrate use of internet and Email
13. Describe and use the statistical packages
14. Describe the use of Hospital Management System

English

Comprehend spoken and written English (and use English) required for effective communication in their professional work students will practice their skills in verbal and written English during clinical and classroom

1. Speak and write grammatically correct English
2. Develop ability to read, understand and express meaningfully, the prescribed text
3. Develop writing skills
4. Develop skill in spoken English
5. Develop skill in listening comprehension

SECOND YEAR

Sociology

Get introduced the concepts of sociology related to community and social institutions in India and its relationship

1. Describe the institutions of family in India
2. Describe the class and caste system and their influence on health and health practices
3. Describe the types of communities in India, their practices and the impact on health
4. Explain the process of social change
5. Describe the social system and inter-relationship of social organizations
6. Explain the nature and process of social control
7. Describe the role of the nurse in dealing with social problems in India
8. Describe the role of the nurse in dealing with social problems in India

Pharmacology

Acquire understanding of pharmaco-dynamics, pharmacokinetics, principles of therapeutics and nursing

1. Describe pharmacodynamics, pharmacokinetics, classification and the principles of drug administration
2. Explain chemotherapy of specific infections and infestations and nurse's responsibilities
3. Describe Antiseptics, disinfectants, insecticides and nurse's responsibilities
4. Describe Drugs acting on Gastrointestinal system and nurse's responsibilities
5. Describe Drugs used on Respiratory systems and nurse's responsibilities
6. Describe Drugs used on Urinary System and nurse's responsibilities
7. Describe Drugs used in Dried, emergency, deficiency of vitamins & minerals, poisoning, for immunization and immunosuppression and nurse's responsibilities
8. Describe Drugs used on skin and mucous membranes and nurse's responsibilities
9. Describe Drugs used on Nervous System and nurse's responsibilities
10. Describe Drugs used on Cardiovascular System and nurse's responsibilities
11. Describe drugs used for hormonal disorders and supplementation, contraception and medical termination of
12. Demonstrate awareness of the common drugs used in alternative system of medicine

Pathology

Acquire knowledge of pathology of various disease conditions and apply this knowledge in practice of nursing.

1. Define the common terms used in pathology
2. Appreciate the deviations from normal to abnormal structure and functions of the body system
3. Explain pathological changes in disease conditions of various systems
4. Describe various laboratory tests and assessment and monitoring of disease conditions
5. Describe the laboratory tests for examination of body cavity fluids, transudates and exudates

6. Describe the laboratory tests for examination of urine and faeces

Genetics

Acquire understanding of Genetics, its role in causation and management of defects and diseases.

1. Explain nature, principles and perspectives of heredity
2. Explain maternal, prenatal and genetic influences on development of defects and diseases
3. Explain the screening methods for genetic defects and diseases in neonates and children
4. Identify genetic disorders in adolescents and adults
5. Describe the role of nurse in genetic services and counseling

Medical-Surgical Nursing -1

Acquire knowledge and develop proficiency in caring for patients with medical and surgical disorders in varieties

1. Appreciate the trends in medical and surgical nursing.
2. Describe the role of a nurse in caring for adult patient in hospital and community
3. Describe the concepts of medical surgical asepsis
4. Describe the common signs, symptoms, problems and their Specific* nursing interventions
5. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of respiratory systems
6. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of digestive systems
7. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with blood and cardiovascular problems
8. Describes the vascular conditions and its nursing management
9. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of genitorurinary system
10. Describe the etiology, pathophysiology clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of male reproductive system
11. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of endocrine system
12. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of endocrine system
13. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of musculoskeletal system
14. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of musculoskeletal system
15. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of Immunological system
16. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with communicable diseases.
17. Identify the various instruments and equipments used for used for common surgical procedures
18. Describe the infection control measures in the operation theatre
19. Describe the role of the nurse in the peri operative nursing care
20. Provide nursing care to adult patients with medial disorders
21. Counsel and educate patients and families
22. Provide pre and post operative nursing care to adult patients with surgical disorders

Community Health Nursing -1

Appreciate the principles of promotion and maintenance of health and use this knowledge effectively in the

1. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of endocrine system
2. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of endocrine system
3. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of musculoskeletal system
4. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of Immunological system
5. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with communicable diseases.
6. Identify the various instruments and equipments used for common surgical procedures
7. Describe the infection control measures in the operation theatre
8. Describe the role of the nurse in the peri operative nursing care
9. Provide nursing care to adult patients with medial disorders
10. Counsel and educate patients and families
11. Provide pre and post operative nursing care to adult patients with surgical disorders
12. Describe determinants of health
13. Describe concept, scope, uses methods and approaches of epidemiology
14. Describe epidemiology and nursing management of common communicable diseases
15. Describe Epidemiology and nursing management of common Noncommunicable diseases
16. Describe Epidemiology and nursing management of common Noncommunicable diseases
17. Describe the concepts and scope of demography
18. Describe methods of data collection, analysis and interpretation of demographic data
19. Identify the impact of population explosion in India
20. Describe methods of population control
21. Identify demographic characteristics, health determinants and community health resources
22. Diagnose health needs of individual and families
23. Provide primary care in health centre

Communication and Educational technology

Acquire an understanding of the principles and methods of communication and teaching. It helps to develop skill in communicating effectively, maintaining effective interpersonal relations, teaching individuals and groups in

1. Describe the communication process
2. Identify techniques of effective communication
3. Establish effective interpersonal relations with patients, families & co-workers
4. Develop effective human relations in context of nursing
5. Develop basic skill of counseling and guidance
6. Describe the philosophy & principles of education
7. Explain the teaching learning process
8. Demonstrate teaching skill using various teaching methods in clinical, classroom and community settings
9. Prepare and use different types of educational media effectively
10. Prepare and use different types of educational media effectively

11. Prepare different types of questions for assessment of knowledge, skills and attitudes
12. Teaching individuals, groups and communities about health with their active participation

THIRD YEAR

Medical Surgical Nursing -II

Acquire knowledge and develop proficiency in caring for patients with medical and surgical disorders in varieties

1. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of
2. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of
3. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and nursing management
4. Describe then etiology, pathophysiology, clinical manifestations, diagnosis measures and nursing management of patients with disorders of female reproductive system
5. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and nursing management
6. Describe the etiology, pathophysiology, clinical manifestations, diagnosis measures and nursing management of patients with disorders of female reproductive system
7. Describe concepts of reproductive health and family welfare programme
8. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and nursing management of patients with Burns, reconstructive and cosmetic surgery
9. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and nursing management
10. Describe organization of emergency and disaster care services
11. Describe the role of nurse in disaster management
12. Describe the role of nurse in management of common Emergencies
13. Describe nursing care of the elderly
14. Describe organization of critical care units
15. Describe the role of nurse in management of patients critical care units
16. Describe the etiology, pathophysiology, clinical manifestations, assessment, diagnostic measures and management of patients with occupational and industrial health disorder
17. Provide care to patients with various medical surgical conditions

Child Health Nursing

Develop an understanding of the modern approach to child-care, identification, prevention and nursing management of common health problems of neonates and children.

1. Explain the modern concept of child care & principles of child health nursing
2. Describe national policy programs and legislation in relation to child health and welfare
3. List major causes of death during infancy early Early & late childhood
4. Describe the major functions and role of the paediatric nurse in caring for a hospitalized child.
5. Describe the principles of child health nursing.
6. Describe the principles of child health nursing.
7. Describe the normal growth & development of children at different ages
8. Identify the needs of children at different ages & provide parental guidance
9. Identify the nutritional needs of children at different ages and ways of meeting the needs
10. Provide care to normal & high risk neonates
11. Perform neonatal resuscitation
12. Recognize and manage Common neonatal problems
13. Provide nursing care in common childhood diseases

14. Identify measures to prevent common childhood diseases including immunization
15. Manage the child with behavioural & social problems
16. Identify the social & welfare services for challenged children
17. Provide nursing care to children with various medical disorders
18. Perform assessment of children: Health, Developmental and Anthropometric
19. Perform Immunization
20. Provide nursing care to critically ill children

Mental Health Nursing

Develop an understanding of the modern approach to mental health care, identification, prevention and nursing management of common mental health problems with special emphasis on therapeutic interventions for

1. Describe the concept of normal & abnormal behavior terms used in mental health Nursing
2. Explains the classification of mental disorders
3. Explain psychodynamics of maladaptive behavior
4. Discuss the etiological factors, psychopathology of mental disorders
5. Explain the principles and standards of mental health nursing
6. Explains the classification of mental disorders
7. Explain psychodynamics of maladaptive behavior
8. Explain the principles and standards of mental health nursing
9. Explain treatment modalities and therapies used in mental disorders and role of the nurse
10. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of
11. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of
12. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of patients with neurotic, stress related & somatization disorders.
13. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of
14. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of
15. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of childhood and adolescent disorders including mental deficiency
16. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of
17. Identify psychiatric emergencies and carry out crisis intervention
18. Explain legal aspects applied in mental health settings and role of the nurse
19. Describes community mental health services and role of the nurse
20. Assess patients with mental health problems
21. Assess patients with mental health problems
22. To provide nursing care for patients with various mental, health problems
23. Provide comprehensive care to patients with mental health problems

Nursing Research and Statistics

Develop an understanding of basic concepts of research, research process and statistics. It is further, structured to conduct/ participate in need based research studies in various setting and utilize the research findings to

1. Describe the concept of research, terms, need and areas of research in nursing.
2. Explain the steps of research process
3. Identify and state the research problem and objectives
4. Review the related literature

5. Describe the research and designs
6. Explain the sampling process
7. Describe the methods of data collection
8. Analyze, interpret and summarize the research data
9. Explain the use of statistics, scale of measurement and graphical presentation of data
10. Describe the measures of central tendency and variability and methods of correlation
11. Communicate and utilize the research finding

FOURTH YEAR

Midwifery and Obstetric Nursing

Appreciate the concepts and principles of midwifery and obstetrical nursing and acquire knowledge and skills in rendering nursing care to normal and high risk pregnant woman during antenatal, natal and post natal period in hospitals and community settings. It also helps to develop skills in managing normal and high risk neonates and

1. Describe the anatomy and physiology of female reproductive system
2. Describe the diagnosis and management of women during antenatal period
3. Describe the physiology and stages of labour
4. Describe the management of women during intranatal period
5. Describe the physiology of puerperium
6. Describe the management of women during postnatal period
7. Describe the assessment and management of normal neonate
8. Describe the identification and management of women with high risk pregnancy
9. Describe the management of abnormal labour
10. Identify the high risk neonates and their nursing management
11. Describe indication, dosage, action, side effects and nurses responsibilities in the administration of drugs
12. Appreciate the importance of family welfare programme
13. Describe the methods of contraception and role of nurse in family welfare programme
14. Assessment of pregnant women
15. Assess woman in labour
16. Carry out pervaginal examinations
17. Conduct normal deliveries
18. Perform episiotomy and suture it
19. Resuscitate newborns
20. Assist with casesarean sections MTP and other surgical procedures
21. Provide nursing care to postnatal mother and baby
22. Counsel and teach mother and family for parent hood
23. Provide nursing care to newborn at risk
24. Counsel for and provide family welfare services

Community Health Nursing - II

Develop knowledge and skill to practice community health nursing for the individual, family and groups at both urban and rural settings by using concepts and principles of health and community health nursing

1. Define concepts, scope, principles and historical development of Community Health and community health

2. Describe health plans, policies, various health committees and health problems in India
3. Describe the system of delivery of community health services in rural and urban areas
4. List the functions of various levels and their staffing pattern
5. Explain the components of health services
6. Describe alternative systems of health promotion and health maintenance
7. Describe the chain of referral system
8. Describe community health Nursing approaches and concepts
9. Describe the roles and responsibilities of community health nursing personnel
10. Describe and appreciate the activities of community health nurse in assisting individual s and groups to
11. Describe national health and family welfare programmes and role of a nurse
12. Describe the various health schemes in India
13. Explain the roles and functions of
14. various national and international health agencies
15. Plan, provide and evaluate care Participate in school health program
16. .Organize group for self help and involve clients in their own health activities
17. Provide comprehensive care to individual, family and community

Management of Nursing Service and Education

Acquire understanding of management of clinical and community health nursing services, nursing educational programmes. This is also designed to enable students to acquire understanding of the professional

1. Explain the principles and functions of management
2. Describe the elements and process of management
3. Describe the Management of nursing services in the hospital and Community
4. Describe the concepts, theories and techniques of organizational behavior and human relations
5. Participate in planning and organizing in service education program
6. Describe management of Nursing educational institutions
7. Describe the ethical and legal responsibilities of a professional nurse
8. Explain the nursing practice standards
9. Explain the various opportunities for professional advancement

Centre for Public Health and Health Care Administration

Course Outcome of Master of Public Health (MPH)

PH-501 PUBLIC HEALTH HISTORICAL ANTECEDENTS IN SOCIAL HEALTH, PUBLIC HEALTH AND MEDICAL SCIENCE AT

1. Introduction, Definition and Concept of Public Health
2. Definition and Concept of Health
3. Interdisciplinary Nature of Public Health
4. Culture Health

PH-502 ENVIRONMENTAL HEALTH AND SUSTAINABLE DEVELOPMENT

1. Basic Concepts and Definition of Environment
2. Environment Pollution
3. Meteorotological
4. Current and Emerging Issue in Environmental Health

PH-503 BASIC PRINCIPLES OF EPIDEMIOLOGY AND APPLICATION OF EPIDEMIOLOGICAL STUDIES

1. Historical Aspects of Epidemiology
 2. Basic Measurements in Epidemiology
 3. Epidemiology of Communicable
 4. Epidemiology of Non-Communicable Diseases
- PH-504 BIO-STATISTICAL METHODS AND APPLICATIONS

1. Introduction to Biostatistics
2. Probability Mass Function
3. Sampling Technique
4. Analysis

PH-505 MENTAL HYGIENE AND SUBSTANCE ABUSE

1. Mental Health
2. Mental Disability
3. Introduction, Definition of Substance abuse and Dependence on Drugs
4. Strategies for Implementing Evidence-Based Practice in Community

PH-506 PRIMARY CARE, SECONDARY CARE, TRADITIONAL CARE, PRACTICE IN PUBLIC HEALTH: GERIATRIC HEALTH

1. Introduction
2. Primary Care and Practice
3. Introduction to Geriatric Health
4. Respiratory Allergies

PH-507 BIOLOGICAL BASIS OF PUBLIC HEALTH AND BIOETHICS IN PUBLIC HEALTH

1. Role of Biomedical Science
2. General Concept of Human Rights
3. History of Medical Ethics and Bioethics
4. Comments on Public Health and Related laws

PH-508 HEALTH ECONOMICS, FINANCE AND PLANNING IN HEALTH CARE SERVICES

1. Introduction and Definitions
2. Health Care Potential of India
3. Health Insurance
4. Planning in Health Care Services

PH-509 RESEARCH METHODOLOGY, BASIC COMPUTING AND COMPUTATIONAL BIOLOGY IN PUBLIC HEALTH

1. Introduction and Definition
2. Importance of Measurement in Research
3. Informatics and Computer
4. Compilation and Results Presentations

PH-510 SOCIAL, PSYCHOLOGICAL AND BEHAVIOURAL HEALTH: HEALTH EDUCATION AND COUNSELLING

1. Basic Concepts in Sociology
2. Basic Concepts in Psychology
3. Basic Concepts in Philosophy
4. The Health of Special Population all over the world

PH-511 HEALTH CARE ADMINISTRATION HEALTH MANAGEMENT INFORMATION SYSTEM AND

1. Concepts of Health Care
2. Health Care Administration
3. Health Management Information System
4. Brief History of Development of Computers

PH-512 WOMAN'S HEALTH CARE, FAMILY PLANNING, INFECTIOUS DISEASES AND NATIONAL HEALTH

1. Demography
2. Relation Between Nutrition
3. Public Health Problems Facing Pregnant Women and Babies
4. Factors Specific to Indian Situation Leading to Maternal and Child Health

PH-513 INTERNATIONAL HEALTH, GLOBAL HEALTH FOUNDATIONS AND ORGANISATIONS AND HUMAN RIGHTS

1. Public Health Verses International Health
2. Global Economy
3. Introduction to Global Health
4. Working Together to Improve Global Health

PH-514 CHILDREN'S HEALTH AND HUMAN NUTRITION NATIONAL HEALTH POLICY AND POPULATION POLICY

1. Preventive Paediatrics
2. National Population Policy and National Rural Health Mission
3. National Health Policy
4. Measuring the Baby

PH-515 SURVEILLANCE AND SURVEY METHODS

1. Surveillance and Surveys
2. Questionnaire Format
3. Survey Design
4. Communicating The Result

PH-516 ENTOMOLOGY SAFE WATER AND SANITATION: LABORATORY PRACTICALS AND WRITING RECORD

1. Medical Entomology
2. Other Arthropods
3. Water
4. Surveillance

PH-517 PUBLIC HEALTH IN EMERGENCIES: ACCIDENTS & INJURIES OCCUPATIONAL HEALTH, DISASTER &

1. Concept, Definition, Objectives, Elements and Significance of Disaster Management
2. Personal Protection in Different Emergencies
3. Disaster Preparedness
4. Epidemics

PH-600 MASTER RESEARCH AND DISSERTATION WRITING

1. Field Visits
2. Survey
3. Conferences
4. Workshops
5. Symposia
6. Assignments

Akal College of Agriculture

B.Sc. Agriculture

Program Out come

PO1. Crop production knowledge: Apply the knowledge of Agronomy, watershed management, Farming system and Sustainable agriculture, to the management of crop production.

PO2. Variety development and Seed production: Identify and development of variety for particular area, seed production, and analyze complex quantitative and qualitative traits reaching substantiated conclusions applying

PO3. Soils and their management: Design solutions for problematic soils using fundamental of soils system components or processes that meet the specified needs with appropriate consideration for the soil

P04. Conduct solution of plant disease and insect pests problems: Identify the disease and insect pests of crop plants and use research-based knowledge to solve the losses due to disease and insect pests infestation using
PO5. Fruits, vegetable, and ornamental crop management: Apply appropriate fundamental techniques, resources, and modern tools for production of fruits, vegetable and plantation crops. Post - harvest management
PO6. Agriculture and society: Apply agriculture extension education knowledge to assess village society, health, safety, legal and cultural issues and the development of entrepreneurship and business communication skill.
PO7. Environment and sustainability: Understand the impact of the agriculture in societal and environmental contexts, and demonstrate the knowledge of forestry, biotechnology, environment, disaster management and
PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the
Course Outcomes

Courses offered in Semester I

Course code: Agron-101 Course Title: "Introductory agriculture"

Outcomes

- CO1 Describe general Introduction of agriculture.

- CO2 Give the history of agricultural development

- CO3 Describe ancient India agriculture in civilization era

- CO4 Describe assets and contrasting trends & agricultural growth

- CO5 Identified liabilities: Soil factors, weather factors

- CO6 Describe multifaceted roles and tasks of women in agriculture

- CO7 Describe empowerment of women & group dynamics
- CO8 Identified the nucleus of agricultural

Credits 1 Theory period of one hour per week over a semester

Course code: PBG-101 Course Title: "Principles of genetics"

Outcomes

- CO1 Describe general principles of genetics

- CO2 Study Mendel's laws of inheritance and exceptions to the laws

- CO3 Significance and differences between mitosis and meiosis

- CO4 Describe crossing over and factors affecting crossing over

- CO5 Describe characteristic features of cytoplasmic inheritance

- CO6 Identify DNA and its structure, function, types

- CO7 Write Gene expression and differential gene activation
- CO8 Evolution of different crop species like

Credits 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Soil-101 Course Title: "Introduction to soil science"

Outcomes

- CO1 Give the pedological and edaphological concepts

- CO2 Classify Composition: rocks and minerals weathering

- CO3 Identify Soil profile, soil physical properties, soil texture

- CO4 Study soil compaction & soil colour

- CO5 Identify soil water, retention and potentials

- CO6 Describe soil colloids, properties, nature, types and significance

- CO7 Classify soil organic matter, composition, decomposability

Credits 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Micro-101 Course Title: "Principles of microbiology"

Outcomes Co1 Give the history of microbiology

Co2 Study metabolism in bacteria

Co3 Identify bacteriophages: structure and properties

Co4 Describe genetic recombination and bacterial genetics

Co5 Study soil microbiology & microbial groups in soil

Co6 Identify microbiology of water & microbiology of food

Co7 Classify beneficial microorganisms in agriculture

Credits 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Comm-101 Course Title: "Comprehension and communication skills in English"

Outcomes Co1 Study the English Comprehension

Co2 Describe War minus shooting

Co3 Study A Dilemma: A layman looks at science raymond B

Co4 Describe You and your English

Co5 Improve Written skills

Co6 Improve The style, importance of professional writing

Credits 1 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Biochem-101 Course Title: "Biochemistry"

Outcomes Co1 Study Scope and importance of biochemistry in agriculture Co2 Identify Structure, properties

Co3 Write classification, structure and functions of Lipids

Co4 Write Classification, structure and functions of carbohydrates

Co5 Study Metabolism: basic concepts, glycolysis & citric acid cycle

Co6 Describe the central dogma of life; DNA replication

Co7 Study structure and biological functions of vitamins

Credits 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Agron-102 Course Title: "Principles of agronomy and agricultural meteorology"

Outcomes Co1 Study meaning and scope of agronomy

Co2 Planting geometry and its effect on growth and yield

Co3 Study agricultural meteorology: weather and climate

Co4 Study earth's atmosphere, composition and structure

Co5 Identify atmospheric, temperature, factors affecting air pressure

Co6 Write wind: factors affecting, cyclones and anticyclones

Co7 Describe process of condensation, formation of dew & fog

Credits 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Bot-101 Course Title: "Basic botany"

Outcomes: Co1 Classify and introduction to different groups of the plant kingdom

Co2 Study morphology: Structure of seeds of different plants

Co3 Identify roots: External characters and functions

Co4 Identify stem: External characters and functions

Co5 Identify leaf: Parts of a typical leaf and their functions

Co6 Identify inflorescence: Elementary knowledge of simple and special types

Co7 Identify pollination: Types of pollinations, agencies responsible for pollination

Co8 Study reproduction in plants: Vegetative, and sexual

Credits: 1 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Math-101 Course Title: "Basic mathematics-I"

Outcomes: Co1 Understand mensuration of rectangles

Co2 Study volumes of cubes and rectangular solids

Co3 Study algebra: Solution of quadratic equations

Co4 Study algebra: Series: nth terms sum to n terms of an AP and GP

Co5 Understand co-ordinate geometry

Credits: 2 Theory period of one hour per week over a semester

Course code: Edu-101 Course Title: "Universal human values in higher education and Professional ethics"

Outcomes: Co1 Understand the need, basic guidelines of value education

Co2 Understand the human being as co-existence of self

Co3 Study basis for universal human values and ethical human conduct

Co4 Understand professional ethics, issues in professional ethics

Co5 Study the holistic criteria for evaluation, case studies of typical holistic technologies

Credits: 1 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Courses offered in Semester II

Course code: Econ-101 Course Title: "Principles of agricultural economics"

Outcomes: Co1 Understand economics: meaning, definition, subject matter

Co2 Study wants: Meaning, characteristics, classifications of wants

Co3 Study consumer's surplus: Meaning, definition, importance

Co4 Understand elasticity of demand: Types of elasticity of demand

Co5 Study welfare economics: meaning, pareto's optimality

Co6 Study public finance: Meaning, principles

Co7 Understand classification of taxes: Cannons of taxation

Credits: 2 Theory period of one hour per week over a semester

Course code: Math-102 Course Title: "Statistics"

Outcomes: Co1 Study definition of statistics and its use and limitations

Co2 Characteristics of ideal average, arithmetic mean

Co3 Study normal distribution and its properties

Co4 Study two samples and paired t test. F test
Co5 Understand correlation and identification through scatter diagram
Co6 Study Inter-relation between 'r' and the regression coefficients
Co7 layout and analysis with equal & unequal number of observations
Credits 1 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: BG-102 Course Title: "Principles of plant breeding"
Outcomes
Co1 Classify plants, botanical description, floral biology
Co2 Understand aims and objectives of plant breeding
Co3 Study methods of breeding-introduction and acclimatization
Co4 Understand Hybridization & types of hybridization
Co5 Identify Incompatibility and male sterility
Co6 Study Population improvement programmes
Credits 2 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Bot-102 Course Title: "Crop physiology"
Outcomes
Co1 Give Introduction, importance in agriculture
Co2 Study Seed viability and vigour
Co3 Classify monocarpic and polycarpic species with example
Co4 Study transpiration in relation to crop productivity
Co5 Understand Photorespiration, factors affecting photosynthesis
Co6 Study Plant growth regulators
Co7 Understand Postharvest physiology, seed dormancy
Credits 2 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Ent-101 Course Title: "Introductory nematology"
Outcomes
Co1 Study History of phytonematology
Co2 Describe nematode general morphology and biology
Co3 Classify nematodes by habitat
Co4 Study symptoms caused by nematodes with examples
Co5 Identify different methods of nematode management
Co6 Understand biological methods, chemical methods (fumigants, non-fumigants)
Credits 1 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Path-101 Course Title: "Plant pathogens and principles of plant pathology"
Outcomes
Co1 Study important plant pathogenic organisms
Co2 Study classification of prokaryotes
Co3 Write definition and objectives of plant pathology
Co4 Identify plant disease epidemiology

Co5 Study cultural methods, rouging
Co6 Understand methods of application of fungicides
Co7 Study application of biotechnology in plant
Credits 3 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: IS-101 Course Title: "Introduction to computer application"

Outcomes
Co1 Give Introduction to computers
Co2 Understand Operating system, DOS and WINDOWS
Co3 Study GUI, desktop and its elements
Co4 Understand applications, MSWORD
Co5 Use of in-built statistical and other functions
Co6 Study Concept of database, units of database
Co7 Write Principles of programming
Credits 1 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: SWE-101 Course Title: "Fundamentals of soil water conservation and engineering"

Outcomes
Co1 Identify Surveying: survey equipment, chain survey
Co2 Understand Levelling-levelling equipment, terminology
Co3 Study Irrigation, classification of projects
Co4 Understand water conveyance systems
Co5 Study drip and sprinkle irrigation systems
Co6 Study water source, water lifting devices
Co7 Study soil and water conservation
Credits 2 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Zoo-101 Course Title: "Basic zoology"

Outcomes
Co1 Give Introduction to Zoology
Co2 Write zoological nomenclature and principles of classification
Co3 Describe Chordates
Co4 Understand Physiology of respiration
Credits 1 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Math-103 Course Title: "Basic mathematics-II"

Outcomes
Co1 Study trigonometry & sexagensimal
Co2 Describe elementary calculus
Co3 Define simple algebraic trigonometric
Co4 Describe Theorems on differentiation of the sum
Co5 Study Integration of the standard forms
Co6 Describe Elements of matrices and determinants
Credits 2 Theory period of one hour per week over a semester

Courses offered in Semester III

Course code: Agron-201 Course Title: "Field Crops-I (Kharif)"

Outcomes: Co1 Give geographic distribution, economic importance of kharif crops

Co2 Study soil and climatic requirement, varieties, cultural practices

Co3 Study yield of kharif crops, oilseeds: groundnut, sesame

Co4 Study yield of kharif crops, fibre crops, cotton, jute

Co5 Identify forage crops, sorghum, maize, cowpea, cluster bean and napier grass

Credits: 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Agron-202 Course Title: "Water management and micro irrigation"

Outcomes: Co1 Study Irrigation: definition and objectives

Co2 Understand Soil plant water relationships

Co3 Identify Methods of soil moisture estimation

Co4 Identify effective rainfall, scheduling of irrigation

Co5 Understand Methods of irrigation

Co6 Study Irrigation efficiency and water use efficiency

Co7 Identify water management of different crops

Credits: 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Ent-201 Course Title: "Insect morphology and systematic"

Outcomes: Co1 Give History of entomology in India

Co2 Study Structure and functions of insect cuticle and moulting

Co3 Understand structure and modifications of insect antennae

Co4 Study structure and functions of digestive, circulatory system

Co5 Study Systematics: Taxonomy, importance, history and development and binomial nomenclature

Credits: 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Soil-201 Course Title: "Soil chemistry, soil fertility and nutrient management"

Outcomes: Co1 Study soil as a source of plant nutrients

Co2 Measures to overcome deficiencies and toxicities

Co3 Understand Reclamation, mechanical, chemical and biological methods

Co4 Identify quality of irrigation water and its appraisal

Co5 Study soil fertility, different approaches for soil fertility evaluation

Co6 Study plant analysis - DRIS methods, critical levels in plants

Co7 Identify factors influencing nutrient use efficiency (NUE) in respect of N, P, K, S, Fe and Zn fertilizers

Credits: 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Econ-201 Course Title: "Agricultural finance and co-operation"

Outcomes: Co1 Study agricultural finance: nature and scope

Co2 Identify agricultural credit: meaning, definition, need

Co3 Give History of financing agriculture in India
Co4 Understand Assessment of crop losses
Co5 Identify Higher financing agencies
Co6 Understand Agricultural cooperation: philosophy and principles
Co7 Reorganisation of cooperative credit structure in Andhra Pradesh and single window system
Credits 1 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: BG-201 Course Title: "Principles of seed technology"

Outcomes
Co1 Give Introduction to seed production
Co2 Study seed production, foundation and certified seed production in maize
Co3 Identify foundation and certified seed production of tomato and brinjal
Co4 Study seed Act and Seed Act enforcement
Co5 Study seed drying: forced air seed drying
Co6 Identify establishment of seed processing plant
Co7 Study general principles of seed storage
Credits 2 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Hort-201 Course Title: "Production technology of vegetables and flowers"

Outcomes
Co1 Give Importance of olericulture, vegetable gardens
Co2 Study ash gourd, snake gourd, bottle gourd, bitter gourd and melons
Co3 Study Bulb crops-onion and garlic
Co4 Identify Tuber crops, potato, sweet potato, tapioca
Co5 Identify Leafy vegetables, amaranthus, palak, gogu
Co6 Write Importance of ornamental gardens
Co7 Use of trees, shrubs, climbers, palms, houseplants
Credits 2 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Ext-201 Course Title: "Dimensions of agricultural extension"

Outcomes
Co1 Give Extension education and agricultural extension
Co2 Identify Rural development; meaning, definition
Co3 Study Community development programme
Co4 Study Panchayat raj system, meaning of democratic
Co5 Study Agricultural development programmes with reference to year of start
Co6 S Study ocial Justice and poverty alleviation programmes
Co7 Study Women development programmes
Credits 1 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Courses offered in Semester IV

Course code: Agron-203 Course Title: "Field crops-II (Rabi)"

Outcomes
Co1 Study Origin, geographical distribution, economic importance of rabi crops
Co2 Study yield of Cereals: wheat, barley; Pulses: chickpea, lentil, peas
Co3 Study yield of sugar crops: sugarcane and sugarbeet

Co4 Study yield of medicinal and aromatic crops such as mentha, lemon grass
Co5 Study yield of commercial crops: potato and tobacco; forage crops: berseem
Credits 2 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Hort-202 Course Title: "Production technology of fruit crops"

Outcomes
Co1 Give Definition and importance of horticulture
Co2 Identify Climatic zones of horticulture crops
Co3 Selection of site, fencing, and wind break, planting systems
Co4 Study propagation methods and use of rootstocks
Co5 Study methods of training and pruning
Co6 Understand package of practices for the cultivation of major fruit
Co7 Understand package of practices for the cultivation of minor fruits
Credits 2 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Soil-202 Course Title: "Manures, fertilizers and agrochemicals"

Outcomes
Co1 Give Introduction, raw materials, manures
Co2 Study composts, different methods, mechanical compost plants
Co3 Understand fertilizers, classifications, manufacturing processes and properties of major nitrogenous
Co4 Study bio fertilizers and their advantage
Co5 Identify organic chemistry as prelude to agro chemicals
Co6 Study Herbicides, major classes, properties and uses of 2,4-D, atrazine
Co7 Study fungicides, major classes, properties and uses of carbendazim
Credits 2 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Ent-202 Course Title: "Insect ecology, beneficial insects and integrated pest management"

Outcomes
Co1 Study Insect ecology: Introduction, environment and its components
Co2 Understand concepts of balance of life in nature
Co3 Study IPM; Introduction, importance, concepts principles
Co4 Identify biological methods of control (parasites, predators
Co5 Study of important insecticides
Co6 Study recent methods of pest control, repellents
Co7 Identify beneficial insects: parasites and predators used in pest control
Credits 2 Theory period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: FPM-201 Course Title: "Farm power and machinery"

Outcomes
Co1 Study farm power in India: sources, I.C engines
Co2 Identify tractors: types, selection of tractor
Co3 Study tillage implements: primary and secondary tillage implements
Co4 Study implements for intercultural operations

Co5 Identify Plant protection equipment and harvesting equipment

Co6 Identify equipment for land development and soil conservation

Credits 1 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Path-201 Course Title: "Diseases of field crops and their management"

Outcomes 1 Study economic importance, symptoms, cause, epidemiology of rice, sorghum, barley and oats

Co2 Study integrated management of diseases of maize, wheat

Co3 Study management of diseases of sugarcane, turmeric, tobacco

Co4 Study epidemiology and disease cycle of diseases of linseed, sesamum, sunflower

Co5 Study management of diseases of cotton, mustard, okra

Co6 Study management of diseases of blackgram, greengram

Co7 Study management of diseases of tea, soybean

Credits 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: PBG-202 Course Title: "Breeding of field and horticultural crops"

medicinal and plantation Crops"

Outcomes 1 Give objectives and important concepts of breeding self-pollinated

Co2 Study origin, distribution of species, wild relatives and forms

Co3 Study wild relatives and forms, Pulses (redgram, greengram, blackgram, soybean)

Co4 Study wild relatives and forms, fibers (cotton, kenaf, roselle, jute)

Co5 Study wild relatives and forms, flowers crops (chrysanthemum, rose, galardia, gerbera and marigold)

Co6 Understand major breeding methods for development of hybrids

Co7 Identify breeding for resistance to biotic and abiotic stresses variability in pathogens and pests

Co8 Study definition of biometrics, assessment of variability

Credits 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Hort-203 Course Title: "Production technology of spices, Aromatics,

Medicinal and Plantation Crops"

Outcomes 1 Give importance and cultivation technology of spices

Co2 Study importance and cultivation technology of aromatic crops

Co3 Identify importance and cultivation technology of plantation crop

Co4 Study importance and cultivation technology of medicinal plants:

Co5 Identify Importance and cultivation technology of medicinal plants: nuxvomica, solanum khasiamum,

Credits 2 Theory period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Courses offered in Semester IV

Course Code: Agron-301, Course Title: Farming systems and sustainable agriculture

Outcomes 1 Describe sustainable agriculture, its goal and prospectives

C02 Identify land degradation and conservators of natural resources

C03 Describe irrigation problems, waste lands and their development

C04 Write down organic farming definition, principles and components

C05 Describe Farming systems: definition, principles and components

C06 Write down IFS models for wetland, irrigated dryland and dryland situations

Credits 1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: LPM-301, Course Title: Livestock production and management

Outcomes 201 Describe place of livestock in the national economy

C02 Write down Important exotic and Indian breeds of cattle, buffalo, sheep, goat

C03 Describe milking of animals and factors affecting milk yield and composition

C04 Write down feeding and management of calves, growing heifers and milch animals

C05 Describe Disease control measures, sanitation and care, breeding, feeding

C06 Write down breed characteristics of poultry, their methods of rearing, breeding, feeding and management,

C07 Explain Cost of production of milk, economical units of cattle, buffalo, sheep, goat

Credits 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Ent-301, Course Title: Insect pests of crop and stored grains and their management

Outcomes 201 Classify stored grain pests: Coleopteran and lepidopteran pests, their biology

C02 Write down distribution, biology, nature and symptoms of damage, and management strategies of insect and

C03 Write down distribution, biology, nature and symptoms of damage, and management strategies of insect and

C04 Write down Distribution, biology, nature and symptoms of damage, and management strategies of insect

C05 Write down distribution, biology, nature and symptoms of damage, and management strategies of insect

C06 Write down distribution, biology, nature and symptoms of damage, and management strategies of insect and

Credits 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: ABM-301, Course Title: Fundamentals of agri-business management

Outcomes 2OI Describe agribusiness: Meaning, definition, structure of agribusiness

C02 Write importance of agribusiness in the Indian economy

C03 Describe management functions, planning, meaning, definition, types of plans

C04 Write financial management of agribusiness

C05 Write agro-based industries: Importance and need,

C06 Write marketing management: meaning, definitions

C07 Write project, definitions, project cycle, identification, formulation, appraisal, implementation, monitoring

Credits 1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Agron-302, Course Title: Practical crop production I (Kharif crops)

Outcomes 2OI Write crop planning, raising field crops in multiple cropping systems

C02 Practical Field preparation, seed treatment, nursery raising, sowing, nutrient management

C03 Practical of weed management and management of insect pests and diseases of crops

C04 Preparation of balance sheet including cost of cultivation, net returns

Credits 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: PHT-301, Course Title: Protected cultivation and postharvest technology

Outcomes \Rightarrow Describe greenhouse technology, introduction, types of greenhouses

C02 Write greenhouse equipment, materials of construction for traditional and low cost green houses

C03 Describe cost estimation and economic analysis. Choice of crops for cultivation under greenhouses

C04 Write Growing media, soil culture, type of soil required, drainage, flooding and leaching

C05 Describe Threshing, threshers for different crops, parts, terminology, care and maintenance

C06 Identify drying, grain drying, types of drying, types of dryers. Storage

C07 Write Grading, methods of grading, equipment for grading of fruits and vegetables

Credits \Rightarrow Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Hort-301, Course Title: Introduction to food science, postharvest technology and value addition

Outcomes \Rightarrow Write down importance of Postharvest technology in horticultural crops.

C02 Explain pre harvest factors affecting quality on postharvest shelf life of fruits and vegetables

C03 Describe the phylum Coelenterata and its polymorphism

C04 Write down methods of storage: precooling, pre-storage treatments, low temperature storage

C05 Describe various methods of packing, packaging materials and transport. Packing technology for export

C06 Write down importance and scope of fruit and vegetable preservation in India

C07 Write down preparation of jams, jellies, marmalades, candies, crystallized and glazed fruits

C08 Write down spoilage of canned products, biochemical, enzymatic and microbial spoilage

Credits \Rightarrow Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Path-301, Course Title: Disease of horticultural crops and their management

Outcomes \Rightarrow O1 Write down economic importance, symptoms, cause, disease cycle and integrated management

C02 Write down economic importance, symptoms, cause, disease cycle and integrated management of diseases

C03 Write down economic Importance, symptoms, cause, disease cycle and integrated management of diseases

C04 Write down Economic importance, symptoms, cause, disease cycle and integrated management of diseases

C05 Write down Economic importance, symptoms, cause, disease cycle and integrated management of diseases

Credits \Rightarrow 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Econ-301, Course Title: Agricultural marketing, trade and prices

Outcomes \Rightarrow O1 Describe agricultural marketing: concepts and definition, scope and subject matter, market and

C02 Explain producer's surplus: meaning, types of producers surplus, marketable surplus

C03 Write down market integration, meaning, definition, types of market integration. marketing efficiency

C04 Write down Theories of international trade: Domestic trade, free trade, international trade

C05 Identify market access, domestic support, export subsidies, exim-policy and ministerial conferences

C06 Identify advantages of food corporation of India: Objectives and functions. quality control

C07 Write down meaning, need for agricultural price policy. Risk in marketing, meaning and importance

Credits \Rightarrow 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: BT-301, Course Title: Principles of Plant Biotechnology

Outcomes \Rightarrow O1 Describe concepts of plant biotechnology and plant genetic engineering

C02 Explain Scope and importance in crop improvement

C03 Write down techniques of in-vitro cultures, micro propagation, anther culture, pollen culture,

C04 Write down somaclonal variation, types, reasons: Somatic embryogenesis

C05 Write procedure of protoplast isolation, culture, manipulation and fusion; Products of somatic hybrids and

C06 Explain Genetic engineering; Restriction enzymes; Vectors for gene transfer, Gene cloning

C07 Write down blotting techniques, DNA finger printing, DNA based markers

Credits 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Courses offered in Semester VI

Course Code: Econ-302, Course Title: Production economics and farm management

Outcomes 1 CO1 Describe Production economics: Meaning, definition, nature and scope

C02 Explain concepts of production. Production functions, meaning, definition

C03 Describe Laws of returns: Increasing, constant and decreasing

C04 Write down the determination of optimum input and output

C05 Describe returns to scale: Meaning, definition, importance

C06 Identify types and systems of farming. Farm planning and budgeting

C07 Write down the linear programming: Assumptions, advantages and limitations

Credits 1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Ext-301, Course Title: Extension methodologies for transfer of agricultural technology

Outcomes 2 CO1 Describe Communication-meaning, definition, models

C02 Explain extension programme planning-meaning, definitions of planning, programme

C03 Describe field trials - meaning, objectives, steps, merits and demerits

C04 Write down Small group discussion techniques - lecture, symposium, panel, debate, forum, buzz group

C05 Describe factors influencing in selection of extension teaching methods and combination

C06 Identify agricultural journalism-meaning, scope and importance

C07 Write down capacity building of extension personnel and farmers-meaning, definition

Credits 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Ext-302, Course Title: Fundamentals of rural sociology and educational psychology

CO1 Describe extension education and agricultural extension: meaning, definition, scope and importance

C02 Explain Indian rural society, important characteristics, differences and relationship between rural and urban

C03 Describe Social Stratification: meaning, definition, functions, basis for stratification

C04 Write down Social values and attitudes: Meaning, definition, types and role of social values and attitudes in

C05 Describe Social Control: meaning, definition, need of social control and means of social control

C06 Identify Leadership: meaning, definition, classification, roles of a leader, different methods of selection of

C07 Write down psychology and educational psychology: meaning, definition,
Scope and importance

C08 Personality: meaning, definition, types, factors influencing the personality and role of personality in

Credits 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: ABM-302, Course Title: Entrepreneurship development

Outcomes CO1 Describe entrepreneurship development: assessing overall business environment in the Indian

C02 Explain globalisation and the emerging business/entrepreneurial environment.

C03 Describe SWOT analysis, generation, incubation and commercialization of ideas and innovations

C04 Write down export and import policies relevant to agriculture sector. Venture capital

C05 Describe communication skills: structural and functional grammar; meaning and process of communication

C06 Identify listening and note taking, writing skills, oral presentation skills; field diary and lab record

C07 Write down individual and group presentations, impromptu presentation, public speaking

Credits 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Agron-303, Course Title: Practical crop production II (Rabi crops)

Outcomes 2OI Write crop planning, raising field crops in multiple cropping systems

C02 Practical Field preparation, seed treatment, nursery raising, sowing, nutrient management

C03 Practical of weed management and management of insect pests and diseases of crops

C04 Preparation of balance sheet including cost of cultivation, net returns

Credits 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Env-301, Course Title: Environmental science and disaster management

Outcomes 2OI Explain scope and importance of environmental studies. Natural resources

C02 Describe the ecosystems: definition, concept, structure and functions.

C03 Describe biodiversity: Definition, classification, threats to biodiversity and its conservation.

C04 Write down environmental pollution: causes, effects and control of air, water, soil

COS Explain disaster management, floods, earthquakes, cyclones and landslides

C06 Write down the environment protection act, the air act, the water act, the wildlife protection.

C07 Write down the woman and child welfare, HIV/AIDS and role of information technology on environment and

Credits 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Agron-304, Course Title: Crop residue management
Outcomes \geq 01 Write down Significance of crop residue management

C02 Explain challenges for diversified use of crop residue in high cropping intensity areas

C03 Describe Crop residue in relation to agricultural ecosystems and conservation agriculture.

C04 Write down on-site and off-site management of crop residues and soil health indicators

C05 Describe beneficial effects of crop residue on soil health, crop yields

C06 Write down recent technologies for conservation agriculture

C07 Write down the Policy options for efficient residue management in Himachal

Credits \geq 1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: RE-301, Course Title: Renewable energy

Outcomes \geq 01 Explain energy sources, introduction, classification, energy from biomass

C02 Classify Principles of combustion, pyrolysis and gasification

C03 Describe briquettes, types of briquetting machines, uses of briquettes, shredders

C04 Write down the solar energy, solar flat plate and focussing plate collectors, solar air heaters

C05 Describe solar refrigeration system, solar ponds, solar photo voltaic systems, solar lantern, solar street lights

C06 Identify wind energy, types of wind mills, constructional details

C07 Write down the liquid bio fuels, bio diesel and ethanol from agricultural produce

Credits \geq 2 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Soil-301, Course Title: Soil physics and erosion management

Outcomes 201 Explain Soil a water reservoir, role in water cycle

C02 Describe Forces of water retention. Soil water potential

C03 Describe the Soil, plant, atmosphere continuum, indices of plant water status

C04 Write down the Soil moisture characteristics, evaporation in the presence and absence of water table

C05 Describe Soil erosion by water - types, effects, mechanics

C06 Identify Rain erosivity and soil erodibility. Runoff

C07 Write down the Soil conservation measures

Credits1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Forst-301, Course Title: Introductory forestry

Outcomes 201 Write about the forestry- definition, scope and important terminology

C02 Classify Status of forests in India and their role

C03 Write down the National and International forestry organizations

C04 Write down the Locality factors: climatic, edaphic, topographical and biotic

C05 Describe choice of species w.r.t site/economic uses and constraints of tree growing

C06 Identify the Forest management: growing stock, normal forest

C07 Write down the Forest utilization major and minor forest products

Credits1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: Agron-305, Course Title: Organic farming

Outcomes 201 Describe concept and relevance of organic farming

C02 Explain biological intensive nutrient management-organic manures

C03 Describe Vermicomposting, green manuring, recycling of organic residues

C04 Write down the soil improvement and amendments

C05 Describe Integrated diseases and pest management

C06 Explain Weed management; Quality considerations, certification,

Credits Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course Code: -----, Course Title: Educational tour (Non-credit)

Outcomes O1 Classify Protista up to phylum using examples from parasitic adaptation

C02 Classify Phylum Porifera with taxonomic keys

C03 Describe the phylum Coelenterata and its polymorphism

C04 Write down the life history of Fasciola and its classification

C05 Describe Phylum Nematoda and give examples of pathogenic Nematodes

C06 Identify the characters of Phylum Annelida with its classification

C07 Write down the classification and characteristics of Phylum Arthropoda

C08 Identify the given Mollusca with respect to economic importance

C09 Write down the classification and characteristics of Phylum

Courses offered in Semester VII

Rural Agricultural Work Experience (RAWE)

Course Code: -----, Course Title: Village attachment

Outcomes O1 Work with villagers

C02 Solve the problem of villagers

C03 Soil testing of farmer field

C04 Identification of disease and insect pest on farmer field

C05 Suggestions to the farmer about human health

C06 Suggestions to the farmer about child education and development

Credits 0 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

3 Practical period of three hour per week over a semester

Course Code: -----, Course Title: Experiential learning

Outcomes 001 Practical on seed production at farm

C02 Practical of food processing

C03 Practical on disease identification and management

C04 Practical on insect identification and management

C05 Practical on mushroom cultivation

C06 Practical on Post harvest technology

C07 Practical on biofertilizer and biopesticides

Credits 0 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

12 Practical period of 12 hour per week over a semester

Course Code: -----, Course Title: Industry attachment

Outcomes 001 Visit to nearby industry

C02 Learning the work culture of industry

C03 Discussion with the industrial workers

C04 Identification the procedure of production of industry

Credits 0 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

4 Practical period of four hour per week over a semester

Course Code: -----, Course Title Project report preparation and examination

Outcomes 001 Daily dairy preparation

C02 Compilation of all programmes during semester

C03 Presentation of the report

C04 Submission of the report

Credits 0 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of one hour per week over a semester

Courses offered in Semester VIII

Course Code: Agron-401, Course Title: Seed Production Technology

C01 Describe about seed quality and characteristics

C02 Describe about types and methods to break seed dormancy

C03 Explain various genetic and agronomic principles of seed production

C04 Describe Post harvest management of seeds

C05 Write down sustainable storage of seeds and their quality analysis

C06 How to write project proposal to get fund from various funding agencies

Credits 1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

2 Practical period of four hour per week over a semester

Course Code: Agron-402, Course Title: Remote Sensing GIS and Land use planning

C01 Discuss design and management of RDBMS

C02 Write about introduction to GIS and GPS technology

C03 Discuss electromagnetic radiation and its features

C04 Write about aerial photography and satellite remote sensing and their interpretation

C05 Describe remote sensing data interpretation and their application in agricultural field

C06 Write about Understanding of Digital cartography and DEM

C07 Study about different GIS software and its applications

Credits 1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

2 Practical period of four hour per week over a semester

Course Code: Agron-403, Course Title: Integrated farming system

C01 Discuss importance and scope of commercial fruit production

C02 Detailed about Importance of commercial varieties

C03 Describe propagation and production of elite planting materials

C04 Discuss crop management practices

C05 Discuss various techniques of harvesting, grading, packing, storage and ripening

C06 Discuss by-product development of various crops

C07 Describe crops gaining importance in the state
Credits: 1 Theory period of one hour per week over a semester
0 Tutorial period of one hour per week over a semester
3 Practical period of nine hour per week over a semester

Course code: Hort-404 Course Title: Nursery management of horticultural crops

CO1 Discuss plant propagation methods and importance
CO2 Describe vegetative propagation methods and its importance
CO3 Write about establishment, maintenance and utilization of progeny orchards
CO4 Discuss various factor for rapid production of uniform and good quality planting materials.
CO5 Detailed about Tissue culture techniques, its advantage and disadvantage
CO6 Describe importance of elite planting materials and their management
CO7 Discuss application of mist in the propagation of nursery plant and various methods of packing, storage

Credits: 2 Theory period of two hour per week over a semester
0 Tutorial period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Hort-405 Course Title: Protected cultivation of horticultural crops

CO1 Discuss scope and importance of protected culture in India
CO2 Discuss establishment and operation of greenhouses and their maintenance
CO3 Write about advantages of growing plants in a greenhouse, functioning and maintenance.
CO4 Detailed about environmental control systems in greenhouse for providing proper condition
CO5 Propagation, special horticultural practices, harvesting methods
CO6 Postharvest handling, standards, grading, packing and marketing

Credits: 2 Theory period of two hour per week over a semester
0 Tutorial period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Hort-406 Course Title: Seed production of vegetables and flowers

CO1 Describe various scope and importance of seed production in vegetable and flower crops
CO2 Write about type of seeds and their management
CO3 Discuss the seed production techniques in vegetables and flowers
CO4 Describe about hybrid seed production methods, importance and scope in vegetables and flowers,
CO5 Discuss economic of seed production and postharvest seed management techniques in vegetable and
CO6 Discuss various growth regulators and physical agents for increased seed germination and seed viability
CO7 Discuss seed legislation and seed law enforcement

Credits: 2 Theory period of two hour per week over a semester
0 Tutorial period of one hour per week over a semester
1 Practical period of two hour per week over a semester

Course code: Hort-407 Course Title: Processing and value addition of horticultural crops

- CO1 Discuss postharvest loss assessment of fruits and vegetables in marketing
- CO2 Details about measurement of postharvest respiration rate and storage management
- CO3 Discuss various packaging methods of fruits and vegetables
- CO4 Discuss the processing of coconut,
- CO5 Discuss the processing of cashew nut and cashew apple
- CO6 Visit to rubber factory and to oil pal industry
- CO7 Discuss the processing, preparation and dehydration of pepper and various other spices

Credits: 1 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

2 Practical period of four hour per week over a semester

Course code: PHT-401 Course Title: Postharvest Technology of Horticultural crops

- CO1 Discuss postharvest loss assessment of fruits and vegetables
- CO2 Familiarize the harvesting indices of fruits and vegetables and respiration rate measurement
- CO3 Exposure to various storage structures for fruits and vegetables
- CO4 Discuss the various methods used for long term storage of fruits and vegetables or the product derived
- CO5 Describe postharvest technology for fruits and their waste management
- CO6 Discuss the experience of fruit processing and their process analysis in industries
- CO7 Details the processing and management of spices crops

Credits: 1 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

2 Practical period of four hour per week over a semester

Course code: PHT-402 Course Title: Unit operation for quality value

- CO1 Discuss harvesting and postharvest management of quality fruits and vegetables
- CO2 Exposure to unit operations involved in pasteurization, canning, aseptic packaging of fruit and vegetable
- CO3 Familiarize the various pasteurizers' methods
- CO4 Exposure to various harvesting devices and their functions
- CO5 Discuss the preparation or manufacturing of various instant product like tea powder, milk powder and
- CO6 Detailed about preparation of osmotically dehydrated fruit product
- CO7 Exposure to packaging machine and their operations

Credits: 1 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

3 Practical period of six hour per week over a semester

Course code: PHT-403 Course Title: Postharvest technology of spices, plantation crops, medicinal and aromatic

- CO1 What are the various commercial uses and processing of major spices
- CO2 Analyse the essential oil from spices and aromatic plants using GLC / GC-MS
- CO3 Exposure to various grinding in spices powders and pouch processing of gravy mixes
- CO4 Discuss processing of medicinal plants
- CO5 Discuss processing of chuli (wild apricot)

CO6 Detailed about tea processing and packaging
CO7 Discuss processing and packaging of aloe vera

Credits: 3 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

3 Practical period of six hour per week over a semester

Course code: PHT-404 Course Title: Integrated storage management of fruits, flowers and vegetables

CO1 Discuss postharvest management and pre-storage treatments for quality produce

CO2 Discuss various application of skin coatings in fruits and vegetables

CO3 Write about the application of irradiation and various cooling methods to increase shelf life

CO4 Discuss various storage methods

CO5 Discuss different types of packaging and Pre-treatments to extend vase life

CO6 Detailed about cut flowers storage methods and processing for valuable product

Credits: 3 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

2 Practical period of four hour per week over a semester

Course code: PHT-405 Course Title: Postharvest handling of cut flowers and dry flowers

CO1 Discuss postharvest processing of cut flowers

CO2 Detailed about various types of packaging materials and various packaging methods for long term use

CO3 Write about demand and consumption of cut flowers and their marketing in India and abroad

CO4 Discuss postharvest handling of cut foliage

CO5 Details about extraction of oil and pigment, use in aromatherapy

CO6 Write about preparation of dry flowers and their marketing

CO7 Discuss storage and care of dried products

Credits: 3 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

2 Practical period of four hour per week over a semester

Course code: PHT-406 Course Title: Processing of cereals, pulses and oilseed crops including biodiesel

CO1 Discuss structure, composition and nutritional significance of cereals

CO2 Describe about various antinutritional factors, hazards and their detoxification

CO3 Write about primary and secondary processing of cereals

CO4 Preparation and processing of value added products and by products from various crops

Credits: 3 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

2 Practical period of four hour per week over a semester

Course code: BT-401 Course Title: Molecular breeding

CO1 Details about molecular cytogenetics:

CO2 Discuss the development and use of different kinds of molecular markers

- CO3 Write about generation of mapping populations
- CO4 Compare the genetic maps and synteny, and their use
- CO5 Discuss marker aided selection and development of markers
- CO6 Describe flow cytometry and its use in cytogenetics
- CO7 Discuss artificial chromosome and their uses

Credits: 1 Theory period of two hour per week over a semester
 0 Tutorial period of one hour per week over a semester
 3 Practical period of six hour per week over a semester

Course code: BT-402 Course Title: Breeding for biotic and abiotic stress

- CO1 Discuss resistance breeding and its importance
- CO2 Details about general principles and methods of breeding for resistance
- CO3 Write about the problems in breeding for biotic stresses
- CO4 Discuss vertical and horizontal resistance breeding
- CO5 What are various innovative techniques in breeding for biotic stresses
- CO6 Discuss the breeding for abiotic stress
- CO7 Write about achievements in breeding for biotic and abiotic stress

Credits: 1 Theory period of two hour per week over a semester
 0 Tutorial period of one hour per week over a semester
 2 Practical period of four hour per week over a semester

Course code: BT-403 Course Title: Recombinant DNA Technology

- CO1 Discuss genetic engineering-principles and methods
- CO2 Write about DNA cloning strategies
- CO3 Discuss separation and isolation of nucleic acids and proteins, and sequencing
- CO4 Details about enzymes of molecular cloning
- CO5 Discuss various methods for preparation and screening of genomic and cDNA libraries
- CO6 What are different structural and regulatory genes

Credits: 1 Theory period of two hour per week over a semester
 0 Tutorial period of one hour per week over a semester
 3 Practical period of six hour per week over a semester

Course code: BT-404 Course Title: Plant tissue culture

- CO1 Discuss plant tissue culture principles and application
- CO2 Details about various methods of preparation of media and production of artificial seeds
- CO3 Discuss planting out and related problems
- CO4 Describe about commercial micropropagation
- CO5 Discuss the advantages and disadvantages of micropropagation and production of virus free plant
- CO6 Write about somaclonal variation, protoplast culture, somatic hybridisation, haploid culture
- CO7 Discuss gene transfer techniques and its importance

Credits: 1 Theory period of two hour per week over a semester
 0 Tutorial period of one hour per week over a semester

3 Practical period of four hour per week over a semester

Course code: BT-405 Course Title: Bio informatics

CO1 Discuss various bioinformatics tools and databases

CO2 Write about the applications of bioinformatics

CO3 Details about molecular mechanics and dynamics, and molecular simulation

CO4 Discuss the various bioinformatics methods for the prediction of molecular structure

CO5 Details about structure prediction methods of proteins and nucleic acid

CO6 Describe about application of bioinformatics and Database management

CO7 Details about computer aided drug design

Credits: 1 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

3 Practical period of six hour per week over a semester

Course code: BT-406 Course Title: Molecular Diagnostics

CO1 Discuss various types of molecular techniques for detection and characterization of plant pathogens

CO2 Write about hybridization methods and autoradiography

CO3 Describe about immunodiagnosics methods

CO4 Discuss about various techniques used for immunodiagnosics

CO5 Write about SNP analysis for known SNPs

Credits: 1 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

3 Practical period of six hour per week over a semester

Courses offered in Semester VIII

Course Code: Agron-401, Course Title: Seed Production Technology

CO1 Describe about seed quality and characteristics

CO2 Describe about types and methods to break seed dormancy

CO3 various genetic and agronomic principles of seed production

CO4 Post harvest management of seeds

CO5 Sustainable storage of seeds and their quality analysis

CO6 how to write project proposal to get fund from various funding agencies

Credits: 1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

2 Practical period of four hour per week over a semester

Course Code: Agron-402, Course Title: : Remote Sensing GIS and Land use planning

CO1 Design and management of RDBMS

C02 Introduction to GIS and GPS technology

C03 Electromagnetic radiation and its features

C04 Introduction to aerial photography and satellite remote sensing and their interpretation

C05 Remote sensing data interpretation and their application in agricultural field

C06 Understanding of Digital cartography and DEM

C07 Study about different GIS software and its applications

Credits 1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

2 Practical period of four hour per week over a semester

Course Code: Agron-403, Course Title:

CO1 Importance and scope of commercial fruit production

C02 Importance of commercial varieties

C03 Propagation and production of elite planting materials

C04 Crop management practices

C05 Study about various techniques of harvesting, grading, packing, storage and ripening

C06 By - product development of various crops

C07 Introduction to crops gaining importance in the state

Credits 1 Theory period of one hour per week over a semester

0 Tutorial period of one hour per week over a semester

3 Practical period of nine hour per week over a semester

Course code: Hort-404 Course Title: Nursery management of horticultural crops

- CO1 Plant propagation methods and importance
- CO2 Vegetative propagation methods and its importance
- CO3 Establishment, maintenance and utilization of progeny orchards.
- CO4 Study about various factor for rapid production of uniform and good quality planting materials.
- CO5 Study about Tissue culture techniques, its advantage and disadvantage
- CO6 Importance of elite planting materials and their management
- CO7 Application of mist in the propagation of nursery plant and various methods of packing, storage and

Credits: 2 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Hort-405 Course Title: Protected cultivation of horticultural crops

- CO1 Introduction, scope and importance protected culture in India.
- CO2 Establishment and operation of greenhouses and their maintenance.
- CO3 Advantages of growing plants in a greenhouse, functioning and maintenance.
- CO4 Study about environmental control systems in greenhouse for providing proper condition
- CO5 Crop regulation, special horticultural practices, harvesting methods
- CO6 Postharvest handling, standards, grading, packing and marketing

Credits: 2 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: Hort-406 Course Title: Seed production of vegetables and flowers

- CO1 Scope and importance of seed production in vegetable and flower crops
- CO2 Study about type of seeds and their management
- CO3 Seed production techniques in vegetables and flowers
- CO4 Hybrid seed production, importance and scope in vegetables and flowers,
- CO5 Economics of seed production and postharvest seed management techniques in vegetable and ornamental
- CO6 Growth regulators and physical agents for increased seed germination and seed viability
- CO7 Seed legislation and seed law enforcement

Credits: 2 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

1 Practical period of two hour per week over a semester

Course code: ABM-401 Course Title: Information and Communication Management

- CO1 Know about Fundamentals of information and communication

CO2A Managerial overview of information and communication
CO3Types, Processing, Analysis and retrieval of information
CO4Describe about different parts of Computer and Data base management system,
CO5Brief about GIS, Remote sensing and information system etc
CO6About Multimedia and their application and satellite communication
CO7Details on teleconference, video conference and its applications and Bioinformatic and its application

Credits: 1 Theory period of two hour per week over a semester
0 Tutorial period of one hour per week over a semester
2 Practical period of four hour per week over a semester

Course code: ABM-402 Course Title: Management of Agro-based industry

CO1Importance about entrepreneurship and its process
CO2Concept, scope, nature and status of Agribusiness and its advantages and disadvantages
CO3Know details about special economic zone, business plan, layout and its cost etc
CO4Details on licensing, govt. Policies, patent, laws and analysis of different Agribusinesses
CO5Management aspect of small business, marketing, bee keeping etc
CO6Management aspect related to finance, production, people and business etc
CO7Details on Private/ Public ventures in agro based industries.

Credits: 1 Theory period of two hour per week over a semester
0 Tutorial period of one hour per week over a semester
3 Practical period of six hour per week over a semester

Course code: ABM-403 Course Title: Marketing Management (Agricultural Import-Export Policy of Govt. of India)

CO1Concept and scope of marketing management.
CO2Details on market
CO3Know details about policies, opportunities, market planning and new product development process
CO4Describe about International trade, Free trade vs protection, methods of protection, quotas, tariffs-
CO5About Foreign exchange rates and policies, exchange control, devaluation, terms of trade Balance of
CO6Details on Exports, Direct exports, indirect exports, Imports, Dumping, anti-dumping measures, licensing, Joint ventures, direct investment and internationalization process, GATT, WTO.
CO7Know about World trade agreements related with agri exports and imports, business laws. policies and

Credits: 1 Theory period of two hour per week over a semester
0 Tutorial period of one hour per week over a semester
2 Practical period of four hour per week over a semester

Course code: ABM-404 Course Title: Financial Management of Agri-business

- CO1 Concept and importance of Financial Management
- CO2 Accounting and its types and Preparation of accounting records.
- CO3 Know details on balance sheet, profit loss account etc
- CO4 Describe about financial analysis and its type, nature and use and Capital budgeting and capital rationing.
- CO5 About investment and decision on investment
- CO6 Details on Project report
- CO7 Know about Depreciation

Credits: 3 Theory period of two hour per week over a semester
 0 Tutorial period of one hour per week over a semester
 2 Practical period of four hour per week over a semester

Course code: ABM-405 Course Title: Natural Resources Economics and Management

- CO1 Concept and importance and classification of Natural resources:
- CO2 Details on Natural resources and associated problems and its management
- CO3 Know about Economics of resource and its management
- CO4 Optimal extraction of non-renewable resources and its problems and solutions
- CO5 About process, conservation, recycling, different methods of natural resources and its relationship with
- CO6 Valuation of natural resources, market and non-market techniques.
- CO7 Global policies in natural resource management relating to poverty, development and environment,

Credits: 3 Theory period of two hour per week over a semester
 0 Tutorial period of one hour per week over a semester
 2 Practical period of four hour per week over a semester

Course code: ABM-406 Course Title: Project formulation, Evaluation and Monitoring

- CO1 Importance of Project concept
- CO2 Details on Phases of project cycle
- CO3 Know about Project identification. Need, concept, significance and approaches.
- CO4 Need, concept, significance and technical, commercial, managerial, organizational, financial, economic
- CO5 Details on bankable project
- CO6 Description of Project evaluation
- CO7 Risk in agricultural projects, methods of handling risk projects

Credits: 3 Theory period of two hour per week over a semester

0 Tutorial period of one hour per week over a semester

2 Practical period of four hour per week over a semester

Course Outcomes of Department of Biotechnology

SEMESTER I

Subject Code: BT-501

Course Title: Cell and Molecular Biology

Evolution of cell and biological macromolecules, general features of

CO 1. Give introduction to prokaryotic and eukaryotic cells

CO 2. Describe structure and function of plasma membrane, molecular organization of cytoskeleton and functions

CO 3. Explain Chromosome organization, chromatin structure, complexity of eukaryotic chromosome, cot curve.

CO 4. Explain cell division and cell cycle

CO 5. Describe DNA replication in prokaryote and eukaryotes.

CO 6. Describe transcription process in prokaryote and eukaryotes

CO 7. Give a detailed account of translation process of prokaryote and eukaryotes.

Subject Code: BT-502

Course Title: General Microbiology

CO 1. Write down history and scope of microbiology

CO 2. Explain characterization, classification and identification of microorganisms, microscopic examination of

CO 3. Describe fine structure and morphology of bacteria, reproduction and cultivation, mixed and pure culture.

CO 4. Explain Microbial physiology and bacterial genetics.

CO 5. Describe viruses, bacteriophages and control of microorganisms (physical and chemical agents)

CO 6. Explain biological fixation of nitrogen.

CO 7. Explain the different, resistance and defense mechanisms in host pathogen interactions.

Subject Code: BT-503

Course Title: General Biochemistry

CO 1. Give fundamental principles that governs life.

CO 2. Explain structure and function of biomolecules.

CO 3. Explain enzyme classification and enzyme kinetics in detail.

CO 4. Give a detailed account for photosynthesis and photorespiration.

CO 5. Explain glucose metabolism in plants.

CO 6. Describe Lipid metabolism.

CO 7. Write down the nutritional aspects of carbohydrates, lipids, proteins and minerals, hormones.

Subject Code: BT-504

Course Title: General Genetics

CO 1. Give chromosome structure and organization, gene structure in detail.

CO 2. Explain concepts of inheritance, Mendelian principles of genetics, applications of Mendelian principles.

CO 3. What are chromosomal basis of inheritance and linkage?

CO 4. Describe replication of genetic material and central dogma.

CO 5. What are numerical and structural chromosomal changes?

CO 6. What do you understand by population and evolutionary genetics.

CO 7. Explain different types of genetic disorders and genetic counseling.

Subject Code: BT-505

Course Title: Computational Biology & Biostatistics

CO 1. Explain the concepts of variables in biological systems, collection, classification, tabulation, graphical and

CO 2. Explain the measure of central tendency, measure of dispersion, correlation and regression.

CO 3. Explain test of significance based on Z, χ^2 , t and F statistics, correlation.

CO 4. Describe Laboratory Information management systems (LIMS).

CO 5. Describe different protein data bases and their functions.

CO 6. Give details regarding sequence analysis using bioinformatics tools.

CO 7. Explain gene finding algorithms and models.

CO 8. Describe Protein-Protein interactions and microarrays chips and data analysis.

Subject Code: BT-506

Course Title: Techniques in Biotechnology-I

CO 1. Perform experiments for the detection of carbohydrates, amino acids, and proteins.

CO 2. Perform SDS-PAGE for protein separation

CO 3. Perform the isolation of bacteria from different sources (soil, water and air)

CO 4. Identify the isolated bacterial colonies using microscopic and staining techniques, plotting growth curve

CO 5. Prepare slides and observe different stages for Mitosis and meiosis.

CO 6. Explain the inheritance and linkage analysis

CO 7. Solve the given numerical of ANOVA and chi square test.

SEMESTER II

Subject Code: BT-507

Course Title: Plant and Animal Biotechnology

CO 1. Write down about historical perspectives of plant biotechnology.

CO 2. Explain various methods of in vitro propagation in plants.

CO 3. Describe Protoplast isolation, culture and applications of somatic hybridization.

CO 4. Describe the significance of plant cell suspension culture in production of secondary metabolites.

CO 5. Describe various methods of gene transfer.

CO 6. Give a detailed account of various molecular markers used in crop improvement.

CO 7. Give different types of culture media and cell cultures.

CO 8. Explain in vitro fertilization and embryo transfer technique in detail.

Course No. BT 508

Course Title: Pharmaceutical Biotechnology

CO 1. Write down about the pharmaceutical industry and development of drugs, economics and regulatory

CO 2. Explain the production of pharmaceuticals by genetically engineered cells (hormones, interferons), microbial transformation for production of important pharmaceuticals.

CO 3. Give mechanism of drug absorption, distribution, metabolism and excretion- and factors affecting the

CO 4. Explain the use of biosensors for rapid clinical analysis, diagnostic kit development for microanalysis.

CO 5. Explain advanced drug delivery systems- controlled release, transdermals, liposomes and drug targeting.

CO 6. What are the principles of pharmacology, pharmacodynamics, nanobiotechnology?

Subject Code: BT-509

Course Title: Instrumental methods of Analysis

CO 1. Explain different types of microscopy.

CO 2. Describe different aspects of radioisotopy and its applications.

CO 3. Explain different types of chromatography and its applications.

CO 4. What is electrophoresis and explain the principle and functioning of 2D PAGE.

CO 5. Explain different methods of DNA sequencing.

CO 6. What is Spectroscopy and explain different types of spectroscopy.

Subject Code: BT-510

Course Title: Immunology

CO 1. Describe different types of immunity and cells associated with immune system.

CO 2. Explain different aspects of antibody, structure and functions.

CO 3. Write down the role of different MHC in immune system and

CO 4. Describe different types of Hypersensitivity reactions and regulation of IgE, mast cells, basophils and allergy.

CO 5. Describe the complement system- and its different pathways.

CO 6. Describe hybridoma technology and production of monoclonal antibody production.

CO 7. Describe different immunological techniques to study antigen antibody reactions.

CO 8. Explain different autoimmune disorders.

Subject Code: BT-511

Course Title: Bioprocess Engineering and Technology

CO 1. Describe isolation, preservation and maintenance of industrial microorganisms and their kinetics.

CO 2. Write down about analysis of batch, fed-batch and continuous bioreactions, stability of microbial reactors,

CO 3. Describe neural networks, mathematical modeling, role of computers in bioprocess control and

CO 4. What is whole cell immobilization and their industrial applications.

CO 5. Give detailed account of industrial production of ethanol, citric and acetic, glycerol, butanol and penicillin.

CO 6. amino acids (lysine, glutamic acid), vitamins and single cell proteins- algal, fungal and yeast biomass.

CO 7. Describe the applications of microorganisms in mineral and oil recovery

Subject Code: BT-512

Course Title: Techniques in Biotechnology-II

CO 1. Perform the isolation of genomic and plasmid DNA

CO 2. Perform quantification of DNA through agarose gel electrophoresis techniques and spectrophotometer

CO 3. Perform PCR and molecular marker analysis

CO 4. Perform Restriction enzyme digestion

CO 5. Selection of recombinants using blue/white colony selection.

CO 6. Perform cell and explant culture, subculturing and regeneration, Embryo rescue, Anther culture

Genetic transformation through particle bombardment, GUS assay.

CO 7. Perform Immunoelectrophoresis; Enzyme immunoassays including ELISA.

CO 8. Isolate industrially important microorganisms for microbial processes.

CO 9. estimate production and estimation of alkaline protease.

SEMESTER III

Subject Code: BT-513

Course Title: Genetic Engineering

CO 1. Define artificial chromosomes. Draw a well labeled diagram of YAC and explain its functioning.

CO 2. Explain the extraction of RNA from plants using a flow chart.

CO 3. What is protein-protein interaction? Explain its different methods.

CO 4. Explain heterologous expression in E.coli and Yeast.

CO 5. Distinguish between genomic DNA and cDNA library.

CO 6. Explain different methods of next generation sequencing with the help of suitable diagrams.

CO 7. Give an introduction to various components and steps of PCR.

CO 8. How would you check success of a PCR reaction and in case of undesired results what kind of changes in reaction and process conditions should be tried for further reactions?

CO 9. Give various examples of genetic manipulation in animals and plants. Explain the risk and safety aspects

Subject Code: BT-514

Course Title: Enzymes and Enzyme Technology

CO 1. Explain nomenclature and classification of enzymes

CO 2. Describe various aspects of enzymology.

CO 3. Describe enzyme extraction, purification, assay and analysis of enzymes

CO4. Describe enzyme kinetics in detail.

CO 5. Explain mechanism of enzyme catalysis.

CO 6. What is cooperativity and its role in enzymology.

CO 7. Give a detailed account regarding clinical aspects of enzymes.

Subject Code: BT-515

Course Title: Biosafety, Bioethics & IPR

CO1. Explain the role of biosafety in human health and environment.

CO 2. Describe biosafety and risk assessment issues, biosafety guidelines and regulatory framework,

CO 3. What are National biosafety policies and law, The Cartagena Protocol on biosafety, WTO and other international agreements related to biosafety, risk management issues- containment.

CO 4. What are general principles for the laboratory and environmental biosafety.

CO 5. Explain regulatory affairs for drugs and biologicals.

CO 6. What are the different effects of GMOs on biodiversity and human health.

CO 7. What are the different aspects of IPR.

Subject Code: BT-516

Course Title: Techniques in Biotechnology-III

CO 1. Perform isolation of plasmid DNA.

CO 2. Perform restriction digestion of plasmid DNA and electrophoresis.

CO 3. Perform ethidium bromide staining and gel documentation.

CO 4. Perform cloning DNA in a pBlueScript vector.

CO 5. Perform Polymerase chain reaction and resolution of amplicons Sequencing methods.

CO 6. Study the effect of pH and temperature on enzyme activity and stability Enzyme kinetics analysis.

Optional Subject Code: BT-518

Course Title: Food Biotechnology

CO 1. explain the microbial spoilage of different food types and agents responsible for the spoilage.milk, meat,

CO 2. Describe different fermented and microbial foods in detail.

CO 3. Describe various techniques for microbiological examination of foods.

CO 4.. What are different food preservation techniques.

CO 5. What are the different measures taken for quality control of food products.

CO 6. Describe different myths and facts associated with food biotechnology,

CO 7. Explain about recombinant DNA technology derived food benefits and safety guidelines.

Optional Subject Code: BT-519

Course Title: Plant Molecular Breeding

CO 1. Write down the methods of breeding in P self and cross- pollinated crops.

CO 2. Give a detailed account for sequence based markers.

CO 3. What are the advanced methods of genotyping?

CO 4. What is QTL mapping? Describe AB-QTL analysis and fine mapping of gene/QTL.
CO 5. Describe the complete mechanism and principle associated with TILLING and Eco-TILLING
CO 6. What are the different aspects of marker assisted selection.

Optional Subject Code: BT-523

Course Title: Environmental Biotechnology

CO 1. Explain the different types of pollutions and their impact on environment.
CO 2. Describe waste water management and different treatment system associated with it.
CO 3. Describe solid waste management and different treatment schemes associated with it.
CO 4. Explain various bioremediation and phytoremediation strategies for biodiversity and its conservation.
CO 5. What are different renewable and non-renewable resources of energy.
CO 6. What is environmental protection act and different environmental laws and policies.

Optional Subject Code: BT-524

Course Title: Microbial Biotechnology

CO 1. Explain isolation and preservation of industrially important microorganisms.
CO 2. Describe different aspects of genomics and transcriptomics of microorganisms.
CO 3. Explain metagenomics and systems biology study in microorganisms.
CO 4. Describe production of proteins and enzymes in different microorganisms.
CO 5. Explain the role of microorganisms as biocontrol agent.
CO 6. Describe biological nitrogen fixation.
CO 7. What are applications of microbes in environmental biotechnology.

Subject Code: BT-600

Dissertation

CO1 Writing synopsis and objectives for proposed research work.
CO2 Study of Literature, generation of data.
CO3 Presenting the data and outcomes at different platforms.
CO4 Writing thesis/report.
CO5 Writing research articles and conference presentations. '

Subject Code: BT-701

Dissertation

CO1 Writing synopsis and objectives for proposed research work.
CO2 Comprehensive examination and Viva Voce
CO3 Study of Literature, generation of data.
CO4 Presenting the data and outcomes at different platforms.
CO5 Writing thesis/report.
CO6 Writing research articles and conference presentations. '

Program Outcomes (M.Sc. and Ph.D. Biotechnology):

P01: Trained Manpower: The post graduate in biotechnology is trained in array of biotechnological tools and techniques including molecular biology and genetic engineering for their intended applications.
P02: Plant tissue culture based germplasm conservation: The micropropagation techniques can be used for germplasm conservation, rapid multiplication of plants, production of secondary metabolites, making synthetic
P03: Quality control: Knowledge of microbiological criterias through food biotechnology and microbiological techniques along with biosafety principles are useful in development of skills for quality control in
P04: Research aptitude: The specific training through intensive research work for six months during masters' dissertation (and 3 years for doctoral dissertation) and a continuous research exposure in state of art research laboratories is boon for understanding key research activities and developing a positive attitude towards

P05: Designing experiments and troubleshooting: The research training based on specific objectives includes designing and performing experiments leading to data generation. The problems encountered during

P06: Team work: Ability to work in matrix environment (both PG and Ph.D. Students) not only increases the knowledge but also leads to the development of team spirit among researchers.

P07: Knowledge and use of advanced techniques: With major emphasis on tools and techniques this course provides an in depth understanding about their principles and application. Further, the hands on training on these

P08: Data analysis and Literature survey: As an integral part of curricula the literature survey for proposed research work and given assignments followed by analysis of generated research data provides a good and useful

Program specific outcomes:

PSO1 Understanding the molecular biology concepts and their application in various biotechnological

PSO2 Knowledge of bio-molecules and their utility in biological systems.

PSO3 In depth knowledge of genetics and molecular breeding for its application in crop improvement and other

PSO4 To understand and apply genetic engineering tools and techniques for sustainable development.

PSO5 To gain the knowledge regarding biosafety guidelines, ethical issues and intellectual property in

PSO6 To develop skill for analyzing the data and sequence outcomes of the biotechnological research using

PSO7 Utilization of microbes for beneficial applications.

PSO8 understanding about enzymes, their characteristics features and applications in biotechnology.

Attainment of PO, PSO and CO:

The methods for measurement of the PO, PSO and CO are as follows:

1. Conducting and evaluating first and second sessional examinations
2. Giving assignments based on specific COs or POs followed by presentation and evaluation.
3. Designing a research problem and writing a synopsis for proposed work for approval by research committee.
4. Presentations through class seminars and credit seminar.
5. Internal assessment based on daily performance in practical classes
6. Pre- thesis seminar for presenting the research outcome during dissertation.
7. Writing a thesis and its external evaluation by expert in the subject (for PG and Ph.D. Students).
8. For Doctoral students comprehensive examination followed by Viva-Voce by an external examiner is

PROGRAM OUTCOME OF DEPARTMENT OF FOOD TECHNOLOGY

M. Sc. Food Technology

PO1: Causes of spoilage of food: Students get acquainted with various causes of spoilage of food through courses

PO2: Food processing technologies: Technologies for processing of different kind of food are incorporated in program such as Technology of Fruits and Vegetables, Technology of cereals, pulses and oilseeds, Bakery and confectionery technology, Meat, Fish and Poultry Technology, Food Processing and Advances in Food Processing,

PO3 Food engineering: Courses such as Principles of Food Engineering, Unit Operations in Food Engineering etc.

PO4 Food and nutrition: Courses such as Nutraceutical and health foods, Food Additives and Ingredients, Food and Nutritional Biochemistry etc. enhances the knowledge of students about Food and nutrition.

PO5 Food analysis and quality control: Courses such as Food Quality System and Management, Food Analysis, Food Biotechnology and Experimental Food Technology etc. enhances the knowledge of students about quality

PO6 Trainings, research and dissertation: Industrial-Training, Research Methodology, Dissertation etc. provides exposure to students regarding industries, research activities and thesis writing experiences.

B. Tech. food Technology

PO 1: Engineering Practices: Students are provided exposure to various engineering techniques through courses such as Engineering Drawing and Graphics, Principles of General Engineering, Workshop Practice, Biochemical

PO 2: Food analysis and quality control: Students get acquainted with various techniques of food analysis and quality control through various courses such as Techniques in Food Analysis, Food Quality, Food Laws and

PO 3: Food processing and Post harvest management practices: Students are provided exposure to Post harvest management practices through courses such as Principles of Food Processing, Post Harvest Management of Fruits and Vegetables, Cereal Processing, Fruit and Vegetable Processing, Legumes and Oil Seeds Processing Technology,

Processing of Meat, Poultry and Fish Products, Bakery and Confectionary Products, Processing of Spices and

PO 4: Microbiology and fermentation: Students are provided exposure to Microbiology and fermentation through courses such as Fundamentals of Microbiology, Food Microbiology, Fermentation and Industrial Microbiology,

PO 5: Food plant design, layout and Product development: Students get acquainted with Food plant design, layout and Product development through courses such as Food Plant Design and Layout, Product Development and Formulation, Food Production Trends and Programs provide exposure about Food plant design, layout and

PO 6: Food chemistry and nutrition: courses such as Human Nutrition, Food Chemistry Food Additives, Biochemistry etc. provides knowledge about nutrition and chemistry of nutritional components.

PO 7: Instrumentation and process control: courses such as Food Processing Equipment, Instrumentation & Processing Control, Refrigeration Engineering and Cold Chain, Heat and Mass transfer Fluid Mechanics and

PO 8: By- products and waste utilization and environmental science: Food Industry By-products & Waste Utilization, Environmental Science and Disaster Management provide knowledge about by- products and waste

PO 9: Industrial Trainings, research and dissertation: In plant training, Training Report Evaluation, Research project etc. provides exposure to students regarding industries, research activities and thesis writing experiences

PO 10: Business plan and entrepreneurship development and communication skills: courses such as Business Management & International Trade, Entrepreneurship and Communication Development, Preparation of Business Plan, Organization of production, Production and Sales Documentation and reports, Principles of Economics,

PO 11: Ethics Human Values and Professional Ethics in Higher Education, NSS / NCC / Physical education etc.

COURSE OUTCOME OF B. TECH. FOOD TECHNOLOGY

Course code: BIOCHEM-101 Course Title: Biochemistry

Outcomes

Co 1 Scope and importance of biochemistry in agriculture

Co 2 Structure, properties and functions of amino acids, proteins; peptide bond, bio membrane.

Co 3 Lipids, classification, structure and functions, general methodology to study lipids

Co 4 Classification, structure and functions of carbohydrates and nucleic acids.

Co 5 Identify DNA and its structure, function, types

Co 6 General introduction to carbohydrates, lipids, proteins and nucleic acids metabolism

Co 7 Structure and biological functions of vitamins; secondary metabolites, DNA replication, transcription and

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: MIC-101 Course Title: "Fundamentals of Microbiology"

Outcomes

Co 1 Evolution and scope of Microbiology

Co 2 Nutrient transport phenomenon, physiology of microorganisms.

Co 3 Physical and chemical factors influencing growth and destruction of microorganisms

Co 4 Structure and replication with particular reference to food borne viruses.

Co 5 Control of Microorganisms by physical and chemical agents.

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-101 Course Title: Principles of Food Processing

Outcomes

Co 1 Sources of food, Scope and benefit of industrial food preservation.

Co 2 Thermal processing methods of food preservation, Principle and equipments: Canning, blanching,

Co 3 Food preservation by drying dehydration and concentration.

Co 4 Need and Principle of concentration, methods of concentration.

Co 5 Methods of Irradiation, Direct & Indirect effect.

Co 6 Presentation of foods by chemicals, antioxidants, moulds inhibitors.

Co 7 Recent methods in preservation: Pulsed electric field processing, high pressure processing.

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-102 Course Title: Human Nutrition

Outcomes

Co 1 Concepts and content of nutrition: Nutrition agencies, Nutrition of community.

Co 2 Water and energy balance; Water intake and losses, Basal metabolism.

Co 3 Formulation of diets; Classification of balanced diet; Preparation of balanced diet for various groups.

Co 4 Malnutrition; Type of Malnutrition, Multi-factorial causes.

Co 5 Assessment of nutritional status; Diet surveys, Anthropometry, Clinical examination.

Co 6 Food fad and faddism. Potentially toxic substance in human food.

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-103 Course Title: Food Chemistry-I

Outcomes

Co 1 Nature, scope and development of food chemistry:

Co 2 Carbohydrates: Functional characteristics of different carbohydrates

Co 3 Proteins in foods: Functional characteristics of proteins and amino acids

Co 4 Proteins in foods: Functional characteristics of proteins and amino acids

Co 5 Lipids in foods: Role and use of lipids /fat, Physicochemical aspects of fatty acids in natural foods

Co 6 Technology of fat and oil processing

Co 7 Enzymes in food industry: Carbohydrates, Proteases, Lipases

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: EE-101 Course Title: Engineering Drawing and Graphics

Outcomes

Co 1 Drawing of lines, lettering and dimensioning

Co 2 Drawing of scales i.e. plain scale, diagonal scale, comparative scale and Vernier scale.

Co 3 Drawing of projections, orthographic projections, methods of projections

Co 4 Drawing of screw threads. Types of threads and terminologies used in it

Co 5 Screw fastening. Locking arrangements for nuts and foundation bolt

Co 6 Drawing of rivets and riveted joints, types of riveted joints, failure of riveted joints

Co 7 Drawing of welded joints; Forms of welds, location and dimensions of welds

Credits 01 Practical period of two hour per week over a semester

Course code: EE-102 Course Title: Workshop Practices

Outcomes

Co 1 Simple exercises on wood working tools and their use

Co 2 Heat treatment processes: hardening, tempering, annealing, normalizing

Co 3 Bench: Flat surface filing, Chipping, Scraping Marking out, Drilling and Screwing.

Co 4 Simple exercise on (a) Lathe (b) Milling machine (c) Shaper and planer

Co 5 Simple exercises in Filing and Fitting, Chipping and Hack sawing Chiseling

Co 6 Simple exercises in Arc, Gas, & Argon welding. Simple exercises in Soldering

Credits 02 Practical period of two hour per week over a semester

Course code: EE-103 Course Title: Principles of General Engineering

Outcomes

Co 1 Alternating current fundamentals: Electromagnetic induction magnitude of induced E.M.F.

Co 2 Transformers: Fundamental of transformer, Theory, vector diagram with and without load

Co 3 Induction motors : Fundamental principles, Production of rotating fields, construction

Co 4 D.C. Machines & AC machines: Construction and operation of D.C. & A. C. motors

Co 5 Electric Power Economics: Electrification and load estimation Maximum demand charge

Co 6 Strength of Material: engineering materials, material science.

Credits 01 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: Edu-101 Course Title: Human Values and Professional Ethics in Higher Education

Outcomes

Co 1 Understanding the need, basic guidelines, content and process of value education

Co 2 Understanding the human being as co-existence of Self

Co 3 Basis for universal human values and ethical human conduct

Co 4 Professional ethics, issues in professional ethics, inherent contradictions and dilemmas and their resolutions

Co 5 The holistic criteria for evaluation, case studies of typical holistic technologies

Credits 01 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: Bot-101 Course Title: Basic Botany

Outcomes

Co 1 Classification and introduction to different groups of the plant kingdom

Co 2 Morphology: Structure of seeds of gram, castor, maize, and their germination
Co 3 Roots: External characters and functions, types of root systems and their bearing on agriculture practices.
Co 4 Stem: External characters and functions, buds and their different kinds
Co 5 Leaf: Parts of a typical leaf and their functions;
Co 6 Elementary knowledge of simple and special types of inflorescences
Co 7 Types of pollinations, agencies responsible (anemophily and entomophily) for pollination
Co 8 Vegetative, and sexual reproduction their merits and demerits
Credits: 01 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: Math-101 Course Title: Basic Mathematics-I

Outcomes

Co 1 Mensuration of rectangles, easy examples of garden paths
Co 2 Volumes of cubes and rectangular solids. Cubic contents of tanks and cisterns
Co 3 Solution of quadratic equations and of those reducible to quadratic equation
Co 4 Algebra: Series: nth terms sum to n terms of an A. P. and G. P. nth term of an H. P.
Co 5 The point-distance and section formulae area of a triangle.
Co 6 The equation of a circle when (i) centre and radius given.
Credits: 02 Theory period of one hour per week over a semester

Course code: ECON-101 Course Title: Principles of Economics

Outcomes

Co 1 Basic terms and concepts of Economics, Meaning and nature of Micro and Macro Economics
Co 2 Nature and Scope of Agricultural Economics, its role and importance
Co 3 Labour: division of labour, problems of unemployment under employment
Co 4 Demand: law of demand, types of supply, law of supply, factors influencing supply, elasticity of supply
Co 5 International trade in Agriculture; exim policy, role of W.T.O., Financial institutions and their role.

Credits: 02 Theory period of one hour per week over a semester

Course code: CS-101 Course Title: Introduction to Computer Application

Outcomes

Co 1 Introduction to computers, anatomy of computers, input and output devices
Co 2 Operating system, DOS and WINDOWS. Disk operating system
Co 3 WINDOWS: GUI, desktop and its elements, WINDOWS explorer
Co 4 Applications, MSWORD: word, processing and units of document, features of word-processing packages
Co 5 Use of in-built statistical and other functions and writing expressions
Co 6 MSACCESS: Concept of database, units of database, creating database.
Co 7 Principles of programming: Flow charts and algorithms, illustration through examples
Credits: 01 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: EE-104 Course Title: Fluid Mechanics and Hydraulics

Outcomes

Co 1 Units & dimensions, Properties of fluids. Static pressure of liquids
Co 2 Compressible and non compressible fluids. Surface tension, capillarity
Co 3 Fluid flow: Classification, steady, uniform and non-uniform, laminar and turbulent, continuity equation

Co 4 Flow through orifices, mouthpieces, notches and weirs.

Co 5 External and internal mouthpieces, types of notches, rectangular Venturimeters,

Co 6 Weber number and hydraulic similitude

Credits 01 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-104 Course Title: Post Harvest Management of Fruits and Vegetables

Outcomes

Co 1 Post harvest technology of fruits and vegetables

Co 2 Morphology, structure and composition of fruits and vegetables

Co 3 Maturity standards; Importance, methods of maturity determinations

Co 4 Fruit ripening: chemical changes, regulations, methods.

Co 5 Commodity pretreatments - chemicals, wax coating

Co 6 Handling and packaging of fruits and vegetables

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-105 Course Title: Food Microbiology

Outcomes

Co 1 Microbial spoilage of foods.

Co 2 Control of microorganisms by use of low and high temperature

Co 3 Microbiology of fruits and vegetables.

Co 4 Microbiology of meat and meat product.

Co 5 Microbiology of poultry and eggs: Sources of contamination, spoilage and prevention.

Co 6 Microbiology of salts and spices: Sources of contamination, spoilage and prevention.

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-106 Course Title: Cereal Processing

Outcomes

Co 1 Present status and future prospects of cereals.

Co 2 Drying of paddy: general principles and methods of drying, cracking phenomenon - prevention.

Co 3 Parboiling of rice. Aging of rice. Enrichment: Need of Enrichment

Co 4 Wheat: Morphology, Physico-chemical properties, Wheat Quality, Wheat Milling

Co 5 Corn: Morphology, Physico-chemical properties, Corn milling

Co 6 Barley: Morphology, Physico-chemical properties and processing (Malting) Sorghum

Co 7 Millets - Oat / Rye: Importance of Millet, composition, processing of millets for food uses.

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-107 Course Title: Food Chemistry- II

Outcomes

Co 1 Chemistry of food flavour; Philosophy and definitions of flavour

Co 2 Food additives and Technology: General attributes, Buffer systems

Co 3 Pigments in animal and plants kingdoms; Heme pigments, Chlorophyll and Carotenoids.

Co 4 Food colorants; Regulatory aspects, Properties of certified dyes
Co 5 Vitamins and minerals: Requirements, Allowances, Enrichment, Restorations, Fortifications
Co 6 Food toxicology: Inherent toxicants, Terms in toxicology, Safety evaluation
Co 7 Modification of food using enzymes; Role of endogenous enzymes in food quality
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-108 Course Title: Food Processing Equipment-I

Outcomes

Co 1 Material handling: Material handling machines and conveyors
Co 2 Extrusion: Extrusion cookers, cold extrusion, single and twin screw extrusion
Co 3 Hygienic design of Food processing equipment. Sanitary requirement
Co 4 Evaporation: Principles of evaporation, types and selection evaporators
Co 5 Drying: Principles of drying, drying rate kinetics, Classification, mass
Co 6 Introduction of biochemical Engineering: Kinetics, product yield
Co 7 Concept of thermo bacteriology: Arrhenius analogy, its application in design.
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: Zoo-101 Course Title: Basic Zoology

Outcomes

Co 1 Introduction to Zoology, characteristics of living organisms
Co 2 Zoological nomenclature and principles of classification; Non-Chordate:
Co 3 Chordates: General study including systematic position upto class, distribution ecology
Co 4 Physiology of respiration, composition of blood and its functions
Credits 02 Theory period of one hour per week over a semester

Course code: Math-102 Course Title: Basic Mathematics-II

Outcomes

Co 1 Trigonometry: Sexagesimal, centesimal and circular measure of an angle
Co 2 Idea of function and limit, evaluation of the limit algebraic, functions,
Co 3 Differentiation of simple algebraic trigonometric, inverse trigonometric, exponential functions
Co 4 Theorems on differentiation of the sum, difference, the product and the quotient of functions
Co 5 Integration of the standard forms as inverse of differentiation
Co 6 Elements of matrices and determinants
Credits 02 Theory period of one hour per week over a semester

Course code: FT-201 Course Title: Fruit and Vegetable Processing

Outcomes

Co 1 Production and processing scenario of fruits and vegetable
Co 2 Commercial processing technology of following fruits and vegetables.
Co 3 Commercial processing technology for

Co 4 Commercial processing technology for Citrus Fruits (Jelly, Marmalade RTS Squash, candy)
Co 5 Commercial processing technology for Tomato (Ketchup, sauce, puree, soup, chutney, pickle)
Co 6 Commercial processing technology for Cauliflower and cabbage
Credits: 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-202 Course Title: Legumes and Oil Seeds Processing Technology

Outcomes

Co 1 Present status and future prospectus of Legumes and Oil seeds
Co 2 Processing of legumes for Food uses, Cottage Scale and commercial methods of dehulling
Co 3 Soaking, Sprouting, Puffing, Roasting & Parboiling of Legumes
Co 4 Introduction to chemical composition and characters of oil seed and oils
Co 5 Expellers: Principle of Expeller, structure design of expeller
Co 6 Refining of oils: Degumming, neutralization, bleaching, filtration, deodorization, their principles and process
Credits: 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-203 Course Title: Processing of Meat, Poultry and Fish Products

Outcomes

Co 1 Sources and developments of meat and poultry industries in India
Co 2 Pre-slaughter transport and care and anti mortem inspection.
Co 3 Egg structure: Composition, quality characteristics processing and preservation of eggs
Co 4 Processing and preservation of meat: mechanical deboning, aging or chilling, freezing, pickling, curing,
Co 5 Meat tenderization. Meat emulsions. Technology of manufacture of meat and poultry products.
Co 6 Types of fish, composition, structure and post mortem change in fish and quality evaluation
Credits: 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-204 Course Title: Food Processing Equipment -II

Outcomes

Co 1 Mechanical Separations: Centrifugation, liquid-liquid centrifugation
Co 2 Filtration: Principles involved in filtration. Pressure and vacuum filtration.
Co 3 Water activity and states: Raoult's Law. Water sorption Isotherms - Hysteresis.
Co 4 Shelf life: Calculation of shelf life. Shelf life requirements
Co 5 Freezing of Foods: Types of freezers including, ice cream freezers
Co 6 Membrane processes: Ultra filtration, Reverse osmosis, Electrodialysis
Co 7 Microwave and Dielectric & Infrared heating: Physical parameters
Credits: 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-205 Course Title: Bakery and Confectionary Products

Outcomes

Co 1 History, Traditional confectionary goods, types of confectionary, classification
Co 2 Production of glucose syrup, Acid hydrolysis, enzyme hydrolysis

Co 3 Cocoa Processing: Cocoa bean, processing, roasting, Fermentation,
Co 4 High Boiled Sweets: Properties of high boiled sweets, preparation of high boiled sweets
Co 5 Toffee: types of toffee, Ingredient and their role. Batch and Continuous method of toffee
Co 6 Quality of confectionery, Standards and regulations,
Co 7 Baked products from soft wheat: Cookies, Crackers, Biscuits and Cakes
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: MIC-201 Course Title: Fermentation and Industrial Microbiology

Outcomes

Co 1 Microbes as friend's; Primary and secondary screening.
Co 2 Bacteriocins Nisin, biocolours carotenoids, B-carotene, lycopane,
Co 3 Production of microbial enzymes.
Co 4 Microbial polysaccharides, types of polysaccharides and their applications
Co 5 Plant cell cultures and metabolites, Production of SCP, Safety of SCP, Baker's yeast.
Co 6 Fermentation Technology: Types, Food based fermented products
Co 7 Economic feasibility studies of few products advances in strain improvements
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: EE-201 Course Title: Heat and Mass Transfer

Outcomes

Co 1 Basic heat transfer process, thermal conductivity, convective film co-efficient
Co 2 Theory of heat conduction, Fourier's law, Derivation of Fourier's equation in Cartesian co-ordinates, Linear
Co 3 One dimensional steady state heat conduction with heat generation
Co 4 Steady-state heat conduction with heat dissipation to environment
Co 5 Convection: Forced and free convection, use of dimensional analysis for correlating variables affecting
Co 6 Radiation through black and grey surfaces, determination of shape factors.
Co 7 Heat Exchangers : General discussion, fouling factors, jacketed kettles
Co 8 Mass transfer : Fick's law of diffusion, steady state diffusion of gases and liquids through solids, equimolar
Credits 01 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-206 Course Title: Extrusion Technology

Outcomes

Co 1 Importance, principles of extrusion cooking, methods of extrusion cooking.
Co 2 Types of extruders, single screw, twin screw their applications, effect of dependent and independent
Co 3 Extruded products; Raw materials, process of manufacture, properties, quality, evaluation, packaging
Co 4 Food proteins: Types, sources, availability, need, properties etc
Co 5 Isolate, concentrate, and substitute to milk, variation in composition and nutritive value
Co 6 Meat Analog; Commercial development, nutritional aspect, marketing aspect.

Credits 01 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-207 Course Title: Food Packaging

Outcomes

Co 1 , Packaging situations in World & India; Need of packaging, Plastic consumption/use in World, India etc

Co 2 Package Materials: classification, packages paper as package material: its manufacture, types, advantages corrugated and paper board boxes etc. Glass as package material

Co 3 Lamination coating and aseptic packaging

Co 4 Coating on paper & films, types of coatings, need of coating, methods of coatings.

Co 5 Packaging of Specific foods. Packaging of specific foods with its properties i.e. Bread, Biscuits and Coffee etc.

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-208 Course Title: Food Quality

Outcomes

Co 1 Food quality: Definition, role in food industry. Quality attributes: Classification of quality attributes.

Co 2 Classification. Genetic- physiological defects, Structural, off color, character, and entomological defects

Co 3 Flavour: Definition and its role in food quality, taste, classification, taste qualities, relative intensity, reaction

Co 4 Factors influencing sensory measurements: Attitudinal factors, motivation psychological errors in judgment,

Co 5 Consumer measurement: Factors influencing acceptance and preference, objectives of consumer preference

Co 6 Quality of raw materials: Physical, chemical and microbial quality.

Credits 01 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-209 Course Title: Processing of Spices and Plantation Crops

Outcomes

Co 1 Production and processing scenario of spice, flavour & plantation crops and its scope

Co 2 Post-Harvest Technology composition, processed products of following major spices

Co 3 Processing and Utilization of all spices, Annie seed, Sweet basil. Caraway seed, Cassia, Cinnamon, Clove,

Co 4 Fern seed nutmeg, malt, mint marjoram. Rose merry, saffron, sage. Savory, Thyme, Ajowan. Asartida, curry

Co 5 Tea-Types, Processing, quality control. Coffee& Cocoa: Processing. Vanilla and annatto-processing.

Co 6 Flavours of minor spices. Flavour of major spices. Spice oil and oleoresins

Co 7 Flavours of soft drinks Baking and confectionery. Standards specification of spices. Functional packaging of

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-210 Course Title: Processing of Milk and Milk Products

Outcomes

Co 1 Milk: Definition, Composition of Milk from different species, Colostrum. Effect of heat on milk.

Co 2 Processing of milk. Pasteurization by LTHT and HTST and UHT - Filtration, UF & RO, Clarification, Cream

Co 3 Classification of milk products. Manufacture of butter and butter oil (Ghee). Fermented milks. Preparation of

Co 4 Ice-cream: Method of manufacture. Manufacture of indigenous milk products: Ghee, Khoa, Channa, Paneer,

Co 5 Indian milk confectionary: Khoa and Channa based sweets. By-products of Dairy Industry: Their utilization.

Packaging and storage of milk and milk products, Defects, Standards.

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-211 Course Title: Food Additives

Outcomes

Co 1 Intentional and unintentional food additives, their toxicology and satyrs evaluation. Naturally occurring food

Co 2 Food colour (natural and artificial). Pigments, their importance and utilization as food colour. Taste and
Co 3 Food colour (natural and artificial). Pigments, their importance and utilization as food colour. Taste and
Co 4 Food preservatives and their chemical action. Role mode of action salt, chelating agents stabilizers and
Co 5 Class I and class II preservatives, E-Numbers. Role of food additives in food industry
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-212 Course Title: Food Biotechnology

Outcomes

Co 1 Prospectus of Biotechnology; Molecular genetics i.e. fundamentals of molecular biology with special
Co 2 Genetic recombination: Mechanisms and technique used for improvement in microbial strains Genetic
recombination: Mechanisms and technique used for improvement in microbial strains
Co 3 Applications of genetically control mechanism in industrial fermentation process
Co 4 Recombinant DNA Technology: plasmids and cloning Expression of foreign genes. Promoter (Enzyme).
Co 5 Cell and tissue culture. Continuous cultures. Secondary metabolites synthesis. Biomass production by using
Co 6 Application of Biotechnology in food pharmaceuticals and agriculture industries. Bio-gas plant; probiotics,
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-213 Course Title: Specialty Foods and Beverage Technology

Outcomes

Co 1 Need and scope of specialty foods: Specialty food based on ease in preparation, cost, health benefits.
Co 2 Specialty foods based on sources; Cereals and millets, Legumes and pulses, Fruits and vegetables.
Co 3 Specialty foods based on process; Innovative process technology, Food additives basis, Bioactive
Co 4 Specialty food based on genetics; Genetically modified foods, Transgenic foods.
Co 5 Therapeutic foods; Modification of diets in disorders, feeding purposes Disease oriented of different organs
Co 6 Specific consumer oriented foods; Defense persons, Space / astronaut, High altitude mountain climbers,
Co 7 Beverage Processing: Definition, Status and Scope of Indian beverage industry.
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: EE-301 Course Title: Refrigeration Engineering and Cold Chain

Outcomes

Co 1 necessity of refrigeration and air conditioning
Co 2 Desirable properties of refrigerants
Co 3 Ice manufacture and principles of ice production
Co 4 Applications of refrigeration in different food products
Co 5 Freezing systems: indirect contact systems, plate freezers and air blast freezers
Co 6 Quality changes in foods during frozen storage.
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: EE-302 Course Title: Biochemical Engineering

Outcomes

Co 1 Biochemical engineering & their scope
Co 2 Basis for biochemical engineering in fermentation industry
Co 3 Simple enzyme kinetics

Co 4 Kinetics pattern of various fermentations
Co 5 Media and air sterilization
Co 6 Aeration and agitation
Co 7 Product recovery of different process
Credits: 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FE-303 Course Title: Instrumentation & Processing Control

Outcomes

Co 1 General characteristics of instruments
Co 2 Various types of thermometers
Co 3 Pressure scales, manometers, pressure elements differential pressure
Co 4 Flow measurement, kinds of flow, rate of flow, total flow differential pressure meters
Co 5 different methods of liquid level measurement
Co 6 Control elements, control actions, pneumatic and electrical control systems
Credits: 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FE-304 Course Title: Energy Generation and Conservation

Outcomes

Co 1 The Zeroth law of thermodynamics
Co 2 The first Law of Thermodynamics
Co 3 Renewable energy sources like solar, wind and biogas and their utilization in food processing
Co 4 Properties of steam: Wet, dry saturated, superheated steam
Co 5 Fuels: Chemical properties, air for combustion, Calorific value and its determination
Co 6 Draught: Natural, forced, fan, jet, Measurement of Height of chimney
Co 7 Air Compressors : Reciprocating, Single and two stage air compressors
Credits: 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-301 Course Title: Techniques in Food Analysis

Outcomes

Co 1 Nature and concepts of food analysis
Co 2 Principles and methodology involved in analytical techniques
Co 3 Chromatography: Adsorption, Column, Partition, Gel-filtration, Affinity, Ion-exchange
Co 4 Separation techniques: Dialysis, Electrophoresis, SDS gel electrophoresis
Co 5 Principles and methodology involved in analysis of foods
Co 6 Evaluation of analytical data
Co 7 Rheological analysis, Textural profile analysis of foods
Credits: 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-302 Course Title: Food Industry Byproducts & Waste Utilization

Outcomes

Co 1 Industrial Byproducts and Waste
Co 2 Agricultural waste and agro based industrial waste management
Co 3 By-products of oil seeds, dairy and fruit and vegetables processing industries

Co 4 By-products of meat, poultry and eggs
Co 5 By-products of fish processing units
Co 6 By-products of plantation crops and spices
Co 7 By-products of fermentation and sugar and bakery industries
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-303 Course Title: Food Safety and Hygiene

Outcomes

Co 1 Dietary Toxins: Naturally occurring in food
Co 2 Intrinsic toxin produced during processing and storage
Co 3 Pesticidal residues as toxin, chlorinated and Non-chlorinated
Co 4 Microbial standards of processed and preserved foods
Co 5 Principles of food hygiene
Co 6 Good manufacturing practices
Co 7 Types of sanitizers and their properties
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: ABM-301 Course Title: Business Management & International Trade

Outcomes

Co 1 Business Management; introduction, theories and functions
Co 2 Marketing Management and Human resource development
Co 3 problems in marketing of agricultural commodities
Co 4 Agricultural price policy and need for price stabilization
Co 5 Major financing agencies: RBI, NABARD, AFC, ADB, World Bank
Co 6 Export trends and prospects of food products in India
Co 7 World Consumption of Food; Patterns and Types of Food Consumption across the Globe
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: ABM-302 Course Title: Entrepreneurship and Communication Development

Outcomes

Co 1 Entrepreneurship development: assessing overall business environment in the Indian economy
Co 2 Globalisation and the emerging business/entrepreneurial environment
Co 3 SWOT analysis, generation, incubation and commercialization of ideas
Co 4 Export and import policies relevant to agriculture sector
Co 5 meaning and process of communication

FALSE

Co 7 Organizing seminars and conferences.

Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: ENV-301 Course Title: Environmental Science and Disaster Management

Outcomes

Co 1 Scope and importance of environmental studies
Co 2 Producers, consumers and decomposers of an ecosystem

Co 3 threats to biodiversity and its conservation.

Co 4 Causes, effects and management of soil nuclear hazards and industrial wastes

Co 5 causes, effects and control of air, water, soil, thermal, noise and marine pollution

Co 6 The environment protection act

Co 7 Role of information technology on environment and human health

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-304 Course Title: Product Development and Formulation

Outcomes

Co 1 Need, importance and objectives of formulation for new product development

Co 2 Formulation based on sources availability and cost competitiveness

Co 3 Standardization of various formulation and product design

Co 4 production trials for new product development at lab and pilot scale

Co 5 Quality assessment of new developed products

Co 6 Market testing and marketing plan

Co 7 Costing and economic evaluation. Commercialization / product launch.

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-305 Course Title: Food Laws and Regulations

Outcomes

Co 1 Need of enforcing the laws and various types of laws

Co 2 General principles to be followed in administration of act

Co 3 Preventions of Food adulteration act

Co 4 Standard weight of measure act and essential commodity act.

Co 5 Fruit product order, Milk & Milk product order and Plant food seed order

Co 6 codex standards for cereals, pulses, fruit & vegetables, meat & poultry products

Co 7 Recommended international code of hygiene for various products

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-306 Course Title: Food Plant Design and Layout

Outcomes

Co 1 Overall design of an Enterprise

Co 2 Classification of dairy and food plants

Co 3 Development and presentation of layout

Co 4 Setting of different sections in a plant, Layout installations.

Co 5 Equipment selection and capacity determination

Co 6 Estimation of services and utilities

Co 7 Maintenance of food plant building

Credits 02 Theory period of one hour per week over a semester

01 Practical period of two hour per week over a semester

Course code: FT-307 Course Title: Food Production Trends and Programs

Outcomes

Co 1 Food demand and supply

Co 2 Magnitude and Inter-dependence of food production and processing agencies
Co 3 Food characteristics & nutritional significance of major food groups
Co 4 New food products developed
Co 5 National and International trends and programs in food handling
Co 6 Food Losses: Factors affecting, programs and strategies to eliminate the losses
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-308 Course Title: Quality Assurance and Certification

Outcomes

Co 1 Quality inspection, quality control, quality management and quality assurance
Co 2 Total quality management; Good manufacturing practices, Good agricultural practices
Co 3 Good laboratory practices, Quality management systems
Co 4 HACCP: Principles, implementation
Co 5 Auditing: Surveillance; Audit, mock audit, third party quality certifying audit
Co 6 Certification, Certification procedures, Certifying bodies, Accrediting bodies, International bodies
Credits 02 Theory period of one hour per week over a semester
01 Practical period of two hour per week over a semester

Course code: FT-309 Course Title: Research project

Outcomes

Co 1 Exposure to various analytical techniques.
Co 2 Innovations in product development.
Co 3 Preparation of project report
Credits 03 Practical period of two hour per week over a semester.

Course code: FT-401 Course Title: Hands of Training

Outcomes

Co 1 Preparation of Business Plan
Co 2 Organization of production
Co 3 Production and Sales
Co 4 Documentation and reports
Co 5 Oral examination
Credits 25 Practical period of two hour per week over a semester.

Course code: FT-402 Course Title: In- plant training off campus/ Industry

Outcomes

Co 1 In-plant training
Co 2 Training Report Evaluation
Credits 30 Practical period of two hour per week over a semester.

Course Outcome of M.Sc. Agronomy

AGRON 501 MODERN CONCEPTS IN CROP PRODUCTION

1. Crop Growth Analysis Relation to Environment
2. Quantitative Agro-biological principles

3. Effect of Loading in Cereals
4. Scientific Principles of Crop Production
5. Integrated Farming System

AGRON 503 PRINCIPLES AND PRACTICES OF WEED MANAGEMENT

1. Weed Biology and Ecology
2. Herbicides Introduction and History of their Development
3. Herbicide Structure
4. Weed management in Major
5. Integrated Weed Management

AGRON 512 DRYLAND FARMING AND WATERSHED MANAGEMENT

1. Definition, concept and Characteristics
2. Soil and Climatic Parameters
3. Stress Physiology and Resistance to Drought
4. Concept of Water Resources Management

AST 511 EXPERIMENTAL STATISTICS

1. Concepts in Statistics
2. Correlation and Regression
3. Basic Designs
4. Mean Comparison and Missing Data
5. Factorial Experiments

AGRON 513 PRINCIPLES AND PRACTICES OF ORGANIC FARMING

1. Organic Farming
2. Organic Farming and Water use Efficiency
3. Control of Weed
4. Socio-Economics Impacts

PGS 501 RESEARCH METHODOLOGY

1. History, Myth and Ethnic Practices
2. Synopsis Writing
3. Formulation and Types of hypothesis
4. Compilation and Presentation of Result
5. Financial Support
6. Introduction to Library and its Services
7. Computer and Informatics
8. Demonstration of Departmental Research

AGRON 504 PRINCIPLES AND PRACTICES OF WATER MANAGEMENT

1. Water and its Role in Plants
2. Soil Water Movement in Soil and Plants
3. Soil, Plant and Meteorological Factors
4. Water Management of the Crops and Cropping System
5. Excess of Soil Water and Plant Growth

AGRON 506 AGRONOMY OF CEREALS, PULES, FODDER AND GREEN MANURE CROPS

1. Cereal
2. Millets
3. Pulses
4. Fodders

5. Mechanization

AGRON 592 RESEARCH TECHNIQUES IN AGRONOMY

1. Agronomy
2. Important Agronomic
3. Important Calculations and Indices and Growth Analysis

HORT 514 PRODUCTION AND PROTECTED CULTIVATION OF HORTICULTURAL CROPS

1. Propagation Methods
2. Packages of practices for the cultivation of Fruit
3. Packages of practices for the cultivation of Vegetables
4. Packages of practices for the cultivation of Crops

AGRON 511 CROPPING SYSTEM AND SUSTAINABLE AGRICULTURE

1. Cropping System
2. Concept of Sustainability
3. Above and below ground interactions and allelopathic effect
4. Crop diversification
5. Plant Ideo-Types for Dry Lands

AGRON 507 AGRONOMY OF OILSEEDS, FIBER, SUGAR AND TUBER CROPS

1. Oilseeds
2. Fiber Crops
3. Sugar Crops
4. Tuber Crops
5. By Products Utilization

AGRON 508 AGRONOMY OF MEDICINAL, AROMATIC AND UNDER UTILIZED CROPS

1. Importance of Medicinal and Aromatic Plants in Human Health
2. Climate and Soil Requirements of Medicinal Plant
3. Climate and Soil Requirements of Aromatic Plants
4. Climate and Soil Requirements of Under-utilized Crops

AGRON 502 PRINCIPLES AND PRACTICES OF SOIL FERTILITY AND NUTRIENT

1. Soil Fertility and Productivity
2. Criteria of Essentiality of Nutrients
3. Preparation and Use of Farmyard
4. Commercial Fertilizers
5. Time and Methods

BT515 BIO-SAFETY, BIOETHICS AND IPR

1. Introduction
2. Bio-safety and Risk Assessment
3. General Principles
4. Regulatory Affairs
5. Ecological aspects of GMOs and Impact on Biodiversity
6. The WTO and other International Agreements

PGS-506 Disaster Management

1. Natural Disasters
2. Climatic Change

3. Disasters
4. Concept of Disaster Management
5. Rehabilitation

Course Outcome of M.Sc. Entomology

ENT-501 INSECT MORPHOLOGY AND SYSTEMATICS

1. Principles Utilities and Relevance
2. Head
3. Thorax
4. Abdomen
5. Introduction to History and Principles of Systematic and Importance
6. Nomenclature

ENT-502 INSECT ANATOMY, PHYSIOLOGY AND NUTRITION

1. Introduction
2. Structure Modification and Physiology of Different Systems
3. Integument Moulting and Metamorphosis
4. Insect Nutrition

ENT-503 CLASSIFICATION OF INSECTS

1. Brief Evolutionary History of Insects
2. Distinguishing Characters, Genera Biology, Habits and Habitats I
3. Distinguishing Characters, Genera Biology, Habits and Habitats II
4. Distinguishing Characters, Genera Biology, Habits and Habitats III
5. Distinguishing Characters, Genera Biology, Habits and Habitats IV

ENT-504 INSECT ECOLOGY

1. History and Definition
2. Basic Concepts of Abundance
3. Population Dynamics
4. Biotic Factors
5. Community Ecology

STAT 501 STATISTICAL METHODS

1. Presentation of Data
2. Measures of Locations and Dispersion
3. Probability and Distributions
4. Correlation and Regression
5. Sampling
6. Test of Significance
7. Experimental Design

ENT-598 RESEARCH METHODOLOGY

1. Introduction
2. Synopsis writing
3. Collection and Analysis of Data
4. Reports and Theses Writing
5. Funding
6. Computer and Informatics
7. Departmental Research Activities and Instrumentation

8. Library and information services

ENT-599 SYNOPSIS SEMINAR AND MASTERS RESEARCH

ENT-505 BIOLOGICAL CONTROL OF INSECT PESTS AND WEEDS

1. History, Principles and Scope of Biological Control
2. Biology, Adaptation, Host Seeking Behavior
3. Mass Production of Quality Biocontrol Agent
4. Successful biological Control
5. Importation of Natural Enemies

ENT-506 TOXICOLOGY OF INSECTICIDES

1. Definition and Scope
2. Classification of Insecticides and Acaricides
3. Principles of Toxicology
4. Insecticide Metabolism
5. Insecticide Residues

ENT-507 PLANT RESISTANCE TO INSECTS

1. Introduction
2. Insect-host Plant Relationship
3. Chemical Ecology
4. Screening Techniques, Resistance, Sources and Current Status
5. Molecular Approaches

ENT-508 PRINCIPLES OF INTEGRATED PEST MANAGEMENT

1. Introduction
2. Basis of IPM
3. IPM Tactics
4. Pest Survey and Surveillance
5. Risk Analysis and Success Stories

ENT-509 PESTS OF FIELD CROPS (DEFICIENCY)

1. Bionomics and Management I
2. Bionomics and Management II
3. Bionomics and Management III
4. Bionomics and Management IV

ENT-510 INSECT VECTORS OF PLANT PATHOGENS

1. Introduction and Characteristics of Insect Vectors
2. Viral and Fungal Pathogens
3. Transmission of Plant Viruses
4. Mycoplasma and Bacterial Pathogens
5. Vector Management

NEMA-506 PLANT NEMATOLOGY

1. Introduction
2. Plant Parasitic Nematodes
3. Organismal Relationships
4. Cellular and physiological responses
5. Nematode Management

ENT-599* MASTERS RESEARCH

ENT- 511 INSECT PESTS OF HORTICULTURE AND PLANTATION CROPS

1. Fruit Crops
2. Vegetables Crops
3. Plantation Crops
4. Other Crops

ENT- 512 MOLECULAR TECHNIQUES IN ENTOMOLOGY

1. Introduction
2. DNA and RNA Analysis in Insects
3. Genes of Interest in Entomological Research
4. Insect Genetic Transformation
5. Special Topics

ENT-513 COMMERCIAL ENTOMOLOGY

1. Bee keeping
2. Sericulture
3. Lac Insect
4. Insects of Medical & Veterinary Importance
5. Household Pests

PATH-505 DETECTION AND DIAGNOSIS OF PLANT DISEASES

1. Introduction
2. Preservation and Separation
3. Techniques
4. Disease Diagnostics and Measurement

PATH-504 PRINCIPLES OF PLANT PATHOLOGY

1. Introduction
2. Life Cycle and Environmental Factors
3. Host Parasite Interactions
4. Genetics and Basis of Resistance
5. Disease Management

EVS-520 DISASTER MANAGEMENT

1. Natural Disasters
2. Man Made Disasters
3. Disaster Management

BT-515 BIOSAFETY, BIOETHICS AND IPR

1. Introduction
2. Biosafety and Risk Assessment
3. Laboratory and Environmental Biosafety
4. Regulatory Affairs
5. Ecological Aspects of GMOs
6. Intellectual Property Right

ENT-591 MASTERS SEMINAR

ENT-599* MASTERS RESEARCH

Deficiency Courses Outcome for B.Sc. Medical/B.Sc. (Hons) Students Joining M.Sc. Agriculture in Entomology
SOILS 321 FUNDAMENTALS OF SOIL SCIENCE

1. Introduction
2. Soil Physical Properties
3. Soil Reaction
4. Soil Organic Matter
5. Soil Organisms
6. Soil Pollution

AGRO-321 FUNDAMENTALS OF AGRONOMY

1. Introduction
2. Crop Nutrition and Irrigation
3. Weeds
4. Growth and Development of Crops
5. Crops Rotation and Distribution
6. Crop Management

PATH 321 FUNDAMENTALS OF PLANT PATHOLOGY

1. Introduction
2. Important Plant Pathogenic Organisms/ Group
3. Bacterial and Mollicutes
4. Viruses
5. Nematodes
6. Disease Development and Management

ENT 321 FUNDAMENTALS FOR ENTOMOLOGY

1. Introduction, Structure and Organ System of Insects
2. Insect Ecology
3. Pests and Pest Management
4. Systematics
5. Agriculturally important Group II

ENT421 AGROCHEMICALS

1. Introduction
2. Herbicides
3. Organic Fungicides
4. Insecticides
5. Fertilizers
6. Mixed and Complex Fertilizers
7. Biopesticides

HORT 321 FUNDAMENTALS OF HORTICULTURE

1. Horticulture
2. Plant Propagation
3. Principles of Orchard Establishment
4. Pollination
5. Bioregulators
6. Irrigation and Fertilization

ENT430 MANAGEMENT OF BENEFICIAL INSECTS

1. Apiculture and Pollinators
2. Sericulture
3. Lac Culture
4. Biocontrol Agents

GBP 321 FUNDAMENTALS OF PLANT BREEDING

1. Introduction
2. Domestication and Genetic Diversity
3. Genetic Basis and Breeding Methods in Self-pollinated Crops
4. Genetic Basis and Methods of Breeding Cross Pollinated Crops
5. Breeding Methods in Asexually Propagated Crops
6. Breeding for Stress Resistance
7. Biotechnological Tools and IPRs

ENT 423 PESTS OF CROPS AND STORED GRAINS AND THEIR MANAGEMENT

1. Introduction
2. Pests of Field and Crops
3. Pests of Horticultural Crops
4. Storage Losses
5. Storage Pests

ENT 422 PRINCIPLES OF INTERGRATED POST DISEASE MANAGEMENT

1. Introduction
2. Pest Detection and ETLs
3. Methods of Pest Control
4. Pesticides
5. Pest Population Estimation, Development and Implementation of IPM
6. Implications and Case Histories

Course Outcome of M.Sc. Genetics and Plant Breeding

STAT-501 STATISTICAL METHODS

1. Presentation of Data
2. Measures of Location And Dispersion
3. Probability and Distribution
4. Correlation and Regression
5. Sampling
6. Tests of Significance
7. Experimental Design

GPB 511 PRINCIPLE OF GENETICS

1. Introduction
2. Multiple Alleles
3. Linkage and Crossing Over
4. Sex Linked Inheritance
5. Extrachromosomal Inheritance
6. Mutations and Mutagenic Agent
7. Fine Structure of Gene

GPB 512 PRINCIPLE AND METHODS OF PLANT BREEDING

1. Historical Perspectives
2. Genetics Basis of Breeding Self Pollinated Crops
3. Breeding Methods for self-pollinated Crops
4. Genetic Basis of Breeding Cross Pollinated Crops
5. Mutation and Polyploidy Breeding

6. Breeding Methods for Vegetative Propagated Crops

7. Pre-Breeding and Genetic Enhancement

GPB513 CYTOLOGY AND CYTOGENETICS

1. Historical Perspectives
2. Chromosome Paring
3. Duplications and Deficiencies
4. Haploidy
5. Trisomics and Tetrasomics
6. Physical Mapping of Genes on Chromosomes

BT501 CELL AND MOLECULAR BIOLOGY

1. Genetic Material
2. Organization of Genetic Material
3. Genetic Code
4. Transcription of Message
5. Processing of RNA Transcript
6. Maturation and Modification of Released Polypeptide
7. Regulation of Gene Expression
8. Signal perception and Transduction

GPB 598 RESEARCH METHODOLOGY

1. Introduction
2. Synopsis Writing
3. Collection and Analysis of Data
4. Reports and These Writing
5. Funding
6. Departmental Research Activities and Instrumentation
7. Library and Information Services

GPB 515 BREEDING FIELD CROPS

1. Plant Ideotype
2. Breeding for Biotic Stress Resistance
3. Breeding For Abiotic Stress
4. Breeding For Nutritional Quality Traits
5. Breeding by Design
6. Participatory

BT 526 BIOTECHNOLOGY IN CROP IMPROVMENTS

1. Crop Biotechnology and its Scope
2. Elementary Idea of Theory and Application of Molecular Techniques
3. Restriction Enzymes
4. Polymerase chain Reaction (PCR)
5. Methods of Gene Transfer in Plants
6. A bried Idea of DNA
7. A Bried Idea of application of Molecular

GPB 517 MUTATION BREEDING

1. Mutation

2. Mutagens
3. Induced Mutation Techniques
4. Plant Characters to be Improved by Mutation Breeding
5. Directed Mutagenesis
6. Role of Induced Mutations in allele mining and Functional Genomics

GPB 518 BREEDING FOR QUALITY TRAITS

1. Developmental Biochemistry and Genetics
2. Nutritional Improvement
3. Breeding Strategies for Quality Traits
4. Breeding for Nutritional Quality traits
5. Genetic Engineering Protocols for Quality Improvement

GPB 519 GENETIC RESOURCES

1. Centers of Diversity and Center of Origin
2. Biodiversity vs Genetic Resources
3. Direct and Indirect Uses of plant Genetic
4. Plant Genetic Resources
5. Techniques for Conservation of Plant Germplasm
6. CBD and Sustainable
7. Role of FAO/CGIAR System for Access to Genetic Resource

BT 515 BIOSAFETY, BIOETHICS & IPR

1. Introduction to Bioethics and Biosafety
2. Biosafety and Risk Assessment Issues
3. General Principles for the Laboratory
4. Regulatory Affairs
5. Ecological Aspects of GMOs
6. The WTO and other International Agreements

GPB 520 BREEDING FOR BIOTIC AND ABIOTIC STRESS TOLERANCE

1. Plant Breeding with Reference to Biotic and Abiotic Stress Resistance
2. Host Defense Response to pathogen Invasions
3. Systemic Acquired resistance (SAR)
4. Classification of Abiotic Stresses
5. Genetics of Abiotic Stress Resistance
6. Utilizing MAS Procedures

BT 519 PLANT MOLECULAR BREEDING

1. Principles of Plant Breeding
2. Introduction to molecular Breeding
3. Advanced methods of Genotyping
4. QTL Mapping using Structured
5. Map Based Gene Cloning and Development of Gene Based Markers
6. Markers Assisted Selection (MAS)

GPB 522 HETEROSIS BREEDING

1. Definition and Historical Aspects of Heterosis
2. Exploitation of Heterosis
3. Development of Inbred Lines and Hybrid Cultivars
4. Current Status of Exploitation of Heterosis in Important Crops
5. Biotechnological Applications in Heterosis Breeding

GPB 523 BREEDING OF VEGETABLE AND FRUIT CROPS

1. Importance, History and Evolutionary Aspects of Vegetable Breeding
2. Breeding, Method (Introduction, Selection, Hybridization, Mutation)
3. Breeding Strategies
4. Theory Origin and Distribution, Taxonomical Status
5. Polyploid Breeding
6. Breeding Strategies of Crops

GPB 524 POPULATION AND BIOMETRICAL GENETICS

1. Genes in Populations
2. Forces Changing Gene Frequencies
3. QTL Mapping
4. Correlation Studies
5. Combining Ability and Gene Effects
6. Genotype-environment Interaction and Stability Analysis
7. Use of Molecular Tools in Population Genetics

GPB 525 BIOINFORMATICS

1. Introduction to Computers
2. Microsoft (MS) Office and its Application
3. Introduction to Statistical Package
4. An Overview of Bioinformatics
5. Sequence and Structure Database
6. Alignment of Sequences
7. Agricultural Biotechnology
8. Access to Literature

GPB 526 MAINTENANCE BREEDING VARIETY RELEASE AND SEED PRODUCTION

1. Production Variety Development and Maintenance
2. Variety Testing
3. Generation System of Seed Multiplication
4. Seed Certification
5. Hybrid Seed Production Technology
6. Release of New Varieties

Course Outcome of M.Sc. Plant Pathology

PATH-501 Taxonomy and Physiology of Fungi

1. Introduction
2. Importance of Mycology
3. Basic Taxonomy
4. Comparative Morphology
5. Comparative Morphology

PATH-502 Plant Virology

1. Background
2. Basic Virology
3. Taxonomy
4. Characterization
5. Other Viruses and Virus like Particles
6. Molecular Plant Virology

PATH-503 Plant Bacteriology

1. Landmark in Plant Bacteriology
2. Taxonomy
3. Growth and physiology
4. General biology
5. Antibacterial Compounds
6. Survival and Dissemination

PATH-504 Principles of Plant Pathology

1. History and Classification of diseases
2. Basic of Plant Pathology
3. Host Parasite Interaction
4. Genetics of Resistance
5. Disease Management

PATH-505 Detection and Diagnosis of Plant Diseases

1. Methods to Prove Koch's Postulates
2. Preservation of plant pathogens
3. Microscopic Techniques
4. Ultracentrifuge and Electrophoretic apparatus
5. Evaluation of fungicides

PATH-599 Synopsis Seminar

STAT-501 Experimental Statistics

1. Concepts in Statistic
2. Correlation and Regression
3. Basic Design
4. Mean Comparison
5. Factorial Experiments

PGS-609 Research Methodology

9. History, Myth and Ethnic Practices
10. Synopsis Writing
11. Formulation and Types of hypothesis
12. Compilation and Presentation of Result
13. Financial Support
14. Computer and Informatics
15. Demonstration of Departmental Research
16. Writing a Review Article

PATH-506 Principles of Plant Disease Management

1. Principles of Plant Disease
2. Disease Resistance and Molecular
3. Foliage, seed and Soil Application of Chemicals
4. History of Fungicides
5. Nature, Properties and mode of Action of Antifungal

ENT-505 Biological Control of Insect Pests and weeds

1. History, Principles and Scope of Biological Control
2. Biology, Adaptation, Host Seeking Behavior
3. Mass Production of Quality Biocontrol Agent
4. Successful biological Control
5. Importation of Natural Enemies

PBG-509 Disease Resistance in Plants

1. Introduction
2. Disease Escapes
3. Host Defense System
4. Gene-for-gene Concept

PATH-507 Integrated Plant Disease Management

1. Introduction
2. Development of IDM
3. Development of IDM
4. IDM in Important Crops
5. IDM in Important Crops

ENT-510 Insect Vectors of Plant Pathogens

1. History of Developments
2. Transmission of plant Viruses and Fungal Pathogens
3. Transmission of plant Viruses
4. Transmission of Mycoplasma and Bacteria
5. Transmission of Plant Viruses

NEMA-506 Plant Nematology

1. History and Growth of Nematology
2. Gross Morphology of Plant Parasitic Nematodes
3. Plant Nematode Relationship
4. Principles and Practice of Nematode Management

PATH-599* Master's Research

PATH-508 Epidemiology and Forecasting of Plant Diseases

1. Epidemics:
2. Population Biology
3. Crop Diseases Assessment
4. Principles and Pre-requisites
5. Procedures

PATH-509 Molecular Techniques in Plant Pathology

1. Recent Concepts
2. Molecular Basis of Host Plant and Pathogen Interaction
3. R Genes
4. T Genes
5. Genetic Engineering for Plant diseases Resistance

ENT-508 Principles of Integrated Pest Management

6. Terminology and Historical Background
7. Concept and Philosophy of IPM
8. Tools of pest Management and their Integration
9. Disease Assessment
10. Risk Analysis

PGS-506 Disaster Management

6. Natural Disasters
7. Climatic Change

- 8. Disasters
- 9. Concept of Disaster Management
- 10. Rehabilitation
- BT-515 Biosafety, Bioethics and IPR
- 1. Introduction
- 2. Biosafety and Risk Assessment
- 3. General Principles
- 4. Regulatory affairs
- 5. Ecological Aspects of GMOs and Impact on biodiversity
- 6. IPRs
- PATH-510 Post-Harvest Diseases and Their Management
- 1. Concept of Post-Harvest Diseases
- 2. Types of Post-Harvest Problems
- 3. Factors governing post-Harvest Problems
- 4. Chemicals in Controlling Post-Harvest Diseases
- 5. Integrated Approach in Controlling Diseases
- PATH-591 Master's Seminar
- PATH-599 Master's Research
- PATH-599* Master's Research

Course Outcome of Deficiency Programme M.Sc. Plant Pathology
(B.Sc. Medical & Non-Medical)

AGRON 401 FUNDAMENTALS OF AGRONOMY

- 1. Agronomy and its Scope
- 2. Crop Nutrition
- 3. Weeds-Importance
- 4. Growth and Development of Crops
- 5. Crop Rotation its Principles
- 6. Crop Management Technologies in Problematic Area

SOIL 401 FUNDAMENTALS OF SOIL SCIENCE

- 1. Soil as a Natural Body
- 2. Soil Physical Properties
- 3. Soil Reaction
- 4. Soil Organic Matter
- 5. Soil Organisms
- 6. Soil Pollution

ENT 401 FUNDAMENTALS OF ENTOMOLOGY

- 1. History of Entomology in India
- 2. Insect Ecology
- 3. Categories of Pests
- 4. Systematics
- 5. Orthoptera

PATH 401 FUNDAMENTALS OF PLANT PATHOLOGY

- 1. Introduction
- 2. Important Plant Pathogenic Organisms
- 3. Bacteria and Mollicutes

4. Nematodes

5. Growth and Reproduction of plant pathogens

HORT 401 FUNDAMENTALS OF HORTICULTURE

1. Horticulture

2. Plant Propagation

3. Principles of Orchard Establishment

4. Pollination

5. Importance of plant Bio-regulator in Horticulture

PATH-505 Detection and Diagnosis of Plant Diseases

1. Methods to Prove Koch's Postulates

2. Preservation of plant pathogens

3. Microscopic Techniques

4. Ultracentrifuge and Electrophoretic apparatus

5. Evaluation of fungicides

PGS-609 Research Methodology

1. History, Myth and Ethnic Practices

2. Synopsis Writing

3. Formulation and Types of hypothesis

4. Compilation and Presentation of Result

5. Financial Support

6. Computer and Informatics

7. Demonstration of Departmental Research

8. Writing a Review Article

PATH-506 Principles of Plant Disease Management

1. Principles of Plant Disease

2. Disease Resistance and Molecular

3. Foliage, seed and Soil Application of Chemicals

4. History of Fungicides

5. Nature, Properties and mode of Action of Antifungal

ENT-505 Biological Control of Insect Pests and weeds

1. History, Principles and Scope of Biological Control

2. Biology, Adaptation, Host Seeking Behavior

3. Mass Production of Quality Biocontrol Agent

4. Successful biological Control

5. Importation of Natural Enemies

PBG-509 Disease Resistance in Plants

1. Introduction

2. Disease Escapes

3. Host Defense System

4. Gene-for-gene Concept

PATH-507 Integrated Plant Disease Management

1. Introduction

2. Development of IDM

3. Development of IDM

4. IDM in Important Crops

5. IDM in Important Crops

ENT-510 Insect Vectors of Plant Pathogens

6. History of Developments
7. Transmission of plant Viruses and Fungal Pathogens
8. Transmission of plant Viruses
9. Transmission of Mycoplasma and Bacteria
10. Transmission of Plant Viruses

NEMA-506 Plant Nematology

5. History and Growth of Nematology
6. Gross Morphology of Plant Parasitic Nematodes
7. Plant Nematode Relationship
8. Principles and Practice of Nematode Management

PATH-501 Taxonomy and Physiology of Fungi

6. Introduction
7. Importance of Mycology
8. Basic Taxonomy
9. Comparative Morphology
10. Comparative Morphology

PATH-502 Plant Virology

7. Background
8. Basic Virology
9. Taxonomy
10. Characterization
11. Other Viruses and Virus like Particles
12. Molecular Plant Virology

PATH-503 Plant Bacteriology

7. Landmark in Plant Bacteriology
8. Taxonomy
9. Growth and physiology
10. General biology
11. Antibacterial Compounds
12. Survival and Dissemination

PATH-504 Principles of Plant Pathology

6. History and Classification of diseases
7. Basic of Plant Pathology
8. Host Parasite Interaction
9. Genetics of Resistance
10. Disease Management

STAT-501 Experimental Statistics

1. Concepts in Statistic
2. Correlation and Regression
3. Basic Design
4. Mean Comparison
5. Factorial Experiments

GPB 401 FUNDAMENTALS OF PLANT BREEDING

1. Historical Development
2. Domestication
3. Genetic Basic and Breeding Methods
4. Genetic Basis and Methods of Breeding cross Pollinated crops

5. Breeding methods in Asexually propagated crops
6. Breeding for Stress Management
7. Biotechnological Tool

PATH-508 Epidemiology and Forecasting of Plant Diseases

1. Epidemics:
2. Population Biology
3. Crop Diseases Assessment
4. Principles and Pre-requisites
5. Procedures

PATH 402 Diseases of Horticultural Crops

1. Symptoms, Etiology, Disease Cycle and Management of Fruits
2. Symptoms, Etiology, Disease Cycle and Management of Vegetables
3. Symptoms, Etiology, Disease Cycle and Management of Plantation crops

PATH-509 Molecular Techniques in Plant Pathology

1. Recent Concepts
2. Molecular Basis of Host Plant and Pathogen Interaction
3. R Genes
4. T Genes
5. Genetic Engineering for Plant diseases Resistance

ENT-508 Principles of Integrated Pest Management

1. Terminology and Historical Background
2. Concept and Philosophy of IPM
3. Tools of pest Management and their Integration
4. Disease Assessment
5. Risk Analysis

PGS-506 Disaster Management

1. Natural Disasters
2. Climatic Change
3. Disasters
4. Concept of Disaster Management
5. Rehabilitation

BT-515 BIO-SAFETY, BIOETHICS AND IPR

1. Introduction
2. Biosafety and Risk Assessment
3. General Principles
4. Regulatory Affairs
5. Ecological Aspects of GMOs and Impact on Biodiversity
6. IPRs

PATH-510 Post-Harvest Diseases and Their Management

1. Concept of Post-Harvest Diseases
2. Types of Post-Harvest Problems
3. Factors governing post-Harvest Problems
4. Chemicals in Controlling Post-Harvest Diseases
5. Integrated Approach in Controlling Diseases

PATH 403 DISEASES OF FIELD CROPS

1. Symptoms, Etiology, Disease Cycle and Management of Cereals
2. Symptoms, Etiology, Disease Cycle and Management of Pulses
3. Symptoms, Etiology, Disease Cycle and Management of Oilseeds

Akal College of Basic Sciences

Program Outcome of B.Sc. (Hon's) Mathematics

FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE

Program Specific Outcome

FALSE
FALSE
FALSE

Program Outcome of M.Sc. in Mathematics

FALSE
FALSE
FALSE
FALSE
FALSE

Program Specific Outcome

FALSE
FALSE

Program Outcomes B.Sc. - Hons. (Physics) Program

PO1. Scientific knowledge: Apply the knowledge of physics fundamentals with the help of mathematics to the

PO2. Problem analysis: Identify, formulate, research literature, and analyze physical problems using basic

PO3. Conduct investigations of complex problems: Use research-based

knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO4. Individual and team work: function effectively as an individual, and as a member or leader in diverse teams,

PO5. Communication: Communicate effectively on complex activities with the scientific community and write effective reports and design documentation, make effective presentations, and give and receive clear

PO6. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific

Program Outcomes BSOs of B.Sc. - Hons. (Physics) Program

- PO1. Understand the basic concepts of Mechanics, Electricity and Magnetism, Waves, Electromagnetic Theory, Thermodynamics, Quantum Mechanics and Statistical Physics, Condensed Matter Physics, Nuclear Physics,
- PO2. Perform procedures/experiments as per laboratory standards
- PO3. Understand the applications of physics in real world problems

Program Outcomes B.Sc. (Non-Medical) Program

- PO1. Scientific knowledge: Apply the knowledge of physics fundamentals with the help of mathematics to the
- PO2. Problem analysis: Identify, formulate, research literature, and analyze physical problems using basic
- PO3. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO4. Individual and team work: function effectively as an individual, and as a member or leader in diverse teams,
- PO5. Communication: Communicate effectively on complex activities with the scientific community and write effective reports and design documentation, make effective presentations, and give and receive clear
- PO6. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Outcomes BSOs of B.Sc. (Non-Medical)

- PO1. Understand the basic concepts of Mechanics, Electricity and Magnetism, Waves, Electromagnetic Theory, Quantum Mechanics and Statistical Physics, Condensed Matter Physics, Nuclear Physics
- PO2. Perform procedures/experiments as per laboratory standards
- PO3. Understand the applications of physics in real world problems

Program Outcomes M.Sc. (Physics) Program

- PO1. Scientific knowledge: Apply the knowledge of physics fundamentals with the help of mathematics to the
- PO2. Problem analysis: Identify, formulate, research literature, and analyze physical problems using basic
- PO3. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO4. Individual and team work: function effectively as an individual, and as a member or leader in diverse teams,
- PO5. Communication: Communicate effectively on complex activities with the scientific community and write effective reports and design documentation, make effective presentations, and give and receive clear
- PO6. Modern tool usage: Apply appropriate techniques, resources, and modern scientific & engineering techniques to complex physical activities with an understanding of the limitations.
- PO7. Research Proficiency: Apply various modern techniques for research specific activities/experiments and
- PO8. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Outcomes BSOs of M.Sc. (Physics)

- PO1. Understand the advanced concepts Mathematical Physics, Classical Mechanics, Statistical Mechanics, Quantum Mechanics, Electronics Nuclear & Particle Physics, Quantum Field Theory, Classical Electrodynamics,
- PO2. Perform procedures/experiments as per laboratory standards
- PO3. Understand the complex applications of physics in real world problems

Program Outcomes Ph.D. (Physics) Program

- PO1. Scientific knowledge: Apply the knowledge of physics fundamentals to the solution of specific research
- PO2. Problem analysis: Identify, formulate, research literature, and analyze research related problems using

- PO3. Conduct investigations of research problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO4. Modern tool usage: Apply appropriate techniques, resources, and modern scientific & engineering techniques to complex research related physical activities with an understanding of the limitations.
- PO5. Research Proficiency: Apply various modern techniques for research specific activities/experiments and Program Outcomes
- PO1. Understand the concepts of research fundamentals and methodology
- PO2. Perform procedures/experiments as per standards
- PO3. Apply the scientific knowledge for the analysis and interpretation of the simulated/experimental outcomes
- PO4. Skill of writing scientific reports and articles as per international standards

Course Outcome of B.Sc. Mathematics

BOT-101 BASIC BOTANY

1. Classification and Introduction
2. Roots
3. Inflorescence
4. Pollination
5. Reproduction

PHY-114 BASIC PHYSICS-I (ELECTRICITY, MAGNETISM & ELECTRONICS)

1. Vector Analysis
2. Current Electricity
3. Maxwell Equation
4. Conduction in Semiconductors
5. Transistor

ENG-101 BASIC COMMUNICATION SKILLS

1. Poetry
2. Essays
3. Short Stories
4. Grammar

EDU-101 HUMAN VALUES AND ETHICS

1. Understanding the Need
2. Understanding the Human Being
3. Basis For universal Human Value
4. Professional Ethics
5. The Holistic Criteria for Evaluation

COMP-101 INTRODUCTION TO COMPUTER APPLICATIONS

1. Introduction to Computer
2. Computer System
3. Peripheral Devices
4. Data Processing and Storage

PBI-111 LANGUAGE (PUNJABI LAZMI)

CHEM-111 BASIC ORGANIC CHEMISTS

1. Structure and Bonding
2. Types of Reagents

3. Stereochemistry -1
4. Stereochemistry -2
5. Alkanes and Cyclokanes

MATH-122 ALGEBRA

1. Symmetric
2. Application of Matrices
3. Relation Between the roots and Coefficients
4. Nature of the roots

ZOO-101 BASIC ZOOLOGY

1. Introduction to Zoology
2. Zoological Nomenclature
3. Chordates
4. Physiology of Respiration

MATH-123 CALCULUS

1. Definition of the Limit of a Function
2. Asymptotes in Cartesian Coordinates
3. Tracing of Curves in Cartesian
4. Quadrature Section Area

EVS-301 ENVIRONMENT SCIENCE

1. Multidisciplinary Nature of Environmental Studies
2. Nature Resources
3. Ecosystems
4. Biodiversity and its Conservation
5. Environmental Pollution
6. Social Issue and The Environment
7. Human Population and the Environment
8. Field Work

CHEM-121 BASIC INORGANIC CHEMISTRY

1. Atomic Structure
2. Periodic Properties
3. Chemical Bonding - 1
4. Chemical Bonding - 2
5. Ionic solids

PHY-125 MECHANICS & WAVES

1. Mechanics
2. Elastic and Inelastic Scattering
3. Frames of Reference and Relativity
4. Waves Simple Harmonic Free Vibrations
5. Forced Vibration and Resonance

MATH-211 ADVANCED CALCULUS

1. Continuity
2. Limit and Continuity of Real Valued Functions of Two Variables
3. Differentiability
4. Curves

MATH-212 LINEAR ALGEBRA

1. Vector Spaces
2. Homomorphism and Isomorphism of Vector Spaces

3. Algebra of Linear Transformation

4. Inner Product Spaces

PHY-214 OPTICS & THERMAL PHYSICS

1. Optics Interference

2. Diffraction

3. Polarization

4. Thermal Physics

5. Thermodynamics

MATH-213 ORDINARY DIFFERENTIAL EQUATIONS

1. Geometrical Meaning of a Differential Equation

2. Orthogonal Trajectories

3. Equations Reducible to Homogeneous

4. Method of Variation Parameters

5. Simultaneous Equation of the Form

MATH-214 MATHEMATICAL MODELING I

1. Introduction

2. Mathematical Modeling in the Biological

3. Single Species Population Models

4. Two Species population Models

5. Mathematical Modeling of Epidemics

MATH-221 NUMERICAL METHODS

1. Solution of Algebraic and Transcendental

2. Solution of Simultaneous Linear Algebraic

3. Finite Difference and Interpolation Finite Difference Operators

4. Differentiation and Integration Numerical Differentiation

5. Solution of Ordinary Differential Equations Numerical Solution

MATH-222 SEQUENCES 1 SERIES

1. Boundaries

2. Sequence

3. Infinite Series

4. Alternating Series

MATH-223 SOLID GEOMETRY

1. General Equation of Second Degree

2. Sphere

3. Central Conicoids

4. Paraboloids

MATH-224 VECTOR CALCULUS

1. Scalar and Vector Product of Three Vectors

2. Gradient of Scalar Point Function

3. Orthogonal Curvilinear

4. Vector Integration

MATH-225 MATHEMATICAL MODELING II

1. Optimization Models on Real Life Situations

2. Models on the Spread of Technological

3. Mathematical Modeling in Economic Environment

4. Theory of Production

MATH-311 GROUP AND RINGS

1. Definition of a Group with an Example and Simple Properties
2. Homomorphism
3. Introduction to Rings
4. Euclidian Rings

MATH-312 PARTIAL DIFFERENTIAL EQUATIONS

1. Partial Differential Equations
2. Linear Partial Differential Equation of Second and Higher Orders
3. Classification of Linear Partial Differential Equations of Second Order
4. Cauchy's Problem for Second Order Partial

MATH-313 REAL ANALYSIS

1. Riemann Integral
2. Improper Integral and their Convergence
3. Definition and Examples of Metric Spaces
4. Continuous

MATH-314 SPECIAL FUNCTIONS AND INTEGRAL TRANSFORMS

1. Series Solution of Differential Equations
2. Legendre and Hermite Differential Equations and their Solutions
3. Laplace Transforms
4. Fourier Transforms

MATH-315 STATICS

1. Composition and Resolution of Forces
2. Analytical Conditions of Equilibrium of Coplanar Forces
3. Virtual Work
4. Wrenches

STAT-311 STATISTICS

1. Data and its Measures
2. Correlation and Regression
3. Sampling Theory
4. Exact Sampling

MATH-321 DYNAMICS

1. Velocity and Acceleration Along Radical
2. Mass, Momentum and Force
3. Motion on Smooth and Rough Plane Curves
4. General Motion of a Rigid Body

MATH-322 LINEAR PROGRAMMING

1. Linear Programing Problem
2. Convex Sets
3. Charne's Big M-Techniques
4. Transportation

MATH-323 NUMBER THEORY & TRIGONOMETRY

1. Divisibility
 2. Complete Residue System
 3. De Moivre's
 4. Inverse Circular and Hyperbolic
- MATH-324 PROGRAMMING IN C & NUMERICAL METHODS

1. Programmer's Model of a Computer
2. Decision System
3. Strings
4. Simultaneous

MATH-325 REAL & COMPLEX ANALYSIS

1. Jacobians
2. Fourier Series
3. Extended Complex Plane
4. Mappings by Elementary Function

Course Outcome of M.Sc. Mathematics

MATH-521 ANALYSIS

1. Unaccountability
2. Series
3. Riemann-Stieltjes
4. Uniform Convergence of Sequences and Series of Functions

MATH-522 COMPLEX ANALYSIS I

1. Power Series
2. Path in Region
3. Extension of Cauchy Integral Formula for Multiple Connected Domain
4. Maximum Modulus Principle
5. Cauchy Residue Theorem and Its Use to Calculate Certain Integrals

MATH-523 ALGEBRA I

1. Groups
2. Jordan-Hölder Theorem for Finite Groups
3. Sylow Theorems
4. Maximal Ideals in Commutative Ring

MATH-524 NUMERICAL METHODS

1. Root Finding for a Polynomial
2. Solution of Initial-Value
3. Solution of Characteristic value problem
4. Solution of parabolic Equation

MATH-525 ORDINARY DIFFERENTIAL EQUATIONS

1. Some Concepts for Real Functions Theory
2. Introduction
3. The n th - order Nonhomogeneous Linear Equation
4. First and Second Comparison Theorem

MATH-531 ANALYSIS II

1. The Space of Linear Transformation or \mathbb{R}^m as a Metric Space
2. The Implicit Function Theorem
3. Measurable Functions

4. The General Lebesgue Integral

MATH-532 COMPLEX ANALYSIS II

1. Bilinear Transformation
2. Definition and Examples of Conformal
3. The Dirichlet's Problems
4. Extension of Zeta

MATH-533 PROGRAMMING IN C

1. Computer Algorithms
2. Arithmetic Expressions
3. Logical Expression
4. Pointer and its application

MATH-534 ALGEBRA II

1. Factorization theory in Integral Domains
2. Algebraic Extensions and Transcendental Extensions
3. Galois Group and the Fundamental Theorem
4. Linear Operator on finite Dimensional

MATH-535 CURVES AND SURFACES

1. Vector Valued Functions and Their Differentiation
2. Surface in R^3
3. First and Second Fundamental Forms
4. Geodesics

MATH-551 PARTIAL DIFFERENTIAL EQUATION

1. Classification of Second order Partial Differential Equation
2. Derivation of Poisson Equation
3. Equation in Cylindrical Coordinates
4. D'Alemberts Solution

MATH-522 MATHEMATICAL STATISTICS

1. Random Variables
2. Conditional Probability
3. Distribution of Functions
4. Distribution and Expectations

MATH-599 RESEARCH METHODOLOGY

1. History
2. Synopsis Writing
3. Formulation
4. Compilation
5. Financial Support and Various Funding Agencies
6. Computer and Informatics
7. Demonstration

MATH-533 DISCRETE MATHEMATICS

1. Sets, Partition Sets
2. Pigeonhole Principle
3. Graphs
4. Rooted Trees

MATH-561 TOPOLOGY

1. Review of Sets Theory and Metric Spaces
2. Compact spaces

3. T1-spaces and Hausdorff Spaces

4. Connected Spaces

MATH-562 NUMBER THEORY I

1. Divisibility

2. Residue Classes

3. The Greatest Integer Function

4. Binary Quadratic

MATH-563 FUNCTIONAL ANALYSIS

1. Normed Linear Spaces

2. Dual Spaces and Reflexivity

3. Riesz Representation

4. Spectral theory of compact Self-Adjoint

MATH-566 NON-COMMUTATIVE RINGS

1. Preliminaries on Rings

2. Semi-Simple Modules

3. Relation Between Jacobson

4. Essential Submodules and Small submodules

MATH-567 CALCULUS OF VARIATIONS AND ANALYTICAL MECHANICS

1. Shortest Distance

2. Natural Boundary Conditions and Transitions conditions

3. Lagrange's Equations of First and Second Kind

4. Poincare-Cartan Integral Invariant

MATH-564 DIFFERENCE EQUATION

1. Introduction

2. First Order Linear Equation

3. Putzer Algorithm

4. Volterra Summation Equation and Fredholm Summation

MATH-565 CODING THEORY

1. Review of Vector Spaces and Finite Fields

2. Vector Spaces over Finite Fields

3. The Parity-Check Matrix and Syndrome Decoding

4. A Double-Error correcting Binary Code and an Introduction BCH Code

MATH-568 OPERATIONS RESEARCH

1. Hyperplane and Hyperspheres

2. Infeasibility in L.P.P

3. Solution of Linear Inequalities

4. Unbalanced TP

5. Two-person

6. Shortest Path Model

MATH-571 NON LINEAR OPTIMIZATION

1. Convex Hulls

2. Definitions and Basic Properties

3. Unconstrained Problems

4. Lagrangian Dual Problems

MATH-572 NUMBER THEORY II

1. Farey Sequences

2. Minkowski's Theorem in Geometry of Numbers

3. Euler Summation Formula
4. Dirichlet Series

MATH-573 COMMUTATIVE ALGEBRA

1. Ideals
2. Hom Functor
3. Applications to Principal Ideal Domains
4. Integral Element

MATH-574 ALGEBRAIC TOPOLOGY

1. Definition and some Example of Homotopies
2. Fundamental Group and Covering Spaces
3. Fundamental Group of Product Space
4. Calculation of Fundamental Groups

MATH-575 FUZZY SET THEORY AND APPLICATION

1. Basic Definitions of Fuzzy Set
2. Fuzzy Complements
3. Fuzzy Number
4. Crisp and Fuzzy Relation

MATH-576 STOCHASTIC PROCESSES

1. Rudiments of Probability Theory
2. Dependence & Independence of Random Variables
3. Integer Valued Random Variables
4. The Gambler's Ruin Problem

MATH-577 APPLIED FUNCTIONAL ANALYSIS

1. Review of Basic Properties of Hilbert Spaces
2. Minkowski Functional
3. Spectral Theory of Operators
4. L₂ Spaces over Hilbert Spaces

MATH- 578 FLUID MECHANICS

1. Real Fluids and Ideal Fluids
2. Impulsive Motion
3. Karman Vortex Street Stress Components
4. Steady flow Past a Fixed Sphere

COURSE OUTCOME OF B.SC. ZOOLOGY (HONS)

MATH-111 BASIC MATHEMATICS-1

1. Mensuration
2. Mensuration- II
3. Algebra
4. Algebra -II
5. Co-ordinate Geometry

BOT-101 BASIC BOTANY

1. Classification and Introduction
2. Roots
3. Inflorescence

4. Pollination

5. Reproduction in Plants

CHEM-111 BASIC ORGANIC CHEMISTRY

1. Structure and Bonding

2. Types of Reagents

3. Stereochemistry - 1

4. Stereochemistry - 2

5. Alkanes and Cycloalkanes

PHY-114 BASIC PHYSICS-I (ELECTRICITY, MAGNETISM & ELECTRONICS)

1. Vector Analysis

2. Current Electricity

3. Maxwell's Equations

4. Conduction in Semiconductors

5. Transistor

ENG-101 BASIC COMMUNICATION SKILLS

1. Poetry

2. Essays

3. Short Stories

4. Grammar

EDU-101* HUMAN VALUES AND ETHICS

1. Understanding the Need

2. Understanding the Human Being

3. Basis for Universal Human Values

4. Professional Ethics

5. The Holistic

COMP-101 INTRODUCTION TO COMPUTER APPLICATIONS

1. Introduction to Computer

2. Computer Systems

3. Peripheral Devices

4. Data Processing and Storage

PBI-111 PUNJABI LAZMI

CHEM-121 BASIC INORGANIC CHEMISTRY

1. Atomic Structure

2. Periodic Properties

3. Chemical Bonding - 1

4. Chemical Bonding - 2

5. Ionic Solids

MATH-121 BASIC MATHEMATICS-1

1. Trigonometry

2. Logarithm and their Applications

3. Elementary Calculus

4. Elements of Matrices and Determinants

ZOO-101 BASIC ZOOLOGY

1. Introduction to Zoology

2. Zoological Nomenclature and Principles of Classification

3. Chordates

4. Functional Anatomy of Respiratory

PHY-124 BASIC PHYSICS-LL (OPTICS AND MODERN PHYSICS)

1. Optics Interference

2. Polarization

3. Modern Physics

4. Quantum Mechanics

5. Statistical Mechanics

BIOCHEM-121 CELL BIOLOGY

1. An Overview of Cells

2. Cell Cycle

3. Endoplasmic

4. Nucleus

5. Oncogenesis

EVS-301 ENVIRONMENT SCIENCE

1. Multidisciplinary Nature of Environmental Studies.

2. Natural Resources

3. Ecosystem

4. Biodiversity

5. Environmental

6. Social Issues

7. Human Population and the Environment

8. Field Work

STAT-102 STATISTICS

1. Introduction

2. Probability

3. Small Sample Test For Means

4. Linear Regression

BOT-121 ALGAE

1. Classification of Algae

2. Salient Features

3. Economic Aspects

4. Distribution

5. Rhodophyta

ZOO-211 DIVERSITY OF NON CHORDATES-I

1. Introduction to Non-Chordate

2. Classification of the Cnidaria

3. Classification of the Aschelminthes

4. Classification of the Annelida

5. Classification of the Platyhelminthes

CHEM-211 BASIC PHYSICAL CHEMISTRY

1. Gaseous states

2. Velocities

3. Chemical Kinetics

4. Thermodynamics

5. Free Energy and Work Function

ZOO-212 ANIMAL PHYSIOLOGY

1. Digestion
2. Respiration
3. Muscle
4. Circulatory System
5. Endocrine System
6. Reproduction

PBG-101 GENETICS

1. Elements of Heredity and Variation
2. Chromosomes and Heredity
3. Gene Interactions
4. Mutations and Mutagens
5. Nucleic Acid

ZOO-213 DIVERSITY OF CHORDATES -1

1. Protochordates
2. Cyclostomata
3. Chondrichthyes
4. Actinopterygii
5. Detail Study of Pisces

MICRO-211 GENERAL MICROBIOLOGY

1. History and Scope of Microbiology
2. General Account of Morphology
3. Principles of Microscopic
4. Reproductions and Growth of Microorganisms
5. Control of Microorganisms

BIOCHEM-211 ELEMENTARY BIOCHEMISTRY

1. Introduction and Importance
2. Lipids
3. Metabolism
4. Biosynthesis
5. Secondary

BOT-211 FUNGI

1. Characteristic Features and Classification
2. General Account of the Following Group of Fungi
3. BASIDIOMYCOTA
4. Lichens
5. Lichens

ZOO-221 DIVERSITY OF NON CHORDATES-I

1. Importance of Arthropoda
2. Importance of Echinodermata
3. Importance of Mollusca
4. Detail Study

ZOO-222 DIVERSITY OF CHORDATES -II

1. Ecological Notes of Amphibia

2. Ecological Notes of Reptilia

3. Ecological Notes of Aves

4. Ecological Notes of Mammalia

ZOO-223 ANIMAL ECOLOGY & ENVIRONMENTAL BIOLOGY

1. Ecology

2. Ecological Factors

3. Population

4. Biotic Community

5. Natural Resources

ZOO-224 INTRODUCTION TO ANIMAL BIODIVERSITY

1. Description of Biodiversity

2. Locomotion and Reproduction in Protista

3. Parasitic Adaptations

4. Salient Features of Protochordates

5. Terrestrial Adaptations and Parental Care in Reptiles

BOT-221 GYMNOSPERMS

1. Development in Classification

2. Morphology and Life History of Cycas (Cycadales)

3. Morphology and Life History Pinus (Coniferales)

4. Morphology and Life History Ephedra (Ephedrales)

5. Pteridospermic

BOT-224 SYSTEMATICS OF ANGIOSPERMS

1. Angiosperms

2. Criteria of Primitive and advanced Nature of Families of Floral Structure

3. Botanical Nomenclature

4. Diversity of Flowering

ZOO-225 TAXONOMY & PALEONTOLOGY

1. Definitions

2. History

3. Population Structures of Species

4. Introduction of Paleontology

5. Origin of Vertebrates

ZOO-311 IMMUNOLOGY

1. Introduction

2. Immune Cells

3. Antigens

4. Major Histocompatibility complex

5. Complement System

6. Generation of Immune Response

ZOO-312 DEVELOPMENTAL BIOLOGY

1. Gametogenesis

2. Egg Maturation

3. Development

4. Fate Maps

5. Tissue Interactions

ZOO-313 COMPARATIVE ANATOMY OF CHORDATES -1

1. Integumentary System
2. Skeletal System
3. Muscle System
4. Digestive System
5. Respiratory System

ZOO-314 ANIMAL BEHAVIOR & CHRONOBIOLOGY THEORY

1. Definition of Behavior
2. Types of Behavior
3. Introduction to Chronobiology
4. Biological Rhythm Types and Characteristics
5. Biological Clocks Relevance of Biological Clocks

ZOO-315 APPLIED ZOOLOGY

1. Useful Animals and their Products
2. Important Human and Veterinary
3. Molecular
4. Arthropods and Vectors of Human
5. Biology and Control

ZOO-316 ZOOTECHNIQUES

1. Collections
2. Ethical Issues
3. collection of Tissues
4. Principle of Microscopy and its Upkeep
5. Tissue Processing for Biochemical Estimations

ZOO-317 WILDLIFE AND ITS IMPORTANCE

1. Concept and Importance of wild life
2. Wild Life Habitat
3. Wild Life Management
4. Ecological Monitoring
5. Case Study

BIOTECH-321 BIOINFORMATICS

1. Bioinformatics
2. Biological Databases
3. Tools for Database Search
4. Gene Identification
5. Bioinformatics and Drug Design

ZOO-321 COMPARATIVE ANATOMY OF NON-CHORDATES

1. General Organization of Protozoan
2. General Organization of and Importance of Parasitic Protozoan's
3. Generation in Coelenterate
4. Platyhelminthes

ZOO-322 COMPARATIVE ANATOMY OF CHORDATES -II

1. Sense Organs
2. Circulatory System
3. Nervous System

4. Urinogenital

5. Comparative account of Reproductive

BIOCHEM-321 PRINCIPLES OF INSTRUMENTAL ANALYSIS

1. Absorption Spectroscopy

2. Chromatography

3. Electrophoresis

4. General Laboratory

5. Radioisotopic Techniques

6. Microscopy

ZOO-323 INSECT MORPHOLOGY AND SYSTEMATICS

1. History of Entomology

2. Morphology

3. Structure and Functions of Digestive

4. Systematics

5. Classification

BIOCHEM-325 RECOMBINANT DNA TECHNOLOGY

1. Molecular Tools

2. Vectors and Gene Cloning

3. Advanced Techniques

4. Methods of Gene Transfer

5. DNA Sequencing

ZOO-324 WILD LIFE CONSERVATION

1. Wild Life Conversation

2. Special Conversation

3. Wild Life Trade And Legislation

4. Wild Life Laws and Ethics

5. National Wild Life Action Plan 2002

COURSE OUTCOME OF B.Sc. BOTANY

Course outcomes:

The courses of Botany subjects as in Bachelor (B.Sc. Hons.) and Master of Science (M.Sc.) programs were started in 2016-17 academic year by Eternal University, Baru-Sahib (H.P.). Botany program provides a broad background in the biology of plants - from the molecular to the organism level. Botany covers a wide range of scientific disciplines concerned with the study of plants, which includes Algae, Bryophytes, Pteridophytes, Gymnosperms, Angiosperms, Fungi, including structure, growth, reproduction, metabolism, development, diseases, chemical properties, and evolutionary relationships among taxonomic groups. Students of botany also take courses in The Department is providing its students with a broad knowledge of botany and equipping them with the tools and drives to conduct original independent research in the disciplines of plant sciences. The programs in botany will help in meeting the manpower requirements of institutions of higher learning and research centers by Further students are expected to make influential contributions to scientific discovery and engage in formal and informal teaching and mentoring, and progress to careers in academia, industry, government and non-

Students of Botany are required to undertake a field excursion of local flora and herbarium preparation, participation in tutorials and seminars. The course syllabus is designed in a way that it will not only impart the theoretical but practical training also. The duration of the course is two years and the syllabus for the course is divided into four semesters. Students are provided with research problems of their interest related to plant Program Specific Outcomes (PSOs):

The B.Sc. and M.Sc. programs in botany will help in meeting the manpower requirements of institutions of lower as well as higher learning and research centers by providing qualified professional biologists. Further students are expected to make influential contributions to scientific discovery and engage in formal and informal teaching and

MATH-111 BASIC MATHEMATICS-1

1. Mensuration of Rectangles
2. Volumes of Cubes and Rectangular Solids
3. Algebra
4. Co-ordinate Geometry

CHEM-111 BASIC ORGANIC CHEMISTRY

1. Structure and Bonding
2. Types of Reagents
3. Stereochemistry - 1
4. Stereochemistry - 2
5. Alkanes Cycloalkanes

PHY-114 BASIC PHYSICS-1

1. Vector Analysis
2. Current Electricity
3. Maxwell's Equations
4. Conduction in Semiconductors
5. Transistor

ENG-101 BASIC COMMUNICATION SKILLS

1. Poetry
2. Essays
3. Short Stories
4. Grammar

EDU-101* HUMAN VALUES AND ETHICS

1. Understanding the Need
2. Understanding the Human Being
3. Basis for Universal Human Values
4. Professional Ethics
5. The Holistic Criteria for Evaluation

COMP-101 INTRODUCTION TO COMPUTER APPLICATIONS

1. Introduction to Computer
2. Computer Systems
3. Peripheral Devices

4. Data Processing

PBI-111 PUNJABI LAZMI

CHEM-121 BASIC INORGANIC CHEMISTRY

1. Atomic Structure
2. Periodic Properties
3. Chemical Bonding - 1
4. Chemical Bonding - 2
5. Ionic Solids

MATH-121 BASIC MATHEMATICS-LL

1. Trigonometry
2. Logarithm
3. Elementary Calculus
4. The Further Differentiation
5. Elements of Matrices and Determinants

PHY-124 BASIC PHYSICS- II

1. Optics, Interference
2. Polarization
3. Modern Physics
4. Quantum Mechanics
5. Statistical Mechanics

BIOCHEM-121 CELL BIOLOGY

1. An Overview of Cells
2. Cell Cycle
3. Endoplasmic Reticulum
4. Nucleus
5. Oncogenesis

EVS-301 ENVIRONMENT SCIENCE

1. Multidisciplinary Nature
2. Ecosystem
3. Biodiversity
4. Environmental Pollution
5. Social Issue and The Environment

PBG-101 GENETICS

1. Elements of Heredity and Variation
2. Chromosomes and Heredity
3. Gene Interactions and Modified Dihybrid Ratio
4. Mutations and Mutagens
5. Nucleic

STAT-102 STATISTICS

1. Introduction
2. Probability
3. Small Sample Test for Means
4. Linear Regression

BOT-121 ALGAE

1. Classification of Algae
2. Salient Features
3. Economic Aspects
4. Distribution
5. Rhodophyta

BOT-211 FUNGI

1. Characteristic Feature and Classification
2. General Account of The Following Groups of the Fungi
3. BASIDIOMYCOTA
4. Lichens
5. Lichens

BOT-212 BRYOPHYTES

1. General Characteristics
2. Origin
3. Gametophyte
4. Sporophyte
5. Ecological Significance

BOT-213 PTERIDOPHYTES

1. General Characters of Pteridophytes
2. Criteria and Comparative System of Classification of Ferns and Fern allies
3. The Earliest Known Records of Pteridophytes with special Reference to Rhynia
4. Psilotum, Lycopodium

ZOO-211 DIVERSITY OF NON-CHORDATES-I

1. Introduction to Non-Chordate
2. Importance of Obelia, Aurelia
3. Classification upto Orders with brief Ecological Note
4. Importance of Pheretima
5. Importance of Fasciola

ZOO-213 DIVERSITY OF CHORDATE-I

1. Notes on the Protochordates
2. Notes on Cyclostomata
3. Chondrichthyes
4. Actinopterygii

MICRO-211 GENERAL MICROBIOLOGY

1. History of Scope of Microbiology
2. General Account of Morphology
3. Principles of Microscopic
4. Reproduction and Growth of Microorganisms
5. Control of Microorganisms

CHEM-211 BASIC PHYSICAL CHEMISTRY

1. Gaseous States
2. Velocities
3. Chemical Kinetics
4. Thermodynamics
5. Free Energy and Work Function

BIOCHEM-211 ELEMENTARY BIOCHEMISTRY

1. Introduction and Importance
2. Lipids
3. Metabolism
4. Biosynthesis
5. Secondary Metabolites

BOT-221 GYMNOSPERMS

1. Developments in Classification
2. Morphology and Life History
3. Development of Gametophyte
4. Pteridospermic

BOT-222 EMBRYOLOGY OF ANGIOSPERM

1. Historical Account of Embryology of Angiosperms
2. Stamen
3. Pollen
4. Pollination
5. Endosperm

BOT-223 PLANT PHYSIOLOGY

1. Plant-Water Relations
2. Photosynthesis
3. Transport of Organic Substances
4. Growth and Development
5. Vernalization

BOT-224 SYSTEMATICS OF ANGIOSPERMS

1. Angiosperms
2. Criteria for Primitive and Advanced Nature of Families and Flowers
3. Botanical Nomenclature
4. Diversity of Flowering Plants as illustrated by Members of Families

BOT-225 PLANT DEVELOPMENT & ANATOMY

1. Cytodifferentiation and Organogenesis During Embryonic Development
2. Leaf
3. Root
4. Vascular Cambium Structure and Function
5. Adaptive and Protective Systems Epidermal Tissue System

ZOO-221 DIVERSITY OF NON-CHORDATES-LL

1. Classification upto orders with Ecological Notes and Economic Importance
2. Details Study Including Morphology
3. Echinodermata
4. Classification Details Study Including Morphology

ZOO-222 DIVERSITY OF CHORDATES-LL

1. Characteristics of Vertebrata and its Groups.
2. Reptilia
3. Detail Study Including Morphology
4. Reptilia
5. Details study including Morphology

BOT-311 ETHNOBOTANY

1. Ethnobotany
2. Documentation
3. Methodology and Study of Ethnobotany
4. Plant Used for various Purpose
5. Plant used in Medicine with Special Reference to Following

BOT-312 PALEOBOTANY

1. Introduction , Basis Principle of Paleobotany
2. Fossil Bryophytes
3. Class Bryopsida
4. First Vascular Plants
5. Fossil Gymnosperms

BOT-313 PHYTOPATHOLOGY

1. Symptomatology in Fungal Infection of Plants
2. Disease Forecasting and Control of following Diseases
3. Groundnut
4. Diseases Caused by plant Viruses

BOT-314 PLANT ECOLOGY AND ENVIRONMENT

1. Introduction
2. Ecosystem
3. Biogeochemical cycles
4. Ecological Succession
5. Aquatic Ecology

BOT-315 PLANTS AND HUMAN WELFARE (ECONOMIC BOTANY)

1. Wood and Cork
2. Gums
3. Industrial Fatty Oils
4. Crops
5. Plant Pathology

BOT-316 PLANT MORPHOGENESIS

1. Plant Morphogenesis
2. Types of Cultures
3. Callus Cultures
4. Organogenesis and Differentiation
5. Protoplast

BOT-321 MOLECULAR BIOLOGY

1. DNA
2. Genetic Code
3. Transposable Elements
4. Types of Microscopes
5. Regulation of Gene Expression

BOT-322 PLANT BIOTECHNOLOGY

1. Introduction
2. Protoplast Culture-Isolation
3. Gene Transfer in Nuclear Genome and Chloroplasts
4. Male Sterility
5. Recombinant DNA Technology

BOT-323 PLANT BREEDING AND CROP IMPROVEMENT

1. Plant Breeding Introduction
2. Self-Incompatibility
3. Germplasm and its Conservation
4. Improvement in Self- Polinated Crops
5. Mutation Breeding

BOT-324 CYTOGENETICS

1. Chromosome
2. Euploidy
3. Mendelian Laws
4. Origin of Life
5. Synthetic Theory of Evolution

BIOTECH-321 BIOINFORMATICS

1. Bioinformatics
2. Tools for Database Search
3. Gene Identification and Prediction
4. Bioinformatics

BIOCHEM-321 PRINCIPLES OF INSTRUMENTAL ANALYSIS

1. Absorption Spectroscopy
2. Chromatography
3. Electrophoresis
4. General Laboratory Techniques
5. Radioisotopic
6. Microscopy

BIOCHEM-322 PLANT BIOCHEMISTRY

1. Photosynthesis
2. Nitrogen and Sulfur Cycles
3. Introduction to Phenyl Propanoid
4. Signals Regulating the Growth and Development of Plant Organs
5. Genetic Engineering of Plant

Course Outcome of M.Sc. Botany

BOT-511 BRYOLOGY

1. Modern System of Classification with Salient Features
2. Ontogeny of Antheridia and Archegonia
3. Evolution of Sporophyte in Bryophytes
4. Substratum Ecology
5. Bryogeography and Conservation of Bryophytes

BOT-512 PTERIDOLOGY

1. Origin and Evolution of Pteridophytes
2. Classification of Pteridophytes with Special Reference to Ferns
3. Comparative Morphology of the Sporophyte
4. Spore Structure
5. Natural and Induced Apogamy and Apospory in Pteridophytes

BOT-513 GYMNOSPERMS

1. Current Trends in the Classification of Gymnosperms
2. Distribution of Gymnosperms with Special Reference to Indian Members and Emphasis
3. Vegetative Morphology and Reproductive Organs only
4. Cytological Studies in Gymnosperms

BOT-514 PLANT RESOURCE UTILIZATION

1. General Account
2. Psychoactive
3. Medicinal Plants
4. Aromatic Plants
5. Insecticides

BOT-515 ANGIOSPERMS: PHYLOGENY & EMBRYOLOGY

1. The Origin of Angiosperms

2. Development Of Male and Female Gametophytes
3. Apomixis
4. Polyembryony
5. Experimental Embryology

BOT-516 PHYCOLOGY

1. Diversity in Algal Habitats
2. Thallus Organization in Algae
3. Current Concepts and Relationships of Prochlorophycean Algae
4. Rhythms and Bioluminescence in Dinoflagellates
5. Economics Importance of Algae

BT-501 CELL & MOLECULAR BIOLOGY

1. Evolution of Cell and Biological Macromolecules
2. Structure and Function of Plasma Membrane
3. Chromosome Organization
4. Transcription Process in Prokaryote and Eukaryotes
5. Translation Process

BOT-521 PLANT ANATOMY

1. Structure and Activity of Vascular and Cork Cambia
2. Phloem
3. The Leaf
4. Seed Coat Anatomy with Reference to Legumes and Cereals
5. Anatomy in Relation to Taxonomy

BOT-522 TAXONOMY OF ANGIOSPERMS

1. Significance
2. Herbarial Practices
3. Diagnostic Key
4. Botanical Latin
5. Numerical Taxonomy

BOT-523 CYTOGENETIC & PLANT BREEDING

1. Genomes
2. Fine Structure of Gene Coding and Noncoding Sequences
3. DNA Enzymes
4. Genetic Recombination
5. Principles of Plant Breeding

BOT-524 ENVIRONMENTAL BOTANY

1. Local Problems
2. Management and Conservation of Natural Resources
3. Biodiversity
4. Ozone Depletion
5. Weed Ecology and Management

BOT-525 MYCOLOGY

1. Kingdom Fungi
2. Structure and Reproduction
3. General Characteristics and Classification
4. A Detailed account of the different orders
5. Phylum Hyphochtriomycota

BOT-591 SYNOPSIS SEMINAR

1. Objective
2. Teaching Methodology

BIOCHEM-522 BIOCHEMISTRY AND MOLECULAR BIOLOGY OF PLANTS

1. Plant Cell Organelles
2. Synthesis and Transport of Sucrose
3. Biochemistry of Nitrogen Fixation
4. Biochemistry and Significances of Secondary metabolites
5. Molecular Biology of Various Stresses

BT-507 PLANT & ANIMAL BIOTECHNOLOGY

1. Historical Perspectives
2. Protoplast Isolation
3. Vectorless and Vector Mediated Transformation
4. Different Types of Culture Media and Cell Cultures
5. In Vitro Fertilization

BOT-531 FORESTRY

1. Silviculture
2. Forest Protection
3. Forests Types
4. Forest Effects
5. Social and Urban Forestry

BOT-532 COMPREHENSIVE TEST & FIELD BOTANY

1. Objective
2. Teaching Methodology

BOT-533 PLANT PATHOLOGY

1. Introduction, History of Plant Pathology
2. Host Parasite Interaction
3. Genetics of Plant Pathogens
4. Dispersal of Plant Pathogens
5. Disease Control

BOT-534 PLANT PHYSIOLOGY

1. Membranes
2. Plant Respiration
3. Photosynthesis

4. Nitrogen Fixation
5. Plant Hormones

BOT-591 SEMINAR

1. Objective
2. Teaching Methodology

BOT-599 RESEARCH METHODOLOGY

1. History, Myths and Ethnic Practices
2. Research Infrastructure
3. Computer and Informatics
4. Formulations and Types of Hypothesis
5. Writing of Manuscripts

BT-505 COMPUTATIONAL BIOLOGY & BIOSTATISTICS

1. Introduction and Definition of Biostatistics
2. Test of Significance Based on Z
3. Protein and Gene Information Resources
4. Introduction to Sequence Comparison
5. Gene Finding Algorithms

BT-513 GENETIC ENGINEERING

1. Scope and Milestones in Genetic Engineering
2. Extraction
3. Construction
4. Expression in Heterologous System
5. Genetic Manipulation of Higher Animals

Course Outcome of M.Sc. Environmental Science

MATHS- 421 MATHEMATIC FOR ENVIRONMENTAL SCIENCE

1. Function and its Application
2. Differentiation and Integration
3. Differential Equations
4. Matrices and Determinants
5. MATLAB

BIO-421 Biology for Environmental science

1. Introduction
2. Biological Communities and Ecosystem
3. Plant Diversity
4. Animal Diversity
5. Microbial Diversity
6. Conservation Biology

EVS-501 FUNDAMENTALS OF ENVIRONMENT SCIENCE

1. Introduction
2. Environmental components Biotic and Abiotic Components, Their Interaction

3. Biogeographical Regions and Ecological Succession

4. Earth System

5. Atmosphere

EVS-502 ENVIRONMENTAL CHEMISTRY

1. Fundamentals of Environmental Chemistry

2. Chemical compositions of Air

3. Water Chemistry and Hydrologic Cycle

4. Soil Chemistry and Biogeochemical Cycle

5. Toxic Chemicals in the Environment

EVS-503 ENVIRONMENTAL MICROBIOLOGY

1. Microorganism in environment

2. Microbiology of Air

3. Use of Environmental Microbes

4. Microbiology of Water

5. Water Analysis for Microbes

EVS-504 REMOTE SENSING, GIS AND ENVIRONMENTAL PHYSICS

1. Introduction to Remote Sensing and Geographical Information System (GIS)

2. Applications of GIS and Remote Sensing

3. The Atmosphere

4. Atmospheric Motions

5. Techniques Environmental Physics

STAT-501 STATISTICAL METHODS

8. Presentation of Data

9. Measures of Location And Dispersion

10. Probability and Distribution

11. Correlation and Regression

12. Sampling

13. Tests of Significance

14. Experimental Design

EVS-598 RESEARCH METHODOLOGY

9. Introduction

10. Synopsis writing

11. Collection and Analysis of Data

12. Reports and Theses Writing

13. Funding

14. Computer and Informatics

15. Departmental Research Activities and Instrumentation

16. Library and information services

EVS-505 ENERGY AND ENVIRONMENT

1. Energy Resources and Their Exploitation

2. Fossil Fuels

3. Hydrogen as an Energy Source

4. Impact of Energy Use

5. Energy Related Environmental

EVS-506 ENVIRONMENTAL POLLUTION AND ITS MANAGEMENT

1. Air Pollution
2. Water Pollution
3. Soil Pollution
4. Noise Pollution
5. Thermal Pollution

EVS-507 ENVIRONMENTAL PHYSIOLOGY OF PLANTS & ANIMALS

1. Introduction
2. Environmental Adaptations of Plants
3. General Characteristics of Adaptations in Animals
4. Responses of Animals to Chemical Agents

EVS-508 NATURAL RESOURCES AND THEIR MANAGEMENT

1. Introduction
2. Forest Resources
3. Water Resources
4. Land Resources
5. Mineral Resources
6. Food Resources

EVS-509 REGIONAL & GLOBAL ENVIRONMENTAL ISSUE

1. Contemporary and Emerging Environmental Issue
2. Climate changes
3. Adaptation and Mitigation Options to Climate Changes
4. Waste Disposal and Managements
5. Urbanization
6. Environmental Toxicants and Human Health

EVS-510 BIO-DIVERSITY AND ITS CONSERVATION

1. Introduction
2. Uses of Biodiversity
3. In Situ Biodiversity Conservation
4. Ex Situ Biodiversity Conservation
5. National and International Effort for Biodiversity Conservation

BT-529 ENVIRONMENTAL INSTRUMENTAL AND TECHNIQUES

1. Microscopy
2. Radioisotopy
3. Chromatography
4. Electrophoresis
5. Dialysis
6. Environmental Techniques

EVS-511 ENVIRONMENTAL LAWS AND POLICY

1. Environmental Protection Laws in India
2. Statutory Protection of the Human Environment
3. Fundamental Right and Duties
4. Scheme of Labeling of Environmentally Friendly Products
5. International and National Organization

EVS-512 ENVIRONMENTAL IMPACT ASSESSMENT

1. Introduction

2. EIA Notification of Govt. of India
3. Data Collection
4. Impact Assessment Methodology
5. EIA Review and Management

EVS-513 SIMULATION & MODELING IN ENVIRONMENTAL SYSTEM

1. Introduction
2. Growth Models
3. Two species Models
4. Some Predator- Prey Models
5. Data Requirements & Limitation of Modeling

BT-515 BIOSAFETY BIOETHICS & IPR

1. Introduction
2. Biosafety and Risk Assessment
3. Laboratory and Environmental Biosafety
4. Ecological Aspects of GMOs
5. Intellectual Property Right

Course Outcome of B.Sc. Medical & Non-Medical

CHEM-101 BASIC ORGANIC CHEMISTRY

1. Structure and Bonding
2. Mechanism of Organic Reactions
3. Alkanes and Cycloalkanes
4. Arenes and Aromaticity
5. Alkenes
6. Cycloalkanes, Dienes and Alkynes
7. Alkyl and Aryl Halides

CHEM-102 BASIC IN-ORGANIC CHEMISTRY

1. Atomic Structure
2. Periodic Properties
3. Chemical Bonding - I
4. Chemical Bonding - II
5. Ionic Solids
6. S-Block Elements
7. P-Block Elements

CHEM-103 LABORATORY WORK

1. Inorganic Chemistry
2. Physical Chemistry
3. Organic Chemistry
4. Viva-Voce
5. Record

CHEM-151 BASIC PHYSICAL CHEMISTRY

1. Gaseous States
2. Critical Phenomenon
3. Velocities
4. Liquid State

5. Liquid Crystals
6. Colloidal State
7. Diffractions
8. Solid Solutions

CHEM-152 CHEMISTRY OF D & F BLOCK ELEMENTS

1. Chemistry of D-block Elements
2. Transition Metal Compounds
3. Chemistry of Lanthanides
4. Chemistry of Actinides
5. Nuclear Chemistry
6. Co-ordination Chemistry

CHEM-153 LABORATORY WORK

1. Organic Chemistry
2. Physical Chemistry (one Experiment only)
3. Inorganic
4. Viva
5. Records

CHEM-201 THERMODYNAMICS & SOLUTION CHEMISTRY

1. Thermodynamics
2. Free Energy and work Functions
3. Partial Molar Properties
4. Chemical Kinetics
5. Statistical thermodynamics

CHEM-202 STEREOCHEMISTRY & REACTION MECHANISM

1. Stereochemistry
2. Alcohols
3. Phenols
4. Ethers and Epoxides
5. Carboxylic Acids
6. Carboxylic Acids Derivatives

CHEM-203 LABORATORY WORK

1. Inorganic Chemistry
2. Organic Chemistry
3. Record
4. Viva

CHEM-251 MOLECULAR REARRANGEMENT AND HETEROCYCLIC CHEMISTRY

1. Aldehydes and Ketones
2. Nitro Compounds
3. Amino Compounds
4. Molecular Rearrangements Involving Electron Deficient Species
5. Heterocyclic Chemistry
6. Organometallic Compounds

CHEM-252 CHEMICAL BONDING AND CO-ORDINATION CHEMISTRY

1. Acids and Bases
2. Non-aqueous
3. Covalent Bond- I
4. Covalent Bond - II
5. Co-ordination Chemistry

CHEM-253 LABORATORY WORK

1. Analytical Chemistry
2. Physical Chemistry
3. Record
4. Viva

CHEM-301 QUANTUM CHEMISTRY AND ELECTROCHEMISTRY

1. Elementary Quantum Mechanics
2. Molecular Orbital Theory
3. Heat Capacity of Solids
4. Electrochemistry - I
5. Electrochemistry - II

CHEM-302 STUDY OF BIOMOLECULES & SYNTHETIC POLYMERS

1. Carbohydrates
2. Amino Acids Peptides and Proteins
3. Nucleic Acids, Pats and Detergent
4. Synthetic Polymers
5. Organic Synthesis via Enolates
6. Nuclear Magnetic Resonance NMR Spectroscopy

CHEM-303 LABORATORY WORK

1. Organic Chemistry
2. Physical Chemistry
3. Inorganic Chemistry
4. Viva
5. Records

CHEM-351 ORGANOMETALLICS COMPOUNDS & SPECTRA OF TRANSITION METAL COMPLEXES

1. Metal Ligand Bonding in Transition Metal Complexes
2. Megneto Chemistry
3. Thermodynamics and Kinetic Aspects of Metal Complexes
4. Organometallic Compunds
5. Electron Spectra of Transition Metal Complexes

CHEM-352 SPECTROSCOPY AND PHOTOCHEMISTRY

1. Molecular Structure and Physical Properties
2. Spectroscopy
3. Rotational Spectra
4. Electronic Spectra
5. Photochemistry

CHEM-353 LABORATORY WORK

1. Inorganic Preparation
2. Organic
3. Physical

4. Viva
5. Records

COURSE OUTCOME OF B.Sc. MICROBIOLOGY (HONS)

BOT-101 BASIC BOTANY

1. Morphology
2. Roots
3. Inflorescence
4. Pollination
5. Reproduction

CHEM-111 BASIC ORGANIC CHEMISTRY

1. Structure and Bonding
2. Types of Reagents
3. Stereochemistry - 1
4. Stereochemistry - 2
5. Alkanes and Cycloalkanes

PHY-114 BASIC PHYSICS-1

1. Vector Analysis
2. Current Electricity
3. Maxwell's Equations
4. Conduction in Semiconductors
5. Transistor

ENG-101 BASIC COMMUNICATION SKILLS

1. Poetry
2. Essays
3. Short Stories
4. Grammar

EDU-101* HUMAN VALUES AND ETHICS

1. Understanding the Need of Human Values
2. Understanding the Human Being as Co-Existence of Self
3. Basis for Universal Human Values and Ethical Human Conduct
4. Professional Ethics
5. The Holistic Criteria for Evaluation

COMP-101 INTRODUCTION TO COMPUTER APPLICATIONS

1. Introduction to Computer
2. Computer System
3. Peripheral Devices
4. Data Processing and Storage

CHEM-121 BASIC INORGANIC CHEMISTRY

1. Atomic Structure
2. Periodic Properties
3. Chemical Bonding - I
4. Chemical Bonding - II

5. Ionic Solids

ZOO-101 BASIC ZOOLOGY

1. Introduction to Zoology
2. Zoological Nomenclature
3. Chordates
4. Physiology

PHY-124 BASIC PHYSICS- II

1. Optics, Interference
2. Polarization
3. Modern Physics, Particle Properties of Waves
4. Quantum Mechanics
5. Statistical

BIOCHEM-121 CELL BIOLOGY

1. An Overview of Cell
2. Cell Cycle
3. Endoplasmic
4. Nucleus
5. Oncogenesis

EVS-301 ENVIRONMENTAL SCIENCE

1. Multidisciplinary
2. Natural Resource
3. Ecosystems
4. Biodiversity
5. Environmental Pollution
6. Social Issue and the Environment
7. Human Population
8. Field Work

PBG-101 GENETICS

1. Elements of Heredity Variation
2. Chromosomes and Heredity
3. Gene Interactions and Modified Dihybrid Ratio
4. Mutations and Mutagens
5. Nucleic Acids

STAT-102 STATISTICS

1. Introduction
2. Probability
3. Small Sample Test for Means
4. Linear Regression

CHEM-211 BASIC PHYSICAL CHEMISTRY

1. Gaseous States
2. Velocities
3. Thermodynamic
4. Free Energy and Work Function

BIOCHEM-211 ELEMENTARY BIOCHEMISTRY

1. Introduction and Importance
2. Lipids
3. Metabolism

4. Biosynthesis
 5. Secondary Metabolites
- MICRO-211 GENERAL MICROBIOLOGY
1. History and Scope of Microbiology
 2. General Account of Morphology
 3. Principles of Microscopic Techniques
 4. Reproduction and Growth of Microorganisms
 5. Control of Microorganisms

MICRO-212 BACTERIOLOGY

1. General Characteristics
2. Detailed Structure of Cell Walls of Gram Positive Bacteria
3. Pure Culture Isolation
4. Endospore Forming Bacteria
5. Bacterial Taxonomy

MICRO-213 MYCOLOGY

1. Introduction to Fungi
2. Fungal Growth and Development
3. Fungal Nutrition
4. Fungal Genetics
5. Mycotechnology

MICRO-214 PHYCOLOGY

1. General Classification
2. Nutrition and Metabolism
3. Phycovirus
4. Environmental and Economic Importance of Algae

BIOCHEM-221 INTRODUCTORY ENZYMOLOGY

1. Introduction to Enzymes
2. Role of Conenzymes
3. Mechanism of Catalysis
4. Monomeric Enzymes
5. Enzyme Kinetics

MICRO-221 INDUSTRIAL MICROBIOLOGY

1. Introduction to Industrial Microbiology
2. Introduction to Fermentation
3. Components and Functioning of Fermenter and Bioreactor
4. Inoculum for Fermentation
5. Productions of SCPs

MICRO-222 SOIL MICROBIOLOGY AND BIOREMEDIATION

1. Introduction to Soil Microbes
2. Association of Microbes and Higher Plants
3. Nitrogen Fixation
4. Microbial Interaction
5. Microbial Bioremediation

MICRO-223 ENVIRONMENTAL MICROBIOLOGY

1. Introduction to Environment

2. Microbial Biodegradation of Petroleum Product in Terrestrial and Ocean Environment
3. Microbiology of Air
4. Microbiology of Water
5. Quantitative and Qualitative Methods of Water Analysis

MICRO-224 FOOD AND DIARY MICROBIOLOGY

1. Foods as a Substrate for Microorganisms
2. Food Preservation
3. Fermented Foods
4. Food Borne Diseases
5. Food Sanitation and Control

MICRO-311 MICROBIAL PHYSIOLOGY AND METABOLISM

1. Introduction to Microbial Physiology
2. Microbial Nutrition
3. Entner-Duodoroff Pathway
4. Biological Nitrogen Fixation
5. Phototrophic Bacteria

MICRO-312 MICROBIAL GENETICS

1. Nature of Genetic Material
2. Vectors
3. Restriction Enzymes
4. Gene Cloning
5. In Vitro Protein Synthesis

MICRO-313 SYSTEMIC BACTERIOLOGY

1. Normal Microflora of Human Body
2. Collection, Transport and Culturing of Clinical Samples
3. Bacterial Diseases Caused by Bacillus Anthracis
4. Bacterial Diseases Caused by Shigella Dysenteriae
5. Antibiotics

MICRO-314 VIROLOGY AND PARASITOLOGY

1. Nature and Definition of Viruses
2. Isolation, Purification and Cultivation of Viruses
3. Parasitic Protozoa
4. Helminthes

MICRO-315 PLANT PATHOLOGY

1. Introduction and History of Plant Pathology
2. Enzymes and Toxins in plant Diseases
3. Plant-Pathogen Interaction
4. Direct and Indirect Transmission
5. Symptoms

MICRO-321 IMMUNOPROPHYLAXIS AND IMMUNOTHERAPY OF INFECTIONS

1. History of Vaccination
2. Vaccines Production
3. Recombinant
4. Combinational Vaccine
5. AIDS

MICRO-322 GENOMICS AND PROTEOMICS

1. Genome Evolution and Organization
2. Comparative Genomics
3. Proteomics and Proteome
4. Protein Digestion Techniques
5. Application of Genomics and Proteomics

MICRO-323 IMMUNOLOGY

1. Historical Account of Immunology
2. Antigens
3. Major Histocompatibility Complex
4. Primary and Secondary
5. Immune Tolerance

BIOTECH-321 BIOINFORMATICS

1. Introduction and Scope of Bioinformatics
2. Tools for Database
3. Gene Identification
4. Bioinformatics and Drug Design

BIOCHEM-321 PRINCIPLES OF INSTRUMENTAL ANALYSIS

1. Absorption Spectroscopy
2. Chromatography
3. Electrophoresis
4. General Laboratory Techniques
5. Radioisotopic Techniques

BIOCHEM-325 RECOMBINANT DNA TECHNOLOGY

1. Molecular Tools for Gene Cloning
2. Vectors and Gene Cloning
3. Advanced Techniques in Molecular Biology
4. Methods of Gene Transfer in Plants Animals
5. DNA Sequencing

COURSE OUTCOME OF M.Sc. MICROBIOLOGY (HONS)

MICRO-511 GENERAL MICROBIOLOGY

1. History Of Microbiology
2. Morphology, Habitat, life Cycle
3. Reproduction and Growth of microorganisms
4. Control of Microbes by Physical
5. Antibiotics

MICRO-512 VIROLOGY AND MYCOLOGY

1. Historical of Virology
2. Plant Viruses
3. Transmission of Viruses
4. Introduction to Mycology
5. Fungal Diseases

MICRO-513 IMMUNOLOGY

1. Historical Account of Immunology
 2. Antigens
 3. Discovery and Structure of MHC
 4. Primary and Secondary Immune Responses
 5. Production and Purification Antibodies
- MICRO-514 GENERAL MICROBIOLOGICAL TECHNIQUES

1

BIOCHEM-511 GENERAL BIOCHEMISTRY

1. Fundamental Principles Governing Life
2. Classification, Structure and Function of Carbohydrates
3. Enzymes Classification and Mechanism of Action
4. Photosynthesis and Respiration
5. DNA Replication, Transcriptions and Translation

BT-504 GENERAL GENETICS

1. Introduction and General Background
2. Chromosomal Basis of Inheritance and Linkage
3. Replication of Genetic Material Code
4. Numerical and Structural Chromosomal Changes
5. Genetics of Inbreeding Depression and Heterosis

BT-505 COMPUTATIONAL BIOLOGY AND BIostatISTICS

1. Introduction and Definition of Biostatistics
2. Test of Significance
3. Introduction LIMS
4. Introduction to Sequence Comparison
5. Gene Finding Algorithms and Software's

MICRO-521 PROKARYOTIC MICROBIOLOGY

1. Domain Bacteria
2. Deeply Branching Phototrophic Bacteria
3. High G+C Gram Positive Bacteria
4. Domain Achaea
5. Major Groups Achaea

MICRO-523 MICROBIAL GENETICS

1. Historical Introduction
2. Mutations
3. Generalized Recombination
4. Transformation
5. Phage

MICRO-524 MOLECULAR BIOLOGY AND GENETIC ENGINEERING.

1. Nucleic Acids
2. Translation
3. Molecular Cloning
4. Cloning Strategies
5. PCR

MICRO-525 ENVIRONMENTAL MICROBIOLOGY

1. Concept of Environment
2. Significance of Cell Number Methods For Enumerating Microbes
3. Positive, Negative and Neutral Microbial Interactions

4. Purification of Waste Waters and Communal Sewage

5. Micorbiology

MICRO-526 MEDICAL AND DIAGNOSTIC MICROBIOLOGY

1. History and Scope of Medical Microbiology

2. Host-Microbial Interactions

3. Systemic Microbiology

4. AIDS

5. Collection of Clinical Specimens

MICRO-527 MEDICAL MICROBIOLOGY AND IMMUNOLOGY TECHNIQUES

MICRO-528 APPLIED MICROBIOLOGY TECHNIQUES

BIOCHEM-526 ADVANCED ENZYMOLOGY

1. Theory of Enzymatic Catalysis

2. Effect of Different Factors

3. Kinetics of Bi-Substrate Reactions

4. Mechanism

5. Role of Enzymes in Regulations of Metabolism

MICRO-591 SYNOPSIS SEMINAR

MICRO-531 INDUSTRIAL MICROBIOLOGY

1. Definitions and Scope

2. Fermentor/Bioreactor

3. Down-Stream Processing

4. Secondary Products

5. Methods of Immobilization

MICRO-532 FOOD MICROBIOLOGY

1. Food as Nutrient for Microbes

2. Food Spoilages by Microbes

3. Physical Methods of Food Preservation

4. Quality Control

5. Fermented Foods

MICRO-533 RECENT ADVANCES IN MICROBIOLOGY AND BIOTECHNOLOGY

1. Bacterial Genome and its Organization

2. Quantitative PCR Applications in Food Microbiology

3. Bacterial Endophytes

4. Transcriptome and Secretome Studies

5. Applications of Nano biotechnology

MICRO-534 RECENT ADVANCES IN FOOD AND INDUSTRIAL MICROBIOLOGY

1. Microbial Biodiversity and its Importance

2. Continuous and Fed Batch Culture

3. System Biology

4. Fermentation of Pharmaceutical

5. Protein Engineering

MICRO-535 FOOD AND INDUSTRIAL MICROBIOLOGY TECHNIQUES

MICRO-536 MICROBIAL PHYSIOLOCIV AND BIOCHEMISTRY

1. Scope of Studies

1

1

1

2. Mode of Nutrition
3. Growth of Microorganisms
4. Physiology
5. Biosynthesis

MICRO-591 SEMINAR

MICRO-599 RESEARCH METHODOLOGY

1. History
2. Synopsis Writing
3. Formulation and Types
4. Compilation and Presentation
5. Financial Support and Various Funding Agencies
6. Computer and Informatics
7. Demonstration

MICRO-600 DISSERTATION*

Course Outcome of M.Sc. Environmental Science

MATHS- 421 MATHEMATIC FOR ENVIRONMENTAL SCIENCE

1. Function and its Application
2. Differentiation and Integration
3. Differential Equations
4. Matrices and Determinants
5. MATLAB

BIO-421 Biology for Environmental science

1. Introduction
2. Biological Communities and Ecosystem
3. Plant Diversity
4. Animal Diversity
5. Microbial Diversity
6. Conservation Biology

EVS-501 FUNDAMENTALS OF ENVIRONMENT SCIENCE

1. Introduction
2. Environmental components Biotic and Abiotic Components, Their Interaction
3. Biogeographical Regions and Ecological Succession
4. Earth System
5. Atmosphere

EVS-502 ENVIRONMENTAL CHEMISTRY

1. Fundamentals of Environmental Chemistry
2. Chemical compositions of Air
3. Water Chemistry and Hydrologic Cycle
4. Soil Chemistry and Biogeochemical Cycle
5. Toxic Chemicals in the Environment

EVS-503 ENVIRONMENTAL MICROBIOLOGY

1. Microorganism in environment
2. Microbiology of Air
3. User of Environmental Microbes
4. Microbiology of Water

5. Water Analysis for Microbes

EVS-504 REMOTE SENSING, GIS AND ENVIRONMENTAL PHYSICS

1. Introduction to Remote Sensing and Geographical Information System (GIS)
2. Applications of GIS and Remote Sensing
3. The Atmosphere
4. Atmospheric Motions
5. Techniques Environmental Physics

STAT-501 STATISTICAL METHODS

1. Presentation of Data
2. Measures of Location And Dispersion
3. Probability and Distribution
4. Correlation and Regression
5. Sampling
6. Tests of Significance
7. Experimental Design

EVS-598 RESEARCH METHODOLOGY

1. Introduction
2. Synopsis writing
3. Collection and Analysis of Data
4. Reports and Theses Writing
5. Founding
6. Computer and Informatics
7. Departmental Research Activities and Instrumentation
8. Library and information services

EVS-505 ENERGY AND ENVIRONMENT

1. Energy Resources and Their Exploitation
2. Fossil Fuels
3. Hydrogen as an Energy Source
4. Impact of Energy Use
5. Energy Related Environmental

EVS-506 ENVIRONMENTAL POLLUTION AND ITS MANAGEMENT

1. Air Pollution
2. Water Pollution
3. Soil Pollution
4. Noise Pollution
5. Thermal Pollution

EVS-507 ENVIRONMENTAL PHYSIOLOGY OF PLANTS & ANIMALS

1. Introduction
2. Environmental Adaptations of Plants
3. General Characteristics of Adaptations in Animals
4. Responses of Animals to Chemical Agents

EVS-508 NATURAL RESOURCES AND THEIR MANAGEMENT

1. Introduction
2. Forest Resources
3. Water Resources

4. Land Resources
5. Mineral Resources
6. Food Resources

EVS-509 REGIONAL & GLOBAL ENVIRONMENTAL ISSUE

1. Contemporary and Emerging Environmental Issue
2. Climate changes
3. Adaptation and Mitigation Options to Climate Changes
4. Waste Disposal and Managements
5. Urbanization
6. Environmental Toxicants and Human Health

EVS-510 BIO-DIVERSITY AND ITS CONSERVATION

1. Introduction
2. Uses of Biodiversity
3. In Situ Biodiversity Conservation
4. Ex Situ Biodiversity Conservation
5. National and International Effort for Biodiversity Conservation

BT-529 ENVIRONMENTAL INSTRUMENTAL AND TECHNIQUES

1. Microscopy
2. Radioisotopy
3. Chromatography
4. Electrophoresis
5. Dialysis
6. Environmental Techniques

EVS-511 ENVIRONMENTAL LAWS AND POLICY

1. Environmental Protection Laws in India
2. Statutory Protection of the Human Environment
3. Fundamental Right and Duties
4. Scheme of Labeling of Environmentally Friendly Products
5. International and National Organization

EVS-512 ENVIRONMENTAL IMPACT ASSESSMENT

1. Introduction
2. EIA Notification of Govt. of India
3. Data Collection
4. Impact Assessment Methodology
5. EIA Review and Management

EVS-513 SIMULATION & MODELING IN ENVIRONMENTAL SYSTEM

1. Introduction
2. Growth Models
3. Two species Models
4. Some Predator- Prey Models
5. Data Requirements & Limitation of Modeling

BT-515 BIOSAFETY BIOETHICS & IPR

1. Introduction
2. Biosafety and Risk Assessment
3. Laboratory and Environmental Biosafety

4. Ecological Aspects of GMOs
5. Intellectual Property Right

COURSE OUTCOME OF Ph.D. MEDICINAL CHEMISTRY

MCT-505 INSTRUMENTAL METHODS OF ANALYSIS AND SPECTROSCOPY

1. UV-Visible Spectroscopy
2. Infrared Spectroscopy
3. Nuclear Magnetic Resonance Spectroscopy
4. Mass Spectrometry
5. Chromatographic Techniques
6. Introductio

PHM-601 RETROSYNTHESIS AND DESIGNING ORGANIC SYNTHESIS

1. Disconnection Approach
2. Protecting Group
3. One Group C-C Disconnections
4. Ring Synthesis
5. Synthesis of Some Complex Molecules

PHM-602 PROTEINS: STRUCTURE AND FUNCTIONS

1. Structure of Proteins
2. Isolation, Purification and Characterization of Proteins
3. Protein Engineering, Folding, Prediction and Design
4. Interaction of Proteins with Other Molecules
5. Membrane Proteins
6. Proteins in Diseases

PHM-603 ENZYMES: STRUCTURE AND FUNCTIONS

1. Enzymes
2. Transition-states Theory
3. Enzyme Technology
4. Examples of Mechanism-Based Inhibitors

MCT-509 DRUG METABOLISM & PHARMACOKINETICS

1. Introduction
2. Drug Transport is Biological System
3. Drug Distribution and Metabolism
4. Pharmacokinetics - 1
5. Pharmacokinetics - 2

MCT-510 DRUG REGULATORY AFFAIRS, BIOSAFETY, BIOETHICS & IPR

1. Drug Regulatory Affairs
2. Introduction to Bioethics & Biosafety
3. General Principle for the Laboratory and Environment Biosafety
4. Introduction to Intellectual Property Concepts
5. Practical Aspects of IPR

PHM-604 DRUG DESIGN AND MOLECULAR MODELING

1. Introduction
 2. Receptor Structure and Function
 3. Quantitative Treatment of Ligand Binding
 4. Receptor
 5. Ligand-gated
- PHM-605 SEMINAR-I

Akal College of Arts and Social Sciences

Programme Outcomes

Programme Outcomes of the programmes and courses taught in the Department of the last five years:

The Akal College of Arts and Social Sciences at the University of equips its students for successful careers in the field of excellence. Whether their goal is to join the workforce with a Bachelor's degree, or to further their education in graduate school, our program is ideal. The curriculum consists of courses taught by the well qualified and professionals decorated both with their teaching skills and their research prowess. The courses are designed to teach timeless fundamentals underlying the discipline, while preparing the students to apply modern day. The programme is designed around a set of curricular outcomes such as the graduate will:

1. be able to apply subject skills to the solution of their so called problems.
2. be knowledgeable of contemporary issues relevant to the subject.
3. understand the importance of life-long learning.
4. be able to design and conduct experiments, on core curriculum.
5. understand the professional and ethical responsibilities of a teacher/professor of language/literature.
6. be able to work both independently and as part of a team.
7. be able to communicate effectively while speaking, employing illustrations and writing.
8. possess the skills and techniques necessary for an efficient teacher.
9. apply critical thinking and problem solving skills.
10. develop an understanding of culture and society.
11. develop an understanding of culture and society.
12. develop information literacy skills to engage in life-long learning.
13. develop an ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and
14. able to find gainful employment in industry or government, be accepted at graduate or professional schools or find employment in school systems as teachers/professors or administrators.
15. Add-on programmes are conducted by the university in order to equip the students with skills required by the

Akal College of Economics, Commerce and Management

Programs: B.Sc.(Hons) Economics, M.Sc. (Hons) Economics and Ph.D. DEPARTMENT: ECONOMICS

Programme Outcomes (POs)

PO 1: This single degree programme provides you with the opportunity to study economics in the greatest depth whilst also providing a considerable amount of choice regarding both the areas of economics and other subjects

PO 2: Demonstrate a global perspective and awareness on working of an economy. The course will sharpen analytical skills of students through integrating knowledge of economic theory with decision making techniques.

PO 3: Use information and knowledge effectively: scanning and organizing data, synthesizing and analysing in order to abstract meaning from information, and to share knowledge.

PO 4: An ability to use current techniques, skills, and tools necessary for economics.

PO 5: Successful career and immediate employment: An ability to recognize the importance of professional development by pursuing postgraduate studies or face competitive examinations that offer challenging and

PO 6: Conceptual Building: Apply conceptual economics foundations to solve practical decision-making problems, both individually and as part of teams using techniques such as case analysis, projects and assignments.

PO 7: An ability to demonstrate a critical awareness of current issues in economics which is informed by leading

Programme Specific Outcomes (PSO)

PSO I: The purpose of this course is to provide students with a basic understanding of the economic theory and analytical tools that can be used in decision making problems. Students will demonstrate knowledge of the terms

PSO II: Integrate tools and concepts from multiple functional areas (i.e micro economics, macro economics, industrial economics, international economics, agricultural economics, public finance etc.) to solve the problems of an economy. Utilize qualitative and quantitative methods to investigate and solve critical problems of an

PSO III: Students will establish themselves as effective professionals by solving real problems through the use of economics and with attention to team work, effective communication, critical thinking and problem solving skills.

PSO IV: Students will develop professional skills that prepare them for immediate employment and for life-long learning in advanced areas of economics and related fields.

PSO V: Students will demonstrate knowledge of empirical tools used in the analysis of data. They demonstrate the ability to frame and solve problems in economics, using concepts.

PSO VI: Students will be provided with an educational foundation that prepares them for excellence, leadership roles along diverse career paths with encouragement to professional ethics and active participation needed for a

PSO VII: Students will understand the expected impact of government policies and should be able to assess the

Course Outcomes (CO)

Subject: Microeconomic Theory - I Subject Code: ECON- 101

CO 1: micro economics teaches human behaviour at an individual level and a producer level.

CO 2: how a consumer takes decision to satisfy his unlimited wants.

CO 3: how a producer takes decision regarding use of inputs (factor cost -land, labour ,capital).

CO 4: concepts of elasticity teach the consumer if changes in income and price whole the consumer behaves.

CO 5: analyse the process of consumer surplus and producer surplus where consumer and producer save money.

CO 6: price determination in the different market.

CO 7: how wage is determined under different market structure.

CO 8 ; how the market signal affects consumer and producer behaviour.

CO 9; theories of production and cost in short run and long run.

SUBJECT: ECONOMICS OF AGRICULTURE SUBJECT CODE: ECON-102

CO 1: To identify and classify the problems of agricultural activity and then with the help of the principles of economics students understand how to get the maximum satisfaction from our resources.

CO 2: To understand the role of agriculture in economic development and also the sources of agricultural

CO 3: To acquaint the students by role of institutions in agricultural development.

CO 4: To make the student understanding about the different economic factors of agricultural development.

Subject: ECONOMICS OF INDUSTRY

Subject Code: ECON 104

CO 1: to provide students with the analytical skills required for understanding problems in industrial economics.

CO 2: To analyse various aspects of strategic interaction between firms and the determinants of industrial

CO 3: It aims to provide an understanding of how theories from industrial economics can help one comprehend the behaviour of firms in imperfectly competitive markets.

CO 4: Students should achieve an understanding some of the most important theories concerning the organisation of industries and the behaviour of firms within those industries.

CO 5: To describe and explain the pricing behaviour by firms with market power and its welfare implications.

CO 6: To recognise and explain the basic determinants of market structure and the key issues in competition

Subject: Regional Economics

Subject Code: ECON- 105

CO 1: Basic and Fundamental Knowledge of concepts, theories and practices in the field of Regional Economics.

CO 2: thorough and systematic study of regional and social accounting techniques with special reference to under

CO 3: understanding the nature of dualistic economies and the importance of balanced regional development.

CO 4: analyse different linkages among different sectors of the economy.

CO 5: how allocation of resources can be done at regional level to achieve specific targets at national level.

CO 6: how to overcome regional imbalances and inequalities with special reference to Indian economy.

CO 7: knowledge regarding different investment criterion.

Subject: MACRO ECONOMICS

Subject Code: ECON 201

CO 1: Students will examine how the economy behaves at the aggregate level and how national income is

CO 2: Students analyze, apply, and communicate basic economic principles, policies, theories, models, and

CO 3: Identify and solve economic problems, assess results, and determine alternative courses of action using

CO 4: To understand working of monetary and fiscal policy options as they relate to economic stabilization in the

CO 5: Formulate and assess macroeconomic policy suggestions.

Subject: Indian Economy since independence

Subject Code: ECON- 202

CO 1: to understand the various aspects of India's economy since independence.

CO 2: develop a perspective on the different problems and approaches to economy..

CO3: analyse major development challenges in India; structural transformation, employment, unemployment

CO 4: to understand the population trends and demographic transition.

CO 5: programmes and emerging perspectives, policy of food and nutrition security of the poor.

CO 6: analyse the growth and productivity of agriculture and industry.

Subject: Labour Economics

Subject Code: ECON-203

CO 1: Labour markets function through the interaction of workers and employers. Labour Economics seeks to understand the functioning and dynamics of the markets for wage

CO 2: Evaluate the determinants of industrial disputes, steps to prevent disputes, Methods of Settlement of industrial disputes, collective bargaining and also labour participation in management.

CO 3: Understand the social security measures in India and important labour legislation in India.

SUBJECT: INTERNATIONAL ECONOMICS

Subject Code: ECON 205

CO 1: Students should be familiar with the main economic theories and models of international trade.

CO 2: Students should be able to apply economic reasoning to issues of the day surrounding globalization.

CO 3: Recognize the cause of trade, sources of the gains from trade and the domestic and international

CO 4: Examine instruments and consequences of trade policy measures-including tariffs and quantitative

CO 5: Students will be aware of the likely distributional consequences of trade and thus of conflicting interests

CO 6: To have an elementary understanding of international economics and the determinants of exchange rates

Subject: Money and Financial Markets

Subject Code: ECON-206

CO 1: to understand the basic introduction of financial institution and markets.

CO 2: to know how financial institution functions and operations.

CO 3: to know about the evolution of financial institution.

CO 4: determination of short term interest rates, structure of interest rates.

CO 5: to understand the efficiency of foreign exchange market.

Subject: Public Economics Subject Code: ECON- 207

CO 1: Introducing concepts related to government revenue and expenditure.

CO 2: Fundamental knowledge and exposure of the concepts, theories and practices in the field of public

CO 3: how basic tools of economics can be applied to public sector like education and health.

CO 4: Role of private and public sector in the development of an economy.

CO 5: how budget of Indian economy is prepared and announced in parliament.

CO 6: Different duties allocated to state and centre in the Indian constitution.

Subject: STATISTICAL METHODS FOR ECONOMICS

Subject Code: MATH 213

CO 1: To acquaint the students with various statistical tools and techniques applied in economics.

CO 2: To provide fundamental knowledge of basic and advance statistical methods in economics.

CO 3: In addition to the theoretical approach, the students will be able to learn how to use the software for

Subject: History of Economic Thought Subject Code: ECON- 302

CO 1: Different views and ideas of economists starting from ancient Greek period to till present.

CO 2: In depth knowledge of how the value of goods can be measure and on what basis they can be exchange in

CO 3: the importance of different factors of production and how they get their remunerative.

CO 4: to study the history of materialistic world and its evolution.

CO 5: contribution of different Nobel Laureates in Economics

Subject: Resources and Environmental Economics Subject Code: ECON- 304

CO 1: to provide knowledge about regarding the scarcity of environment resources.

CO 2: how human activities and environment are inert-linked.

CO 3: to know the importance of common property rights in case of public/state resources.

CO 4: to evaluate cost and optimal level of pollution in the economy with the help of tools/techniques.

CO 5: how taxes/levies can regulate the state resources available to each and every citizen.

CO 6: detail study of different environmental problems and steps/measure taken to control them.

Subject: Comparative Economic Development Subject Code: ECON-306

CO 1: to describe different perspective regarding economic development.

CO 2: Assess the historical development of different countries

CO 3: A detail study of process of development of different countries through case studies.

CO 4: to understand the very nature and structure of agriculture sector in developed countries like Britain, Japan

CO 5: analyse the role of manufacturing sector in the development process of developed countries.

CO 6: compare the development process and policies of developed countries and the present scenario of their

SUBJECT: INSTITUTIONAL ECONOMICS SUBJECT CODE: ECON-307

CO 1: To familiarize the student with the different types of institutions.

CO 2: To acquaint the students with the financial institutions and separation of ownership and control, Incentive commitment problems of financial institutions.

CO 3: To understand the legal institutions and their economic performance.

CO 4: Explain the Political economy of institutional changes, Political economy of privatization, Legal

SUBJECT: HEALTH ECONOMICS Subject Code: ECON-308

CO 1; to understand the problems in the market for health care.

CO 2: analysing health care markets with economics.

CO 3: to describe the demand for health and health care. .

CO 4; how to managed health care professional, hospitals services.

CO 5: to know about public policies to enhance access, to contain cost.

Subject: ECONOMETRICS Subject Code: ECON 511

CO 1: To acquaint the students with various statistical and mathematical tools and techniques applied in

CO 2: Providing fundamental knowledge and exposure to use basic and advance econometric methods in

CO 3: Demonstrate a familiarity with the properties and applications of several families of statistical distributions

CO 4: Demonstrate an understanding of variations and generalizations of the basic regression model.

CO 5: In addition to the theoretical approach, the students will be able to learn how to use the programme

Course Outcomes (CO)

Subject: Microeconomic Theory Subject Code: ECON- 501

CO 1: Understand that economics is about the allocation of scarce resources, that scarcity forces choice, tradeoffs exist and that every choice has an opportunity cost. Demonstrate these concepts using a production possibility

CO 1: micro economics teaches human behaviour at an individual level and a producer level

CO 2: how a consumer takes decision to satisfy his unlimited wants.

CO 3: how a producer takes decision regarding use of inputs (factor cost -land,labour ,capital).

CO 4: concepts of elasticity teaches the consumer if changes in income and price whole the consumer behave.

CO 5: analyse the process of consumer surplus and producer surplus where consumer and producer save money.

CO 6: price determination in the different market .

CO 7: how wage is determined under different market structure .

CO 8 ; how the market signal affects consumer and producer behaviour.

MACRO-ECONOMIC THEORY SUBJECT CODE: ECON 502

CO 1: Students analyze, apply, and communicate basic economic principles, policies, theories, models, and
CO 2: Identify and solve economic problems, assess results, and determine alternative courses of action using
CO 3: To evaluate the macro-economic theories of investment and different growth models.
CO 4: Evaluate, analyze, and communicate private and public decision-making processes, contemporary and historical socioeconomic issues, and the fundamental role that economic forces play in domestic and global

CO 5: To understand working of monetary and fiscal policy options as they relate to economic stabilization in the

SUBJECT: HISTORY OF ECONOMIC THOUGHT SUBJECT CODE: ECON- 503

CO 1: views and ideas of economists starting from ancient Greek period to till present.
CO 2: In depth knowledge of how the value of goods can be measure and on what basis they can be exchange in
CO 3: the importance of different factors of production and how they get their remunerative.
CO 4: to study the history of materialistic world and its evolution.
CO 5: contribution of different Nobel Laureates in Economics
CO 6: Similarity and differences among different school of thoughts.
CO 7: achievements, failures, the capabilities and the limitations of different theoreticians.
CO 8: asses the implications of problems correctly according to time and circumstances.

Subject: Money and Financial Markets Subject Code: ECON-506

CO 1: to understand the basic introduction of financial institution and markets.
CO 2: to know how finanacial institution functions and operations .
CO 3: to know about the evolution of financial institution .
CO 4: determination of short term interest rates, structure of interest rates.
CO 5: describe the characteristics of money market, bond market, equity market.

Subject: Indian Economy SUBJECT CODE: ECON- 508

CO 1: to understand the various aspects of India's economy since Independence.
CO 2: develop a perspective on the different problems and approaches to economy.
CO 3: understand the role of the Indian economy in the global context and ho different factors have affected this
CO 4: analyse major development challenges in India; structural transformation, employment, unemployment
CO 5: to understand the population trends and demographic transition.
CO 6: programmes and emerging perspectives, policy of food and nutrition security of the poor.
CO 7: analyse the growth and productivity of agriculture and industry.
CO 8 : describe the foreign trade in terms of foreign direct investment .

SUBJECT: RESEARCH METHODOLOGY SUBJECT CODE: ECON 510

CO 1: The course aims at equipping students with an understanding of the research process, tools and techniques
CO 2: Apply a range of quantitative and / or qualitative research techniques to economics.
CO 3: Understand and apply research approaches, techniques and strategies in the appropriate manner for
CO 4: Demonstrate knowledge and understanding of data analysis and interpretation in relation to the research
CO 5: Develop necessary critical thinking skills in order to evaluate different research approaches utilised.
CO 6: Students should be able to identify the overall process of designing a research study from its inception to its
CO 7: Complete a research project in which they formulate a research question, apply appropriate methods to answer the question, and prepare a paper summarizing their results.

SUBJECT: PUBLIC FINANCE

SUBJECT CODE: ECON- 512

CO 1: Fundamental knowledge and exposure of the concepts, theories and practices in the field of public

CO 2: basic knowledge of sources of government revenue and expenditure.

CO 3: how basic tools of economics can be applied to public sector like education and health.

CO 4: Role of private and public sector in the development of an economy.

CO 5: how budget of Indian economy is prepared and announced in parliament.

CO 6: Different duties allocated to state and centre in the Indian constitution.

CO 7: how government use tool of deficit financing to fill the gap between revenue and expenditure.

CO 8: how government manage its debt burden through different techniques.

CO 9: to study different economic relation between central and state government.

CO 10: about the role of finance commission and it's working.

SUBJECT: HEALTH ECONOMICS Subject Code: ECON-514 (i)

CO 1; to understand the problems in the market for health care.

CO 2: analysing health care markets with economics.

CO 3: to describe the demand for health and health care.

CO 4: how to managed health care professional, hospitals services.

CO 5: to know about public policies to enhance access, to contain cost.

CO 6: role of WHO in Indian Health Policy.

CO 7: measures/steps taken in building high class health facilities.

CO 8: public and private expenditure in health care.

SUBJECT: ADVANCED ECONOMETRICS

SUBJECT CODE: ECON 514 (ii)

CO 1: To acquaint the students with various statistical and mathematical tools and techniques applied in

CO 2: Demonstrate a familiarity with the properties and applications of several families of statistical distributions

CO 3: Students will study different models and their analysis in economics.

CO 4: To empirically study time series and panel data models, which have great relevance in economic policy

CO 5: In addition to the theoretical approach, the students will be able to learn how to use the programme package to do time series and panel data analyses of empirical data.

Department: Commerce

Name of Program: B.COM/M.COM

Programme Outcomes (POs)

PO 1 : Developing professional skill among students: As commerce is a stream which highly is centric focus on financial, accounting and taxation skill. Hence, students are kept in focus to develop such skill from very

PO 2 : Speaking / Writing skills : An ability to communicate effectively, both in writing and orally .

PO 3: Professional integrity : An understanding of professional, ethical, legal, financial, marketing, sales, logistical

PO 4 : Social awareness : A Knowledge of contemporary issues.

PO 5: Practical managerial analysis skills: An ability to use current techniques, skills, and tools necessary for

PO 6: Continuing education awareness : An integrated knowledge of and demonstrated ability to perform as management professionals, and will be prepared for continued learning throughout their career. Recognition of

PO 7: Successful career and immediate employment : An ability to recognize the importance of professional development by pursuing postgraduate studies or face competitive examinations that offer challenging and

PO 8 : Team work : An ability to function effectively on multi-disciplinary teams.

PO 9 : Conceptual Building: Apply conceptual business foundations to solve practical decision-making problems, both individually and as part of teams using techniques such as case analysis, projects and assignments.

PO 10: Systematic Understanding: An ability to develop a systematic understanding of globalization and its impact
PO 11: Current Affair: An ability to demonstrate a critical awareness of current issues (e.g., diversity, social responsibility, sustainability, innovation, knowledge management, etc.) in business and management which is
PO 12 : Skill Development: An ability to analyze a problem, identify, formulate and use the appropriate
PO 13: Human Values and Professional Ethics: Recognize and address ethical issues and values and apply them in
PO14: Environment and Sustainability: Understand the environment issues in the Business, how they affect the Business and how effectively Business can be managed without harming the environment. An ability to

Programme Specific Outcomes (PSO)

PSO I

Students will establish themselves as effective professionals by solving real problems through the use of management science knowledge and with attention to team work, effective communication, critical thinking and

PSO II

Students will develop professional skills that prepare them for immediate employment and for life-long learning

PSO III

Students will demonstrate their ability to adapt to a rapidly changing environment by having learned and applied

Students will be provided with an educational foundation that prepares them for excellence, leadership roles along diverse career paths with encouragement to professional ethics and active participation needed for a Course Outcomes (CO)

Subject: business regulatory framework Subject Code: BC-101

CO 1: Thorough and systematic coverage of business regulations theory and practice.

CO 2: Fundamental knowledge and exposure of laws, sections and practices in the field of business laws.

CO 3: Basic roles and functions of regulatory body, with special attention to protect consumers right.

CO 4: Evaluate the business fraudulence preventions right with cases.

CO 5: Assess global situation, including opportunities and threats that will impact on business regulatory.

CO 6: Government indicatives to protect consumers interest.

CO 7: Assess managerial practices and choices relative to ethical principles and standards in business.

Subject: financial accounting Subject Code: BC-102

CO 1: To understand various ACCOUNTING principles and standards

CO 2: Preparation of financial statement.

CO3: Recognize and understand ethical issues related to the accounting profession.

CO4: Prepare financial statements in accordance with Generally Accepted Accounting Principles.

CO5: Employ critical thinking skills to analyze financial data as well as the effects of differing financial accounting

CO6: Effectively define the needs of the various users of accounting data and demonstrate the ability to communicate such data effectively, as well as the ability to provide knowledgeable recommendations.

CO7: Recognize circumstances providing for increased exposure to fraud and define preventative internal control

Subject: Business organisation and management Subject Code: BC-103

CO 1: Thorough and systematic coverage of management theory and practice.

CO 2: Fundamental knowledge and exposure of the concepts, theories and practices in the field of management.

CO 3: basic roles, skills and functions of management, with special attention to managerial responsibility for

CO 4: Evaluate the global context for taking managerial actions of planning, organizing and controlling.

CO 5: Assess global situation, including opportunities and threats that will impact management of an

CO 6: Integrate management principles into management practices.

CO 7: Assess managerial practices and choices relative to ethical principles and standards.

CO 8: Specify how the managerial tasks of planning, organizing, and controlling can be executed in a variety of

Subject: Computer applications Subject Code: BCOMP-101

CO 1: The purpose of the study is to contribute to a better understanding of student learning outcomes in a web-

CO 2: Essential tools in making business decisions in today's global economy with use of computers.

CO 3: In addition, the study sought to determine if there was a significant difference between the characteristics of students who chose the entirely online web-based instruction to complete a spreadsheet software application

CO 4: Discuss the language of computers.

CO 5: Explain the effects technology on the industry.

CO 6: Outline technology operates in a business environment.

CO 7: Describe how hi tech information is utilized in business.

Subject: Human values and professional ethics Subject Code: EDU -101

CO 1: Understanding the need, basic guidelines, content and process for Value Education.

CO 2: A look at basic aspirations: Self Exploration, Happiness and Prosperity

CO 3: Fulfilment of human aspirations and harmony

Subject: Business mathematics Subject Code: MAH-115

CO 1: define basic terms in the areas of business calculating math.

CO 2: To explain basic methods of math , types, interest account and their basic applications and methods of

CO 3: To solve problems in the areas of compound interest account, use of compound interest account, loan and consumer credit.

.Subject: Corporate Accounting Subject Code: BC-201

CO 1: To acquaint the students regarding various accounting concepts and its application in managerial decision

CO 2: To build potential to use appropriate accounting tools and techniques

CO 3: To understand financial accounting and management accounting for preparing and analyzing financial

CO 4: The ability to account for a range of advanced financial accounting issues

CO 5: An understanding of the accounting requirements for a corporate group and familiarity with the theory underlying the methods used to account for inter-company investments.

Subject: Management accounting Subject Code: BC-202

CO 1: To provide an understanding of basic concepts, theories and techniques in management accounting.

CO 2: An understanding of the differences between financial and managerial accounting, Develop students who have a functional knowledge of the basic managerial accounting principles. Improve the student's analytical and

CO 3: Upon completion of this program, Management Accounting Option graduates will be able to: ...

CO 4: This course also provides students with an understanding of management accounting concepts related to the management functions of planning, control, and decision making.

CO 5: Develop students who have a functional knowledge of the basic managerial accounting principles. Improve

Subject: Company law and auditing Subject Code: BC-203

CO 1: Students will be able to demonstrate comprehensive and accurate knowledge and understanding of the

CO 2: To apply and demonstrate comprehensive knowledge and understanding of social and economic policy

CO 3: Students can read and study primary and secondary sources of company law, with minimal staff guidance; critically analyse, interpret, evaluate and synthesise information from a variety of sources.

CO 4: Understand the interdependence of the operating system with other key functional areas of the firm.

CO 5: Identify and evaluate the key factors and the interdependence of these factors in the design of effective

CO 6: Identify and evaluate a range of tools appropriate for analysis of operating systems of the firm.

Subject: Principle of Marketing Subject Code: BC-204

CO 1: Understanding concepts, philosophies, processes and techniques of managing the marketing operations of

CO 2: This course will provide better understanding of the complexities associated with marketing functions,

CO 3: The opportunity to apply the key concepts to practical business situations.

CO 4: Manage people, processes and resources within a diverse organization.

CO 5: Apply knowledge of leadership concepts in an integrated manner.

CO 6: Analyze an organization's activities to develop/implement a marketing strategy.

Subject: Human Resource Management Subject Code: BC-205

CO 1: To make student aware of the various functions and importance of the HR department in any organization.

CO 2: Managing the human resources, whereby the underlying objective is to attract retain and motivate the

CO 3: Research and analyze information needs and apply current and emerging information technologies to

CO 4: Develop, implement, and evaluate organizational development strategies aimed at promoting

CO 5: Present and evaluate communication messages and processes related to the human resources function of

CO 6: Manage own professional development and provide leadership to others in the achievement of ongoing

CO 7: Facilitate and communicate the human resources component of the organization's business plan.

Subject: Environmental Studies Subject Code: EVS-301

CO 1: The Environmental Studies major prepares students for careers as leaders in understanding and addressing complex environmental issues from a problem-oriented AND interdisciplinary perspective

CO 2: Apply systems concepts and methodologies to analyze and understand interactions between social and

CO 3: To apply and demonstrate a general understanding of the breadth and nature of environmental issues in

Subject: Financial Reporting and Analysis Subject Code: BC-301

CO 1: Understand the basic types of derivatives, their payoff functions, their developments, and the economic

CO 2: Understand the basic risk management and trading strategies using derivatives.

CO 3: Understand no-arbitrage principle and its role in pricing financial forwards and futures.

CO 4: Understand the design and pricing of a forward rate agreement; understand the payoff of a Eurodollar futures; understand the design of swaps and how to determine the swap rate by using no-arbitrage principle.

CO 5: Understand the put-call parity and other pricing relations between calls and puts using no-arbitrage

CO 6: Understand extensively the binomial approach in pricing European and American options.

Subject: Income Tax Subject Code: BC -302

CO 1: Describe and discuss important tax and nontax factors involved in selecting the entity type for a particular

CO 2: Determine common corporate book-tax differences in accounting for various corporate transactions and

CO 3: Compute a corporation's income tax provision under the ASC 740 rules and understand the proper financial statement disclosure for a corporation's income tax expense related items.

CO 4: Describe and discuss important tax and nontax issues relevant to corporate and flow-through entities.

Subject: Foreign exchange management Subject Code: BC -303

CO 1: Analyze alternative currency translation methods for settlement of goods

CO 2: Examine the organization of the Foreign Exchange Market, the Spot Market, and the Forward Market, and how the information driven in these markets can be used by small business operators in controlling and managing

CO 3: Problem-solving methodology used to illustrate the theories and tools in financial decision making.

Subject: Essential of E-Commerce Subject Code: BC- 304

CO 1: Define e-commerce and describe how it differs from e-business.

CO 2: Identify and describe the unique features of e-commerce technology and discuss their business

CO 3: Describe the major types of e-commerce

CO 4: Understand and apply research approaches, techniques and strategies in the appropriate manner for

CO 5: Discuss the origins and growth of e-commerce.

CO 6: Conceptualise the research process

CO 7: Understand the evolution of e-commerce from its early years to today.

Subject: Advertising and personal selling Subject Code: BC -305

CO 1: Discuss the role of public relations in the promotional mix

CO 2: Define and state the objectives of sales promotion

CO 3: Discuss the most common forms of consumer sales promotion

CO 4: Describe personal selling

Subject: Business Statistics

Subject Code: STAT-106

CO 1: Understand the basic concepts and principles of statistics

CO 2: Outcome of this course is to provide an understanding for the graduate business student on statistical concepts to include measurements of location and dispersion, probability, probability distributions, sampling,

CO 3: independently calculate basic statistical parameters (mean, measures of dispersion, correlation coefficient.

CO 4: devise strategic approaches to managing a business successfully in terms of statistics

Subject: Cost Accounting

Subject Code: BC -104

CO 1: Understanding of the function, the roles, the goals and the processes of cost accounting, and covering the

CO 2: Express the place and role of cost accounting in the modern economic environment.

CO 3: Select the costs according to their impact on business

CO 4: Differentiate methods of schedule costs per unit of production,

CO 5: Differentiate methods of calculating stock consumption.

CO 6: Interpret the impact of the selected costs method.

CO 7: Identify the specifics of different costing methods

,

Subject: Business economics Subject Code: BC -104

CO 1: Apply the concept of opportunity cost.

CO 2: Employ marginal analysis for decision making

CO 3: Analyze operations of markets under varying competitive conditions.

CO 4: Analyze causes and consequences of unemployment, inflation and economic growth.

Subject: Business Environment Subject Code: BC -105

CO 1: To provide knowledge of the environment in which businesses operate, the economic operational and financial framework with particular application to the transaction of business.

CO 2: Make student aware about political environment and geographical environment.

CO 3: Understand the concept of business ethics.

Subject: Management Information System Subject Code: MBA-508

CO 1: Describe the role of information technology and information systems in business

CO 2: Record the current issues of information technology and relate those issues to the firm

CO 3: Reproduce a working knowledge of concepts and terminology related to information technology

CO 4: Appraise the knowledge previously acquired of Microsoft Office

CO 5: Analyze how information technology impacts a firm

CO 6: Interpret how to use information technology to solve business problems

CO 7: Illustrate the impact of information systems in society

Subject: Indian financial system Subject Code: BC-206

CO 1: define the term finance

CO 2: identify the role of finance in an economy

CO 3: describe various kinds of finance

CO 4: explain the financial system and its components

CO 5: discuss the different financial intermediaries

CO 6: describe various functions of financial market and instruments

CO 7: outline the services of electronic banking and ATM

Subject: Financial management Subject Code: BC-207

CO 1: Understanding of the function, the roles, the goals and the processes of corporate financial management,

CO 2: Issues in investment and operations.

CO 3: Problem-solving methodology used to illustrate the theories and tools in financial decision making

Subject: Fundamentals of Investment & Stock Market Subject Code: BC -208

CO 1: The objective of this paper is to acquaint the students with emerging trends in financial services and stock

CO 2: Make student aware about SEBI, Mutual Funds

CO 7: Use portfolio analysis and the product life cycle to understand how a firm manages its product mix.

CO 8: Apply an understanding of the finance manager's role in investment analysis.

Subject: Financial reporting and analysis Subject Code: BC-301

CO 1: Describe and apply the basic techniques of financial statement analysis;

CO 2: Explain the relationship between strategic business analysis, accounting analysis and financial analysis;

CO 2: Identify and utilise value-relevant information contained within financial statements;

CO 3: Recognize and explain the fundamental role of accounting numbers in the valuation of entities and the key financial claims on these entities assets (equity and debt securities);

CO 4: Understand the impact of financial reporting choices on the usefulness of reported earnings to predict

CO 5: Prepare a written analysis of a listed company, which incorporates and synthesizes the strategic,

CO 6: Conduct applied business research (including locating, critically interpreting and evaluating firm-specific financial information);marketing issues and provide recommendations in both written form and in the form of a

CO 7: Produce a comprehensive international marketing plan

Subject: International business Subject Code: BC-210

CO 1: Explain how international factors affect domestic concerns.

CO 2: Explain regional economic integration and economic and political integration.

CO 3: Explain the main institutions that shape the global marketplace.

CO 4: Explain businesses expansion abroad.

CO 5: Students are expected to enhance their cognitive knowledge of global issues; interpersonal skills with individuals from various cultures, and social responsibility awareness on global issues.

Subject: Indirect Taxes Subject Code: BC-306

CO 1: By the end of the course students will be able to describe how the provisions in the corporate tax laws can be used for tax planning. ... Students who complete this course will be able to learn various direct and indirect

CO 2: Students may be able to understand the concept of VAT;; identify situations where input tax credit is

CO 3: By the end of the course students will be able to describe how the provisions in the tax laws can be used for

Subject: Governance, Ethics & Social Responsibility of Business Subject Code: BC-307

CO 1: Tackle some ethical dilemmas they might face in their professional life.

CO 2: Critically think about concrete cases.

CO 3: Understand different ethical framework and tools that will help them to address ethical issues.

CO 4: Capacity to research autonomously and methodically the information needed to solve a complex,

CO 5: Integrate autonomously researched information, tools, knowledge and context to build and propose, either individually or as part of a team, original, creative and viable solutions to concrete complex management

Subject: Labour Laws

Subject Code: BC-308

CO 1: To acquaint the students with basic Acts pertaining to social security

CO 2: Labour welfare practices in India.

CO 3: To help students develop the skills of conflict avoidance, resolution and negotiation

CO 1: The nature and scope of labor laws

CO 2: The rationale of labor laws in organizations

CO 3: The international labor organization visa-viz the labor laws in India

CO 4: Managing employee relations at work

Subject: Seminar on Entrepreneurship & Small Business

Subject Code: BC-309

CO1: Demonstrate skills and knowledge about a wide range of subjects essential to the formation, operation, and

CO2: Apply, analyze, synthesize, and evaluate information to frame and solve business problems.

CO3: Create an environment conducive to positive group interaction.

CO4: Demonstrate a breadth or depth of knowledge and skill, according to the students' independent selection of degree elective courses or according to the program's specialized areas of focus.

Course Outcomes (CO) of M.COM

Subject: Management Concept and Organizational Behaviour Subject Code: MC-501

CO 1: Thorough and systematic coverage of management theory and practice.

CO 2: Fundamental knowledge and exposure of the concepts, theories and practices in the field of management.

CO 3: basic roles, skills and functions of management, with special attention to managerial responsibility for

CO 4: Evaluate the global context for taking managerial actions of planning, organizing and controlling.

CO 5: Assess global situation, including opportunities and threats that will impact management of an

CO 6: Integrate management principles into management practices.

CO 7: Assess managerial practices and choices relative to ethical principles and standards.

CO 8: Specify how the managerial tasks of planning, organizing, and controlling can be executed in a variety of

Subject: Managerial Economics Subject Code: MC-502

CO 1: To understand various social, political, legal and economic issues

CO 2: Factors that influence business in India

CO 3: To appreciate associated opportunities, risks and challenges and their relevance for managerial decisions.

CO 4: Understand the internal and external decisions to be made by managers

CO 5: Analyze the demand and supply conditions and assess the position of a company

CO 6: Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.

CO 7: Analyze real-world business problems with a systematic theoretical framework.

Subject: Accounting for Managerial Decision

Subject Code: MC-503

CO 1: To acquaint the students regard various accounting concepts and its application in managerial decision

CO 2: To build potential to use appropriate accounting tools and techniques

CO 3: To understand financial accounting and management accounting for preparing and analyzing financial

Subject: Quantitative Techniques Subject Code: MC-504

CO 1: To acquaint the students with various statistical tools and techniques used to business decision making.

CO 2: Providing fundamental knowledge and exposure to use various statistical methods

CO 3: To understand, analyze and interpret data for decision making.

Subject: Human Resource Management Subject Code: MC-505

CO 1: To make student aware of the various functions and importance of the HR department in any organization.

CO 2: Managing the human resources, whereby the underlying objective is to attract retain and motivate the

CO 3: Research and analyze information needs and apply current and emerging information technologies to

CO 4: Develop, implement, and evaluate organizational development strategies aimed at promoting

CO 5: Present and evaluate communication messages and processes related to the human resources function of

CO 6: Manage own professional development and provide leadership to others in the achievement of ongoing

CO 7: Facilitate and communicate the human resources component of the organization's business plan.

Subject: Corporate Financial Accounting

Subject Code: MC-505

CO 1: To understand various ACCOUNTING principles and standards

CO 2: Preparation of financial statement.

CO3: Recognize and understand ethical issues related to the accounting profession.

CO4: Prepare financial statements in accordance with Generally Accepted Accounting Principles.

CO5: Employ critical thinking skills to analyze financial data as well as the effects of differing financial accounting

CO6: Effectively define the needs of the various users of accounting data and demonstrate the ability to communicate such data effectively, as well as the ability to provide knowledgeable recommendations.

CO7: Recognize circumstances providing for increase

Subject: Financial management

Subject Code: MC-506

CO 1: Understanding of the function, the roles, the goals and the processes of corporate financial management,

CO 2: Issues in investment and operations.

CO 3: Problem-solving methodology used to illustrate the theories and tools in financial decision making

Subject: Marketing Management

Subject Code: MC-507

CO 1: Understanding concepts, philosophies, processes and techniques of managing the marketing operations of

CO 2: This course will provide better understanding of the complexities associated with marketing functions,

CO 3: The opportunity to apply the key concepts to practical business situations.

CO 4: Manage people, processes and resources within a diverse organization.

CO 5: Apply knowledge of leadership concepts in an integrated manner.

CO 6: Analyze an organization's activities to develop/implement a marketing strategy.

Subject: Management Information Systems Subject Code: MC-508

CO 1: Describe the role of information technology and information systems in business

CO 2: Record the current issues of information technology and relate those issues to the firm

CO 3: Reproduce a working knowledge of concepts and terminology related to information technology

CO 4: Appraise the knowledge previously acquired of Microsoft Office

CO 5: Analyze how information technology impacts a firm

CO 6: Interpret how to use information technology to solve business problems

CO 7: Illustrate the impact of information systems in society

Subject: Strategic Management Subject Code: MC -566

CO 1: Understand the basic concepts and principles of strategic management

CO 2: Analyse the internal and external environment of business

CO 3: Develop and prepare organizational strategies that will be effective for the current business environment

CO 4: devise strategic approaches to managing a business successfully in a global context

MBA program outcome includes:

FALSE

FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE

MBA Course Specific Outcomes:

FALSE
FALSE
FALSE
FALSE

AKAL COLLEGE OF EDUCATION

Programme outcomes

Programme outcomes, programme specific outcomes and course outcomes for all programme offered by the institution are stated and displayed on website and communicated to teachers and students- yes they are stated
Programme outcomes, programme specific outcomes and course outcomes for the programme offered by the

1. To produce intellectually sound, concerned, morally upright, spiritually oriented, patriotic and law-abiding
2. To promote global understanding for peaceful co-existence and universal brotherhood.
3. To develop scientific temper, creative and responsible leadership in the field of education who can render
4. To develop among the teachers self confidence and a sense of value commitment and attitudes of critical
5. To empower the teachers with sufficient theoretical and practical knowledge necessary to perform their various roles in the educational system as well as in the society.
6. To equip the teachers with excellent communication skill and proper understanding of the psychological and
7. To acquaint the teachers with appropriate skills and methodologies to facilitate learning among the pupils and
8. To enable the teachers to manage learning resources, to use community resources as educational inputs and to organize experience for the all round development of students.
9. To generate in the teachers the capability to develop curiosity, imagination and self- confidence among
10. To motivate the teachers to understand action research and employ innovative practices in accordance with

Attainment of Programme outcomes, programme specific outcomes and course outcomes

Attendance is compulsorily taken . The class test and assignments are evaluated within a short duration and the marks are recorded. The student's participation in the classes and the marks scored in tutorials, assignments Subject teachers. Remedial programmes are arranged for slow learners. Library register, attendance register are monitored to know about the student's interest in academic activities. The faculty members are encouraged to conduct surprise tests, quizzes to monitor the academic progress of each student. Subject wise result analysis is