SRI RAMACHANDRA UNIVERSITY
(Declared under Section 3 of the UGC Act, 1956)

Accredited by NAAC with A Grade
Porur, Chennai 600 116

HAND BOOK OF CHOICE BASED CREDIT SYSTEM (CBCS)
FOR UG AND PG DEGREE PROGRAMS
2015-16

CHOICES AND SYLLABUS

FOR

GENERIC ELECTIVE, ABILITY ENHANCEMENT
COMPULSORY & SKILLS ENHANCEMENT COURSES
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### A. LIST OF GENERIC ELECTIVE COURSES OFFERED BY SRU DEPARTMENTS

#### Faculty of Physiotherapy

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<th>Semester Odd/Even</th>
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**Faculty of Biomedical Sciences**

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2. **ASE 002** Applied Psychology  
3. **ASE 003** Soft Skills  
4. **ASE 004** Physician Office Management  
5. **ASE 005** Culinary Skills for Optimal Nutrition  
6. **ASE 006** Bakery and Confectioneries  
7. **ASE 007** Fundamentals Of Biomedical Physics  
8. **ASE 008** Introduction To Communication Disorders And Rehabilitation  
9. **ASE 009** Functional Language Skills  
10. **ASE 010** Basic quantitative research tools for clinical and public health research  
11. **ASE 011** Health Science Data Analysis using R-Statistical Software  
12. **ASE 012** Occupational Health Services  

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**Faculty of Biomedical Sciences**

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### Generic Elective and Skilled Enhancement Course

#### GENERIC ELECTIVE AND SKILLED ENHANCEMENT COURSE

#### TYPICAL WEEK TIME TABLE FOR ODD AND EVEN SEMESTERS

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- **Odd Week**: Total number of hours per week = Total number of hours per day (7) X Total number of days per week (6) = 42 Hours of teacher learner interaction
- **Even Week**: Total number of hours per week = Total number of hours per day (7) X Total number of days per week (5) = 35 Hours of teacher learner interaction
- **Average Credit per week** = 38.8 Hours
- **Skill Enhancement on Thursday** 1 hour = 1 Credit
- **Skill Enhancement on Saturday** 1 hour = 0.5 Credit (Working Odd Saturdays)
SYLLABUS FOR GENERIC ELECTIVES

Faculty of Physiotherapy

<table>
<thead>
<tr>
<th>Course Number</th>
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COURSE OBJECTIVES

After 45 hours of lecture demonstration and clinical practice the student should be able to
1. Understand, Interpret, analyse clinical findings related to cardiac problems and apply appropriate techniques.
2. Demonstrate various selected yoga asana and meditation
3. Acquire knowledge on stress management and healing, improving communication skills.

COURSE CONTENT:

Unit I: The healers role, anatomy and physiology of the heart and heart disease-electrical system of heart, blood pressure, cardiovascular diseases, angina, cardiac arrest, stroke TIA warning signs.

Unit II: The psychosocial factors in cardiac disease- Internal, external stress factors, cognitive functioning, stress management and healing

Unit III: Yogic principles and healing, the five sheaths or koshas, self awareness and mindfulness, warm ups, sun salutations and asanas, meditation, imagery and visualization, communication skills.

PRACTICALS:
All the techniques demonstrated under cardiac yoga must be practiced by students.
Record should be maintained by student for developed skill practiced

EVALUATION:
Unit tests, term examinations and assignment are conducted to evaluate a student.

REFERENCES:
1. Beyond the relaxation response H. Benson, Times Books
2. Integral Yoga hatha Satchidananda, Holt Rinehart & Winston
3. Cardiac Yoga-M. Mala Cunnigham.

Faculty of Physiotherapy

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COURSE DESCRIPTION
This course serves to integrate the knowledge gained by the students in Women's Health and create awareness and carry out research in this area. This course also provides knowledge on educating and training women with various needs. In addition, the students will be able to show their proficiency based on written and oral internal evaluation.

COURSE OBJECTIVE
The objectives of this course is that after 45 hours of lectures demonstrations, practicals the student will be able to plan appropriate fitness counselling and create awareness in the community. The student will also demonstrate skill in appreciating the significance and knowledge of women's health to the wider community.

COURSE OUTLINE:
UNIT I- Introductory part
Female anatomy
Female physiology
Exercise physiology and Homeostasis
Fitness definition, aspects, parameters for testing
Factors enhancing fitness

UNIT II - Women and Exercise
Aerobic Exercises - principles, Exercise choices
Strength training - types, principles, core training and choices
Flexibility Training - types, stretching
Individualised training programs

UNIT III - Preventive Pelvic floor Training
Introductory pelvic floor - Anatomy and Physiology
Pelvic floor re-education (awareness, activation, isolation, co-ordination, strength and endurance exercises
Assessment, treatment and advice for urogenital dysfunction

EVALUATION:
Unit tests, assignments and term examinations are conducted to evaluate the students.

REFERENCES
- Women’s Health Sapsford, Publisher Lippincott.
- Exercise physiology, Mcardle, Katch, Katch 5th edition
- Women’s health and fitness Guide Michele Kettes

JOURNALS
- The Association of chartered physiotherapists in Women’s Health Journal
- American Physical Therapy Association - continence and Women’s Health Journal

Faculty of Allied Health Sciences - Department of AHS

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Department of AHS

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Learning Objectives

- To give a better understanding about yourself and those around you.
- To understand the concept of personality and its theories.
- Factors influencing personality development; nature vs nurture.
- Personality traits and types.
- Understanding the relationship between personality, stress and coping
- Coping with health stress
- Importance of soft skills in personality
- Various aspects of soft skills

PERSONALITY DEVELOPMENT AND STRESS MANAGEMENT

Unit 1
Introduction to Personality Development, Developing Personality, Stages of Development, Types of personality, Theories of personality

Unit 2
How needs impact personality, Maslow's hierarchy of need, Basic Personality Traits; Values, Beliefs, Interactions, Experiences, Environmental influences, the big five dimensions.

Unit 3
Stress; causes, effect and types, Stress resistant personalities, Relaxation; training aspects importance and Body works.

Unit 4
Health stress and coping, Understanding and communicating our health needs, Behavioral and psychological correlates of illness.

Unit 5
Soft skill; need and importance, Personality development and soft skills. Effective communication, listening, speaking, writing, interpretation part of soft skills and personality

Learning Outcome:

By successfully completing this course, students will be able to:
Describe how a personality develops.

- Define the stages of personality development.
- Define personality types.
- Describe basic personality traits.
- Personality and stress.
- Health stress, coping and relaxation.
- Soft skills and personality.

Text Books:

Reference Books:
1. Lazarus J Stress Relief and Relaxation Techniques, Viva Book Private limited.

Online Resources:
1. Role of soft skills and personality development http://resjournals.com/ERJ/Pdf/2012/Feb/Kushwaha.pdf

Learning objectives:
- To understand the importance of health behaviour and psychosocial factors in developing and maintaining the lifestyle diseases
- To elucidate the impact of stress on the immune system and chronic illness
- To understand the methods of management of lifestyle diseases

HEALTH PSYCHOLOGY

Unit I - Introduction: Concepts of health definition of health determinants of health health psychology the need for health psychology field mind and body relationship bio-psychosocial model versus bio-medical model role of lifestyle changes in illness

Unit II - Health related behaviour: Role of behaviour in disease and disorder smoking and substance abuse - eating disorders and management exercise and its benefits developing a healthy diet

Unit III - Stress and disease: Definition of stress stages of stress stress and personality Psychoneuroimmunology health outcomes of stress stress management

Unit IV - Major lifestyle diseases I:
Coronary Heart Disease (CHD): Role of stress and personality in CHD other psychosocial risk factor modification of risk factors management of Cardio vascular diseases

Hypertension: causes of hypertension psychological factors related to hypertension management of hypertension

Stroke: Risk factors for stroke stroke and quality of life rehabilitative intervention

Unit V - Major lifestyle diseases II:
Diabetes: types of diabetes lifestyle changes as a cause for diabetes stress management and diabetes control
Cancer: psychological factors related to cancer  cancer related health behaviour - stress, coping and cancer  psychological intervention

Unit VI - Management of lifestyle diseases: effects of chronic illness  quality of life  emotional responses  coping mechanisms  pain management  dealing with terminally ill patients  lifestyle modification, prevention and health promotion

Learning Outcomes:
By the end of the course the students will be able to

- Appreciate the impact of psychosocial factors in developing lifestyle diseases
- Understand the role of health related behaviour as the causative factor and curative factor in lifestyle diseases
- Understand the nature, causes and risk factors associated with major lifestyle diseases
- Understand the management aspects of lifestyle diseases
- Understand the prevention and health promotion

Text Books:

References Books:

Online Resources:
1. Global Health (EBSCO)  
(//www.google.co.in/search?q=Global+Health+(EBSCO)&rlz=1C1SAVU_enIN566IN566&oq=Global+Health+(EBSCO)&aqs=chrome..69i57.18704j0j8&sourceid=chrome&es_sm=93&ie=UTF-8)

Department of AHS

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Learning Objectives

- Understand the basics and key concepts related to organizational behavior and its application in handling people at organizations
- To understand about the evolution of organizational behavior and to understand the relation between various psychological concepts with organizational behavioral
To explore the various key concepts and how these key factors can be applied to understand and enhance efficacy of organization.

**Organizational Behavior**

**Unit I: Basics of Organizational Behavior (OB)**

Introduction - Definitions - Contributing fields to organizational behaviour Behaviour model for organizational efficiency-Organizational components that need to be managed

**Unit II: Evolution of Management Concepts**


**Unit III: Personality, Learning and Motivation in Organization**

Introduction - Determinants of personality - Personality traits The Myers-Briggs Type Indicator (MBTI), Locus of control, Personality Orientation - Achievement orientation Authoritarianism - Self esteem and Self monitoring - Risk taking-Types of personality. Theories of learning-Processes, Application of reinforcement to shape behaviour: Extinction Application of learning and organizational behaviour modification.

**Unit IV: Role of Communication in OB**

Objectives of communication, Communication Process - Means of communication Structure of communication - Types of communication, Communication network- Barriers to effective communication, Overcoming communication barriers.

**Unit V: Conflict Management**

Definition, Causes of Conflict, Transition of Conflict, Types of Conflict, Conflict Process, Conflict Resolution Model.

**Unit VI: Stress Management**

Stress-Symptoms, General Adaptation Syndrome, Sources of Jobs Stress, Group stressors, Individual Stressors, Stress and Behaviour, Burnout - Causes of Burnout, Prevention of Burnout, Management of stress Individual vs Organizational level strategies.

**Learning Outcome**

At the end of the course student will learn about

- The basic concepts of organizational behavior
- Will understand about the concept of modern management emerged
- They will understand about the key concepts of psychology which are applied in organizational behavior
- They will learn to identify various issues in the organization such as communication, conflicts and stress and how to address these issues.

**Text books:**


**Reference books:**

Online Resources:

### Department of AHS

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**Learning objectives**
- To understand theoretical foundations of counselling psychology
- To examine briefly the major perspectives of counselling and to apply based on the client’s needs
- To assess one’s own needs and motivations and personal characteristics that will help in personal growth and wellbeing.
- To understand basic counselling skills as practiced by an effective counsellor.
- To discuss special settings and populations where counselling could be effectively used.
- To explore ethical and legal issues for the practice of counselling profession.

**COUNSELLING AND GUIDANCE**

**UNIT I:**
Introduction and definition of Counselling and Guidance, Counsellor Preparation, Qualifications, Qualities, Legal and Professional ethics

**UNIT-II:**
Different approaches to counselling, goals in counselling, role and functions of the counsellor.

**UNIT-III:**
Micro skills in Counselling- relationship building strategies and methods: Opening techniques, attending skills-verbal and non-verbal communication, Listening skills-Open questions and closed questions, Encouragement, Paraphrasing, Reflection, Summarization, influencing skills-Reframing, genuineness and Self-disclosure.

**UNIT-IV:**
Macro skills in Counselling, empathy, advanced empathy, Confrontation & challenging, Resistance, transference and counter-transference

**UNIT-V:** Counselling situations and Counselling across life-span.
Learning Outcome
At the end of this course, the students will be able to:

- Demonstrate basic knowledge in counselling (concepts, theories, ethical issues, basic skills, etc.).
- Apply this knowledge in improving one’s own life as well as to understand others in a better way.
- Use basic counselling skills (attending and listening skill) in improving their relationships.

REFERENCES
Text books:

Reference books:

Online Resources:
1. http://www.basic-counseling-skills.com/

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<thead>
<tr>
<th>S. No.</th>
<th>Code Number</th>
<th>Course Name</th>
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<td>First Aid Management &amp; Splinting Techniques</td>
<td>Elective Open</td>
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<td>AGE 006</td>
<td>Airway Management ECG &amp; Emergency Drugs</td>
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<td>AHS</td>
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FIRST AID MANAGEMENT AND SPLINTING TECHNIQUES

Objectives:

- At the end of each topic the health extension package students will be able to:
  - Describe first aid and the role of first aid.
  - Describe the purpose of emergency care.
  - Outline steps of emergency care.
  - Provide first aid for the causality and suddenly ill individuals.
  - Identify the emergency situations.
  - Differentiate problems of pregnant woman and every labor mgt.
  - Use appropriate, knowledge skill and materials while helping the casualty.

- Differentiate between emergency situation and other use.
- List management, assessment, and care steps for upper extremity and lower extremity fractures.
- Describe and demonstrate methods of splinting fractures of the upper extremities:
  - Shoulder (scapula) and collar bone (clavicle), humerus (arm), elbow, forearm, wrist (carpals), hand (metacarpals) and fingers (phalanges)
- Splinting techniques of lower extremities Thomas splint, sam splint, etc.

Unit-I BACKGROUND INFORMATION

- The importance of first Aid
- First aid supplies
- First aid and the law
- Prevention practices

Unit-II ACTION AT AN EMERGENCY

- Recognizing Emergencies
- Deciding to act
- Seeking medical care
- Disease transmission
- Rescuer reactions

Unit III BLEEDING AND WOUNDS

- External bleeding
- Wound infection
- Amputations
- Impaled objects
- Wound that require medical care
- Internal Bleeding
- Dressing and Bandages

Unit-IV BONE, JOINT AND MUSCLE INJURIES

- Bone injuries
- Splinting
- Joint injuries
- RICE injuries
- Muscle injuries
- Splints Introduction, Types, Uses, Splinting guidelines, Slings, Procedure, Complications

UNIT-V RESCUING AND MOVING INJURIES
- Water rescue
- Ice rescue
- Electrical Emergency Rescue
- Hazardous materials incidents
- Motor Vehicle crashes
- Fires
- Confined spaces
- Triage what to do with multiple victims
- Moving victims

Recommended books:
1. First Aid CPR and AED standard (sixth edition)
2. First aid book-St Johns Ambulance services
3. Text book of Orthopaedics Natarajan

Reference books:
- First Aid and Management of Minor Injuries by Jon Dallimore
- First Aid and Beyond by Dan Wolfe - Smashwords, 2014
- International Trauma Life Support Provider Manual
- Essentials Orthpaedics Mark D Miller

Online references:
- Emergency care and safety Institute online Barbara Paramedic practice today.
- WWW.ECS Institute .org

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<th>Course Number</th>
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Airway Management, ECG and Emergency drugs

Objectives:
- Define indications for airway adjuncts and explain correct insertion
- Deliver assisted ventilations effectively to patients with compromised breathing by mouth-to-mask, bag-mask, and flow restricted ventilator techniques
- Learn fundamental principles of airway management and quickly recognize and decisively manage patients whose breathing is threatened.
Demonstrate knowledge of electrocardiogram interpretation by listing the differential diagnosis, evaluating the ECG in relation to other patient data and trends, and describing subsequent steps in assessment and/or management.

Demonstrate knowledge of the pharmacokinetics, pharmacodynamics, metabolism, and excretion of various drugs used in the Emergency Department.

Unit I
- Basic anatomy
- Physiology
- Airway related problems
- Airway assessment

Unit II
- Airway equipment/adjucents
- Introduction
- Indications
- Contraindications
- Procedure

Unit-III
- Special considerations
  - Head tilt
  - Chin lift
  - Jaw thrust
- Pediatrics
- Needle cricothyroidotomy

Unit IV
- Basics of ECG
- Conduction systems
- Anatomy of the heart

Unit V
- Cardiac arrest rhythms
- Identification of MI
- Common arrhythmias

Unit-VI
- Introduction to drugs
- Routes of administration
- Pharmacodynamics
- Adrenaline
- Amiodarone
- Lidocaine
- Vasopressin
- Noradrenaline
- Dopamine
- Atropine
- Magnesium sulphate
- Adenosine

Recommended Books:
1. Mosby’s paramedic text book,
2. Barbara paramedic practice today
3. Medical Pharmacology Padmaja Udaykumar
4. ECG made easy John R. Hampton
Reference Books:
2. American Heart Association Advanced Cardiac Life support Provider Manual

Online References:
1. www.trauma.org
2. Airway management academy.com

### Course Objective:
The core objective of this course is to gain in depth knowledge on the structural and physiological functions of the various parts of the eye and the different examination procedures for the ocular structures.

#### 1. Clinical Examination of the Visual System

**I - History Taking**
Importance of history taking, Demographic data and its importance, Chief presenting symptoms, History of present illness, History of past illness, Family History, Common ocular symptoms and their causes defective vision, watering eyes, discharge, redness, pain, asthenopia and other symptoms

**II - Visual Acuity measurement**
Distance visual acuity charts, methods and measurements; Near visual acuity charts, methods and measurements; contrast sensitivity testing; colour vision testing

**III - External Examination**
Examination of head posture, examination of forehead, examination of eye brows, examination of eyelids, examination of Lacrimal apparatus, examination of eyeball on the whole, examination of the cornea, conjunctiva sclera and anterior chamber, eye movements, muscle balance and squint evaluation

**IV - Anterior segment Evaluation**
Slit lamp examination of the eyelids, cornea, conjunctiva, anterior chamber depth, iris, and lens Intraocular pressure measurements using non contact tonometer

**V - Posterior segment Evaluation**
Introduction and importance of posterior segment evaluation- direct and indirect ophthalmoscopy

### Learning Outcome:
- To have in depth knowledge on the functions of the visual system
- To have the skill to perform basic ophthalmic examination

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Text Books:

Reference Books:

### Learning objective:
The course highlights the importance of vision when dealing with sports activities. The course also covers the therapies and trainings to improve the coordination of limbs with eyes.

#### Sports Vision

I  Understanding the role of vision in sports personnels
Definition, Classification into Dynamic and static sports, Visual assessment, Identifying the visual Skills required, estimating the impact of vision training on sporting conditions

II  Comprehensive sports vision Examination
Visual motor skills assessment, visual efficiency skills assessment, visual information processing skill assessment

III  Decision making mechanism
Psychology of completion, Considerable factors, Dominant eye identification, Choosing the skill with the sports they play, Common visual needs required, Deficits in the person to be addressed, Player’s Expectations and Preferences, Designing Treatment plan: Therapy Goals, Skill improving techniques

IV- Optometric therapies and training

V- Preservation and Protection of Vision
Hazards: Physical and Radiation, Preventive measures, Managing Sports eye injuries

#### Learning Outcome:
- To have adequate knowledge on the role of vision in sports personnels
- To have in depth knowledge on the role of vision therapists in handling sports personnels

#### Text books:

#### Reference Books:

#### Online references:
1. visiontherapystories.org
Learning Objective: To impart the various methods of eye banking and the various procedures involved in tissue preservation, transport and storage.

Eye Banking

I - Anatomy of the eye and cornea

Structures, Functions of cornea, Layers of cornea, factors affecting corneal Transparency, Anomalies of cornea, Ectatic conditions of cornea, Dystrophies and Degenerations of cornea

II - Infrastructure requirements

Physical Space, Equipments, Maintenance and cleaning, Reagents, infection control and safety, waste disposal

III - Standards for eye retrieval

Pre recovery procedure, retrieval procedures, screening of donors, contraindication

IV - Technical Procedures

Whole Eye Enucleations, Preparation, Equipment and Instrumentation, Procedure, Corneal Excisions, Preparation, Equipment and Instrumentation, Procedure

V - Tissue evaluation and preservation standards

Gross examination, slit lamp examination, specular microscopy, short term preservation, long term preservation, whole globe preservation, sclera preservation

Learning outcome:

- To gain in depth knowledge on the need and importance of eye donation
- To gain adequate competency in eye donation procedures

Text books:


Reference Books:

4. Postgraduate Ophthalmology, Volume 1 Zia Chaudhuri, Murugesan Vanathi

Online References: http://npcb.nic.in/writereaddata/mainlinkfile/file176.pdf
Learning objective: The main objective of this course is to identify children with special needs and initiate appropriate interventions.

Visual diagnosis for children with special needs

I - Overview of the special population
Identification of a special child, History, Prevalance of Developmental Delay, Down syndrome, Autism, Cerebral Palsy, ADHD, Signs and symptoms, Causes, Pathophysiology

II - Comprehensive ocular examination procedures for special children
Vision assessment, Sensory Tests, Motor Tests, Refraction procedures, Ocular Health Assessment

III - Diagnosis and management options for refractive errors, strabismus and amblyopia
Management principles in myopia, management principles in hyperopia, management principles in astigmatism, management principles in Aphakia in children, management principles in convergent strabismus, management principles in divergent strabismus, management principles in amblyopia, management principles in nystagmus

IV - Early intervention needs and procedures
Review of the visual development process, need for early intervention, early intervention strategies and methods

V - Introduction into Visual information processing skills
Importance of visual discrimination, visual memory, visual spatial relationship, visual form constancy, visual sequential memory, visual figure ground, visual closure; Insight into vision therapy in special children

Learning Outcome:
- To develop the ability to correctly pick up a child with special needs
- To expand the skill to diagnose the condition
- To widen the ability to do appropriate referrals

Text books:
1. Optometric management of learning related vision problems Scheiman and Rouse
2. Visual diagnosis and care of the patient with special needs Marc B. Taub, Mary Bartuccio, Dominick M Maino

Reference Books:
2. Clinical procedures in primary eye care; David B. Elliot, 4 ed, Saunders Ltd.; 2013
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<td>AGE 011</td>
<td>Functional foods and nutraceuticals for health promotion</td>
<td>3</td>
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### Objectives

1. To impart knowledge about nutraceuticals
2. To make the students understand the significant role of nutraceuticals and its health benefits.

### Functional foods and nutraceuticals for health promotion

**I - Introduction to nutraceuticals**

Nutraceuticals  Concept, definition, food and non-food sources of nutraceutical factors. Use of nutraceuticals in Sidha, Ayurveda, Unani and Chinese, their role in preventing /controlling diseases.

**II - Introduction to phytochemicals**

Phytochemicals  Definition. Phytochemicals and gastrointestinal health. Natural occurrence of certain phytochemicals.

**III- Introduction to functional foods**


**IV - Functional foods and health**

Functional foods in the following: Acute gastrointestinal infections, coronary heart disease (CHD), anti-tumour properties, obesity. Functional foods and prevention of diabetes; Functional foods and cognition; Functional foods and bone health.

**V - Probiotics and Prebiotics**

Probiotics: Definition, types; functional properties, medical applications. Probiotic products Prebiotics: Definition and types; Prebiotic ingredients in foods; applications.

**VI- Synbiotics**

Synbiotics: Definition. Potential traditional and novel food interventions.

### Learning Outcomes:

The student will be able to:

1. Comprehend the application of nutraceuticals for the benefit of human beings.
2. Realize the indispensable use of nutraceuticals in the management of various diseases/disorders.

**Text Books**


**Reference books**


**Journal references:**

1. Nutrition Journal
2. Current Topics in Nutraceutical Research

**Websites:**

http://www.nutraingredients.com/
http://www.cspinet.org/nah/

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**Semester - ODD**

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**Nutrition Support Techniques**

**Learning Objectives**

- To understand the process of nutrition care in a clinical setting
- To understand the need for nutrition support
- To be familiar with the different routes of nutrition delivery
- To get familiarized with the basic principles of enteral and parenteral nutrition

**I- Introduction to Therapeutic Nutrition**

Nutrition Care Process, Importance of nutrition support in clinical setting, basic nutritional assessment and estimation of requirements

**II- Routes of Nutrition Support**

Oral, Ryles tube feeding, parenteral nutrition, nutrition support algorithm, principles of oral feeding
III - Enteral Nutrition
Definition, type of formulations, routes of Enteral nutrition support, method of feeding, tube feeding protocols, transition, recent advances in Enteral nutrition

IV - Parenteral Nutrition
Definition, type of formulations, routes of Enteral nutrition support, method of feeding, tube feeding protocols, transition, recent advances in parenteral nutrition

V - Complications of Nutrition Support
Gastrointestinal, Mechanical, Metabolic, Infectious - prevention

VI - Monitoring of Nutrition Support
Anthropometric, biochemical and dietary intake monitoring techniques,

At the end of the module the learner will be able to
✓ Make a decision on the route of nutrition support
✓ Be familiar with the different feeding techniques and devices
✓ To monitor the outcome of nutrition support
✓ To make appropriate selection of enteral or parenteral formulations

Text Books

Reference Texts

Practicals
Learning Objectives
1. To be aware of different enteral and parenteral feeding formulations available in the market
2. To plan feeding schedules based on sound nutritional principles
3. To develop the skill of monitoring nutrition support

Practicals
1. Enteral and Parenteral Feeding Access Devices
2. Market survey of Enteral and parenteral products
3. Planning and scheduling Enteral nutrition support
4. Planning and scheduling Parenteral nutrition support
5. Selection of one Enteral and one parenteral nutrition support case and submission of follow up report

At the end of the module the learner will be able to
1. Be an integral part of the health care team in monitoring nutrition support
2. Developed skill of planning nutrition support schedule

### Department of Clinical Nutrition

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#### Learning Objectives

To enable the students to:

- Be familiar with food safety hazards, assessment of risk.
- Understand the principles, actions, and limitations of food sanitation procedures.
- Know insight into the current and future implications concerning food safety hazards and risks.
- Understand the basics of quality concepts and practice in food companies.
- Provide a basic acquaintance with food laws, food standards and specifications.

#### Food laws, food safety and quality control.

**I - Food laws and Standards**

History, Global Scenario, National and International laws, Indian Food Regulatory Regimen

**II - Standards of quality**


**III - Laws pertaining to food groups**

Food laws for various food item according to food groups

Milk and Milk Products Order (MMPO), Meat Food Products Order (MFPO), STAMP, Fruits Products Order (FPO).

**IV - Food safety**

Definition, Types of hazards, biological, chemical, physical hazards, Impact on health Factors affecting Food Safety, Control measures, Importance of Safe Foods, Management of hazards

**V - Quality Control concepts in food industry**


**VI - Quality management systems in India**

Sampling procedures and plans; Domestic regulations; Global Food safety Initiative; Labeling issues; International food standards. Quality assurance, Total Quality Management; GMP/GHP; GLP, GAP; Sanitary and hygienic practices; Quality manuals, documentation and audits; Indian & International quality systems and standards like ISO (International organization for standardization), HACCP, Codex Alimentarius, Export import policy, export documentation.

#### Learning Outcome

The students will be able to
✓ Explain time-dependent characteristics of food materials.
1. Explain factors controlling rates of chemical, enzymatic, physical and microbial changes in foods.
2. Understand the basic techniques to adopt safe food handling practices for small scale and large scale food production.
3. Understand the food laws and standards required for the manufacturing and marketing food products.

**Text books**

**Reference books**

**Journals**
1. Journal of food safety and hygiene
2. Food hygiene and global health

**Web references**
[www.fao.org](http://www.fao.org)
[www.foodlaw.us/](http://www.foodlaw.us/)

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### Department of Clinical Nutrition

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**Learning Objectives**
✓ To gain knowledge on the importance of nutrition with respect to occupational disease
✓ To understand and adopt the dietary guidelines
✓ To acquire knowledge and skills regarding the exposures of humans to hazards in the environment (including the work environment) and the assessment of the magnitude of risks.

**Occupational Nutrition**

I - Introduction
Definition, type of works, occupational diseases, occupational hygiene. Basic constituents of food

II - Work evaluation
Factors influencing work performance, calorie requirements for various types of activity, energy expenditure in relation to intensity of muscular work,

III- Macro and Micronutrient requirements
Carbohydrate, fat and protein requirements for various types of activity
Vitamins and essential minerals like sodium calcium etc.

IV- Nutritional Assessment
Evaluation of occupational risk factors
Nutritional status in industrial workers
Nutritional habits food frequency and recalls

V- Individuals at risk
Child labour
Parental Labour and Child Nutrition
Maternal labour, breastfeeding and infant health.

VI - Workplace nutrition
Meal planning, wise selection of foods, designing nutrition strategy based on type of work, shift work nutrition, counselling techniques.

Learning outcomes
3. To understand the compromised nutritional status with regards to the occupation to the individual and family.
4. Counselling techniques

Text Books

Reference Book
1. Industrial nutrition, Magnus Pyke, Macdonald & Evans, Original from the University of California, 1950.

Journal
1. British journal of industrial medicine

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Learning objectives
✓ To understand the principles of nutritional epidemiology and its importance in public health
✓ To understand the prevalence and determinants of community’s nutritional/ health problems.
Malnutrition and Public Health

I-Introduction
Definition, aims, basic measurements and applications

II-Epidemiology
Study designs methods applied in conducting nutrition research
Measuring exposure (diet) outcome (disease) relationship and their interpretation

III-Vital statistics in relation to public health nutrition
Infant morbidity and mortality
Under five statistics

IV-Public health aspects of under nutrition
Etiology, public health implications, prevention and community based management of PEM, severe acute malnutrition and micronutrient deficiencies of public health significance.

V-Public health aspects of life style related disorders
Public health implications and preventive strategies for obesity, hypertension, coronary heart disease, diabetes, osteoporosis, cancer and dental carrier

VI-Nutrition education in community
Methods of education on nutrition awareness in community; nutrition demonstration, skits, visual aids.

Learning outcome
✓ To be able to understand public health implications of various nutritional problems.
✓ To understand strategies to overcome the same.

Text books:

Reference books

Journal reference
1. International Journal of Food Safety, Nutrition and Public Health
2. Public Health Nutrition

Web reference
1. www.nutritionsonociety.org/publications/nutrition...journals/public-health
2. www.nestlenutrition-institute.org/
3. www.nutrition society.org
4. www.internationalmedicalcorps.org/
5. www.internationalmedicalcorps.org/

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<td>Basics of Food and Nutrition</td>
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**Learning Objectives:**

- Understand the use of food in the body and its relationship to good health through basic principle of Nutrition
- To gain information about the functions of nutrients, their sources, requirements and effects of deficiencies.
- To apply this knowledge of nutrition in daily life.

**Basic of Food and Nutrition**

**I Food**

Food: Definition of food, nutrition and nutrients characteristics of good health. Relation of nutrition to good health Optimum Nutrition Malnutrition Over and under nutrition

Classification of foods: Based on (a) Major nutrient content/ (b) Basic five food group/(c) and functional food group classification, i.e. energy giving foods, Body building foods, protective foods

Food selection: Factors, responsible for food selection

Methods of cooking: Advantages and disadvantages of each method with examples.

Food preservation: Food spoilage, causes and prevention. Methods of food preservation.

Food additives colorants, flavour- producing agents and their identification

**II - Food Groups**

Discussion of following foods under different headings structure: Composition, nutrient content and methods of preparation.(a) Cereals, (b) Pulses, (c) Nuts and oil seeds (d) Milk and Milk products, (e) Flesh foods meat,fish and poultry (f) Eggs (g) Fruits and Vegetables (h) Beverages, (i) spices and condiments (j) Convenience foods.

**III Macro Nutrients**

Macro Nutrients: carbohydrates, lipids and protein-their occurrence in the body composition, classification; functions, dietary sources and daily recommended allowances.

**IV - Vitamins**

Dietary requirements summary of vitamin stability toxicity and sources of vitamins bioavailability of vitamins reasons for losses in foods.

**V - Minerals**
Dietary requirements summary of Mineral stability toxicity and sources of Minerals bioavailability of Minerals reasons for losses in foods.

VI - Water and Interrelationship between Nutrients

Importance of water and water balance & Interrelationship between nutrients.

Learning Outcomes: At end of this Paper, the students will able to Know the

✓ Use of food in the body and its relationship to good health through basic principle of Nutrition
✓ Functions of nutrients, their sources, requirements and effects of deficiencies.
✓ Knowledge of nutrition applications in daily life.

Text Books:


Reference Books:

✓ Food, Nutrition and Health, Linda Tapsell, Oxford University,2013.

Journal Reference:

1. Journal of Nutrition & Food Sciences
2. International Journal of Food Sciences and Nutrition
3. Journal of Human Nutrition and Food Science
4. Current Nutrition & Food Science

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<td>Food and Nutrition In Emergencies</td>
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Learning Objectives:

✓ Understand the Special Nutrition Concerns arising out of the Disaster &Emergency Situations.
✓ Understand the Strategies for Nutritional Rehabilitation of Emergency affected Populations.
✓ To develop Skills for Problem Solving and convergence of services especially in special Conditions
Food and Nutrition in Emergencies

I - Types of Disasters and Principles of Nutrition Management
Types of Disasters  Natural (Drought, Flood, Earthquake, Cyclone, Tsunami), Manmade (Famine, War, Civil and Political Emergencies), Factors giving rise to emergency situation in these Disasters.
Principles of Management- Cultural Preferences Availability, Meeting Energy and Protein Requirements, Micronutrients and other Nutrients, Monitoring adequacy of food access and intake.

II- Organizing Nutrition Relief I
Introduction  General Feeding Programme: General Principles  Factors that affect ration levels and compositions, Food for general distribution, Organizing day rations distribution, Ration Cards. General ration distribution in camps, Villages and among Population.
Large Scale Cooked Food Distribution: Type, Quantities, & Facilities of cooked food distribution. Hygiene and Food Storage, Personnel & Equipment, Cooking Fuel. Monitoring the Effectiveness of Feeding Programme

III- Organizing Nutrition Relief II
Selective Feeding Programme: Types of supplementary feeding programme, foods and rations for supplementary programme. Targeted and Blanket Programme, Ration cards and attendance records, Complementary Public Health Interventions.
Therapeutic feeding of children, General Procedure Preparations, Administration, Medical Care, Signs of Recovery and Discharge. Treatment for Severe Wasting and Famine Edema, Initial treatment Phase and Rehabilitation Phase

IV- Assessment and Surveillance
Assessment and Surveillance of Nutritional Status, Indicators of Malnutrition, Rapid Nutritional Surveys, Organizing Field Work, Analysis, Interpretation and Reporting of Survey Results. Nutritional Screening and Health Surveillance. Health information System, Disease Surveillance, Surveillance reports, mortality data, Priority setting and phase

V - Preparedness and Management
Preparedness of Nation and Community, Coordination of relief Work, Administration of Camps, Logistics transportation and storage. Operation  Fostering ownership and participation, Optimizing food aid, Minimizing dependency, Mental health concerns, Facilitating Rehabilitation

Learning Outcomes:-
By the end of this paper, students will be able to:
✓ Understand the contexts in which different emergencies arise
✓ Be familiar with the roles of organizations involved in emergencies
Identify the most appropriate nutrition interventions in different emergency contexts
Apply the use of nutritional information in emergencies
Become familiar with up to date interventions and survey methodologies
Understand the controversies and challenges associated with policy change in the emergency setting.

Textbooks Reference:-

4. Assessment of Nutritional status in emergency affected populations Adolescents, special supplement, UNACC/SCN sub-committee on nutrition, Bradley, A. Woodruff and Arabella Duffield, 2000

Reference Book:-

The Management of Nutrition in Major Emergencies, WHO, 2000

Website References:-

1. www.learnwarecorp.com

Journal References:-

1. International Journal of Food Safety, Nutrition and Public Health
2. Journal of Hunger & Environmental Nutrition

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## Exercise Psychology (AGE 022)

### Learning Objectives
- To describe the various exercise-induced physiological changes.
- To illustrate the basic concepts of cardiopulmonary exercise testing.

### Learning Outcomes:
At the end of this module, the student must be able to:
- Visualise the physiological changes in various systems produced during exercise.
- Understand the potential uses of cardiopulmonary exercise testing.

### Unit I: Cardiovascular Response to Exercise
- Cardiac response to acute exercise.
- Effect of exercise on blood flow distribution.
- Blood pressure response to acute exercise.
- Regulation of ventilation during exercise.

### Unit II: Skeletal Muscle Response and Regulation during Exercise & Recovery
- Concept of fatigue:
  - Central vs peripheral fatigue.
  - High and low frequency fatigue.
  - Models of peripheral fatigue.
  - Models of central fatigue.
  - Central governor theory.
- Central vs peripheral control of exercise.

### Unit III: The Brain as a Regulator of Exercise
- Cardiopulmonary exercise testing: indications, types and interpretation.

### Recommended/Suggested Textbooks:
- Katch and Katch Exercise Physiology.
Learning Objective:
- To give the student general knowledge about the branch of Sports Biomechanics.
- To discuss functional anatomy as relevant to sports biomechanics.

Learning Outcome: The student have understood

UNIT I
Concepts in biomechanics
- What Is Biomechanics?
- What Are the Goals of Sport and Exercise Biomechanics?
- The History of Sport Biomechanics

UNIT II
Functional Anatomy and kinematics
Kinematic concepts for describing human motion: general motion, anatomical planes and axes applied to human motion
Planes of movement and axes of rotation:
- what is planes
- types of planes
- how to correlate with joint motion planes
- what is axis
- types of axis
- how to function with movement planes
Fundamental and derived quantities, vectors and scalars
Definition and explanation with examples
1. work
2. speed
3. power
4. energy
5. vectors
6. scalars
7. energy-work relationship
8. vector component

Equilibrium or Changing Motion
- What are forces?
- Classification of forces and friction
- Addition of forces: force composition resolution of forces
- Static & dynamic equilibrium

UNIT III
Biomechanics of gait
Basic concepts
- Introduction, gait cycle

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Department of Arthroscopy And Sports Medicine
Semester - Even

Course Number | Course Code | Course Title | L | T | P | C | Total Hours |
-------------|-------------|--------------|---|---|---|---|-------------|
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UNIT IV
Measurement in Biomechanics:
- Description of cameras, force plates and EMG
- Indications for use
- Protocols for testing

Recommended/ Suggested textbooks:
- Peter McGinnis, Biomechanics of Sport and Exercise. (2nd Edition).

Learning Objectives
- To describe the various exercise induced physiological changes.
- To understand the concepts of fatigue and its causes
- To illustrate the basic concepts of cardiopulmonary exercise testing

Learning outcomes:
At the end of this module, the student must be able to
- Visualise the physiological changes in various systems produced during exercise
- Understand the potential uses of cardiopulmonary exercise testing

Unit I:
Cardio respiratory response to exercise
- Cardiac response to acute exercise.
- Effect of exercise on blood flow distribution
- Blood pressure response to acute exercise
- Regulation of ventilation during exercise

Unit II:
Skeletal muscle response and regulation during exercise & recovery

Unit III:
Body fluid response and regulation during exercise and recovery
- Body fluid response during exercise and recovery
- Renal regulation of acid base balance during exercise
- Pulmonary regulation of acid base balance during exercise
- Mechanisms and regulation of sweating

Unit IV:
The brain as a regulator of exercise
- Concept of fatigue
  - Central vs peripheral fatigue
• High and low frequency fatigue
• Models of peripheral fatigue
• Models of central fatigue
• Central governor theory

- Central vs peripheral control of exercise

Unit V:
Cardiopulmonary exercise testing- indications, types and interpretation.

Recommended/Suggested Textbooks:
• Katch and Katch Exercise Physiology

Learning Objective:
• To give the student general knowledge about the branch of Sports Biomechanics
• To discuss functional anatomy as relevant to sports biomechanics

Learning Outcome:

UNIT I
Concepts in biomechanics and movement:
• What Is Biomechanics?
• What Are the Goals of Sport and Exercise Biomechanics?
• The History of Sport Biomechanics
Planes of movement and axes of rotation:
• what is planes
• types of planes
• how to correlate with joint motion planes
• what is axes
• types of axes
• how to function with movement planes

Fundamental and derived quantities, vectors and scalars
Definition and explanation with examples
1. work
2. speed
3. power
4. energy
5. vectors
6. scalars
7. energy-work relationship
8. Vector Component

Equilibrium or Changing Motion
- What are forces?
- Classification of forces and friction
- Addition of forces: force composition resolution of forces
- Static & dynamic equilibrium

UNIT II: Kinetics and Kinematics

Linear Kinematics
- Describing Objects in Linear Motion
- Motion
- Linear Kinematics
- Uniform Acceleration and Projectile Motion

B. Angular Kinematics
- Describing Objects in Angular Motion
- Angular Position and Displacement
- Angular and Linear Displacement
- Angular Velocity
- Angular and Linear Velocity
- Angular Acceleration
- Angular and Linear Acceleration
- Anatomical System for Describing Limb

Kinetics

A. Linear Kinetics
- Explaining the causes of linear motion
- Newton’s first law of motion: law of inertia
- Conservation of momentum
- Newton’s second law of motion: law of acceleration
- Impulse and momentum
- Newton’s third law of motion: law of action-reaction
- Newton’s law of universal gravitation

B. Angular Kinetics
- Explaining the Causes of Angular Motion
- Angular Inertia
- Angular Momentum
- Angular Interpretation of Newton’s First Law of Motion
- Angular Interpretation of Newton’s Second Law of Motion
- Angular Impulse and Angular Momentum
- Angular Interpretation of Newton’s third law
- Levers, types, and comparison with human joint
- Centre of gravity, line of gravity and mass determination
- Segmental kinetics
- Kinetic chain concepts
- Torques and Moments of Force
- Maintaining Equilibrium or Changing Angular Motion
What Are Torques?
Forces and Torques in Equilibrium

Recommended/Suggested Textbooks:

UNIT III
Biomechanics of gait
Basic concepts
- Introduction, gait cycle
- Types,
- Stance phase and cycles
- Swing phase and cycles
- Gait pattern

UNIT IV
Measurement in Biomechanics:
- Description of cameras, force plates and EMG
- Indications for use
- Protocols for testing

UNIT V
Ergonomics
1. Work load as a risk factor for musculoskeletal disorders.
2. Ergonomic aspects of biomechanics

Recommended/ Suggested textbooks:

Department of Arthroscopy And Sports Medicine
Semester - Even
Course Number  Course Code  Course Title  L  T  P  C  Total Hours
24  AGE 022  Exercise Psychology  Generic Elective for PG  2  -  2  3  90

Learning Objective:
- To examines various personality and social-psychological factors that underlie participation, adherence and performance in physical activity and sport.
- Understand how group processes influence the individual and team functioning and performance.
- Understand how sport and exercise influence psychological health and well-being

Learning Outcomes:
At the completion of this module the students must be able to;
   a) Summarise the psychological theories and models from the area of sport and exercise psychology
   b) Demonstrate knowledge of personality and motivation and aggression in relation to sport and exercise
c) Know the impact of arousal, stress and anxiety on sport performance
   Demonstrate knowledge of what competitive state anxiety is, and the factors that contribute to this state

UNIT I
**Review of psychology concepts**
- a. Historical and conceptual ideas
- b. The peripheral and central nervous system
- c. Brain structure and function
- d. Perception
- e. Memory
- f. Decision-making
- g. Information processing model
- h. Skill acquisition and learning
- i. Attitudes and attitude change

UNIT II
**Personality and sport**
- a. Understanding personality structure
- b. Measuring personality
- c. Examining cognitive strategies and success

UNIT III
**Motivation**
- a. Approaches to motivation
- b. Building motivation
- c. Developing realistic view

UNIT IV
**Arousal stress and anxiety**
1. Measuring arousal
2. Anxiety
3. Sources of stress & anxiety
4. Stress process
5. Aggression in sport

UNIT V
**Psychological factors that affect people in exercise environments**
- a. Reasons why people exercise
- b. Reasons for not exercising
- c. Determinants of exercise adherence
- d. Influence of sport and exercise participation on psychological health and well-being
- e. Addictive and unhealthy behaviour
- f. Overtraining and burnout
- g. Behaviour change models
- h. Different psychological intervention strategies to enhance sport participation

**Recommended/Suggested Textbooks:**
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### Department of Allied Health Sciences
#### Category Generic Elective

Course Transactor: P. Vijayalakshmi Anbu

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**BASICS OF YOGA AND PRACTICE**

**Learning Objectives:**

1. Explain the origin of yoga
2. Understand the history of yoga
3. Definitions of yoga,
4. Describe the systems of yoga

**Learning Outcome:**

UNIT I Introduction to Yoga
The origins of yoga, definitions, aims and objectives of yoga, yoga is a science and art
UNIT-II Streams of Yoga
Streams of yoga, karma yoga, bhakthi yoga, jana yoga, raja yoga, hatha yoga, yoga disciplined way of life.
UNIT-III Astanga Yoga
Astanga yoga-Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, and Samadhi Concept of Kaivalya Pada.

UNIT-IV Practical
Dynamic Breathing Exercise, Suriyanamaskar, Asanas, Pranayama, Types of Pranayama, Mudra, Bhadhas, Shat Kriyas, Meaning & Concept of Meditation.

REFERENCE BOOKS
B.K.S.Iyenkar- Light on Yoga Sutras of Patanjali (Haper Collins Publications India Pvt. Ltd. New Delhi)
Swami Sivananda: Practice of Yoga (The Divine Life Society, Shivananda Nagar, P.O., U.P. Himalayas, India)
Swamy Satyananda Saraswathi: Asanas, Prnanayama, Mudra, Bhndha, (India: Yoga Publications Trust, Munger, Bihar)
B.Natarajan: Thirumantiram (Atamil Scriptural Classic) (Sri Ramakrishna Math, Madras.)

## Department of Allied Health Sciences
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### PRANAYAMA

**Learning Objectives:**

1. Understand the respiratory system
2. Explain the types of breathing
3. Describe about the pranic body
4. Describe the breathing and life space span
5. Understand the aspects of pranayama
6. To know the special pranayama techniques

**Learning Outcome:**

UNIT I
Concepts of prana and pranayama, definition of pranayama, need, purpose and goal of pranayama, benefits of pranayama, result of wrong practices

UNIT-II
Components of pranayama, prerequisites and preparations for pranayama as per yoga sutras, hathayoga prathipika and other books, food, quality of breath in pranayama, different seated asanas suitable for pranayama.

UNIT-III
Difference between pranayama and breathing exercises, types of pranayama, smarvitti and visamavritti,
Four aspects of pranayam, Antak kumbhaka, bahiranga kumbhaga, rechakham, purakham.
UNIT-IV (Practical)
Specific Pranayama Techniques- Surya Bhedha, Chandra Bhedana, Ujjayi, Sitali, Sitkari, Bhastrika, Nadi Sudhhi, Kapalabhati, Sectional Breathing

REFERENCE BOOKS
1. Desikachar, t.k.v., light on yoga, harper colins publishers, new delhi.
2. B.K.S.Iyengar- Light on Yoga Sutras of Patanjali(Haper Collins Publications India Pvt. Ltd. New Delhi)
3. Swami Sivananda: Practice of Yoga (The Divine Life Society, Shivananda Nagar, P.O., U.P.Himalayas, India)
5. B.Natarajan: Thirumantiram (Atamil Scriptural Classic) (Sri Ramakrishna Math, Madras.)

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THERAPEUTIC VALUE OF YOGA

Learning Objectives:
- Understand the basic concepts of human body
- Describe physiological benefits of yoga
- Explain the role of yoga in diseases
- Describe psychological benefits of yoga

Learning Outcome:

UNIT I: Basic Anatomy and Physiology of Human Body
Cells, Tissues, Various Organs, Muscles, Bones, Joints, Skin, Respiratory System, Circulatory System, digestive, reproductive, nervous, endocrine, sensory systems.

UNIT-II Physiology
Physiological benefits of Asanas and Pranayama, Bandhas, Mudras, Kriyas, Dhayana, regulation of breath.

UNIT-III Role of Yoga in Diseases
Yogic concepts of human body, principles of yogic management role of asanas, pranayama and meditation in various diseases like diabetes, hypertension, coronary heart diseases, asthmas, arthritis, obesity, back pain,

UNIT-IV Role of Yoga in Psychological Problems
Anxiety, depression, phobia, fatigue, nervousness, neurosis. Psycho-neuro immunology, research based evidence from various journals.
REFERENCE BOOKS
1. Nagendra HR. yoga research and applications (vivekananda Kendra yoga prakashana, bengalore)
2. B.K.S.Iyenkar- Light on Yoga Sutras of Patanjali(Haper Collins Publications India Pvt. Ltd. New Delhi)
3. Swami Sivananda: Practice of Yoga (The Divine Life Society, Shivananda Nagar, P.O., U.P.Himalayas, India)
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ASANAS AND ITS BENEFITS

Learning Objectives:
- To impart basic, classical and scientific knowledge about Yogasana, its foundations and applications to the aspirants.
- To make the people aware of the fundamentals of Yogasana for wellness in their daily life.
- To develop healthy lifestyle of an individual through the practice of Yogasana
- To promote positive health and spiritual evolution of individuals by the practice of Yogasanas.
- To help for the development of personality of learners at all levels.
- To make aware of the utility of Yogasanas in disease prevention and promotion of health.

Learning Outcome

UNIT I
Important definitions of yoga, role of asana in the practice of yoga, asananas and its characteristics. Different definitions of asanas, principles of practice of the asananas.

UNIT-II
Difference between asanas and other physical exercises, role of breath in the asana practice, principles of breathing, relationship between breath and movement, basic rules of practice.

UNIT-III
Classification of asanas, role of position of rest . Basic principles of governing the order of practice. Counter posture, modification of asanas-needs and methods,

UNIT-IV (Practical)
Psycho and physiological aspects of asanas, Benefits of asanas, Basic Asanas-standing-urdhva tadaasana, ardhha chakrasana, padahastasana, nindra padasana, ardhha kadi chakrasana, Sitting-vajrasana, ushtrasana, sasangasana, ardhamatsyenrasana, supine-uthana padaasna, ardhha halasana, navasana, Prone-bhujangasana, salabhasana, dhanurasana.

REFERENCE BOOKS
1. Desikachar, T.K.V.,  the heart of yoga  india publishing house, new delhi.
2. B.K.S.Iyenkar- Light on Yoga Sutras of Patanjali(Haper Collins Publications India Pvt. Ltd. New Delhi)
3. Swami Sivananda: Practice of Yoga (The Divine Life Society, Shivananda Nagar, P.O., U.P. Himalayas, India)
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**Department of Allied Health Sciences**
**Category Generic Elective**

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**DHYANA AND THOUGHT PROCESSING**

**Learning Objectives:**
- To understand the concept of human body
- Describe about the Patanjali yoga sutras
- To know the skills to improve the personality

**Learning Outcome:**

**UNIT I INTRODUCTION TO DHAYANA**
Yogic concept of human body, principles of yogic management, Meaning and concepts of meditation, different schools of meditation, prerequisites and preparations for dhyana as per yoga sutras, do s and don ts of practicing the meditation.

**UNIT-II MIND**
Patanjali yoga sutras, mind, Activities of the mind and their role klesas- avidya, asmita, raga, abhinivesa, Power of mind, functions and powers of conscious mind, subconscious mind, different states of mind, how to use our mind.

**UNIT-III PERSONALITY DEVELOPMENT**
Definitions of personality, theories and functions of personality theories (subjective judgmental criteria), personality developmental skills-(interpersonal skills, stress management, conflict resolutions)

**UNIT-IV**
Psycho and physiological benefits of meditation, decision making, problem solving , role of meditation in decision making and problem solving attitude. Practice of meditation and introspection.

**REFERENCE BOOKS**
1. B.K.S.Iyenkar- Light on Yoga Sutras of Patanjali (Haper Collins Publications India Pvt. Ltd. New Delhi)
2. Swami Sivananda: Practice of Yoga (The Divine Life Society, Shivananda Nagar, P.O., U.P. Himalayas, India)
4. B.Natarajan: Thirumantiram (Atamil Scriptural Classic) (Sri Ramakrishna Math, Madras.)
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Course Transactor: P.Vijayalakshmi Anbu,

Department of Speech, Language and Hearing Sciences

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<tr>
<th>Course Number</th>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>30</td>
<td>AGE 028</td>
<td><strong>Noise exposure and its effects</strong></td>
<td>3</td>
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</table>

**Learning objectives:**

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

- Define the impact of noise on hearing and factors that determine the extent of hearing loss.
- Summarize the auditory and non-auditory effects of noise
- List the auditory test used for screening individuals with noise induced hearing loss
- Describe hearing conservation program.

**30. Noise exposure and its effects**

**Unit 1: Noise measurements**

Definition of noise, various types of noise in community, industry, music, traffic.Instrumentation and procedure for indoor and outdoor noise measurements,Sound Level Metre (SLM), Noise dosimeter and its operations

**Unit 2: Hearing mechanism**

Structures and functions of external, middle and inner ear, properties of sound, pathophysiology of noise induced hearing loss

**Unit 3: Auditory and non-auditory effects of noise**

Auditory effects of noise on hearing: temporary threshold shift, permanent threshold shift, recovery patterns, and histopathological changes. Non auditory effects of noise on health, sleep disturbance, stress, effect on work and performance, damage risk criteria & occupational hazards of noise.

**Unit 4: Audiological screening to detect noise induced hearing loss**
Pure tone audiometry screening, otoacoustic emissions screening, speech audiometry, analyse the patterns of noise induced hearing loss in audiogram, base line and periodic monitoring assessment

Unit 5: Hearing conservation

Definition of hearing conservation, need for hearing conservation programme, steps in hearing conservation programme, ear protective devices (ear plug, ear muffs, helmets, special hearing protectors), noise cancellation headphones.

Learning Outcomes:
After the completion of the course, the student will be able to

✓ Describe the functioning of the ear, how it is affected by noise, and ways to control noise in community & workplace
✓ Explain the components of audiometric testing and describe the audiogram and its uses
✓ Select and use proper hearing protection whenever excessive noise is encountered
✓ Describe the elements of a noise monitoring program

References

Online Resources:

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<tr>
<th>Course Number</th>
<th>Course Code</th>
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<td>31.</td>
<td>AGE 029</td>
<td>Basic concepts in Voice and its efficient use</td>
<td>2</td>
<td>-</td>
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</table>

Learning objectives:
At the end of the course, the candidate will be able to:

✓ Explain/contrast the processes involved in speaking and singing.
✓ Speak/sing in an appropriate voice with correct vocal pitch, volume, quality and intonation.
✓ Develop awareness of posture and coordinated breath support that is required for effective speaking and singing.
✓ Establish and modify practices that are required to maintain vocal health, in order to facilitate good speaking/ singing and prevent voice disorders.

31. Basic concepts in Voice and its efficient use
Unit 1: Vocal sound and its production

Brief overview of anatomical structures and functions of breathing apparatus, phonatory apparatus, resonatory apparatus and their coordination, Contrast between speech and song, Voice parameters and their production, Measurement of voice, terminologies and applications.

Unit 2: Vocal health and voice disorders

Concept of voice use, misuse, abuse and care, professional voice users- risk and effects of training, vocal pedagogy, vocal habits, non-vocal habits, vocal hygiene, voice rest, identification of voice problems, first aid for voice deviances/disorders, health and lifestyle, effects of environment, management options.

Unit 3: Development of vocal technique

Techniques of breathing and breath support, techniques of voicing, tone quality and volume, techniques of balancing resonance and pitch blends, techniques of good diction, production of vowels, and consonants, application of the techniques in speech and song.

Unit 4: Vocal practice and use

Building balanced practice routines for speaking and singing, breath control and coordination training, vocal range enhancements, delivery of speech/song, accent, stress, intonation, facial expression, rate and style, vocal ornaments.

Unit 5: Essentials of vocal training and execution

Aspects of motivation, practice, patience, perseverance, self analysis, performance anxiety, vocal health check, use of technology such as microphone, feedback devices, mastering of techniques, warming up and cool down techniques, techniques to develop endurance and stamina, aspects related to growth, ageing and the related, general health

Practical Classes:

1. Identifying organs of voice production mechanism & illustration of working of the speech/song apparatus
2. Analysis of the parameters of voice, components of speech and song
3. Observation of voice disorders, eliciting causes, analysing vocal and non vocal habits, voice use/abuse patterns
4. Development of voice use hierarchy, vocal hygiene program and checklist
5. Learning techniques of posture and movement
6. Learning techniques of breathing, breath support and coordination
7. Learning techniques of vocal warm up, vocal stretching and contraction
8. Learning techniques of resonance
9. Learning techniques of articulation and prosody
10. Staging of learnt techniques through speech/eloquence, debate, song

Learning Outcomes:

After the completion of the course, students will demonstrate the ability to

- Communicate in a natural voice that is suited for him/her
✓ Use techniques of posture and voice in communication
✓ Maintain good vocal health

References:

Online Resources:
2. www.wikihow.com/develop-a-perfect-speaking-voice
3. www.udemy.com/enhance-your-speaking-voice/

<table>
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1. Fundamentals of Occupational Health

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**Course Description**

The primary objective of this course is to provide a comprehensive overview of major occupational and environmental risk factors that affect human health. The course will provide global and national perspectives on a range of hazards encountered in community and workplace settings and consequent health burdens together with relevant regulatory frameworks for prevention and control of such exposures.

**Learning Objectives:**

- To learn about major categories of hazards (including physical, chemical, biological and psychosocial hazards) in workplaces and communities that pose health risks for exposed populations.
- To gain an in-depth knowledge on common sources, routes of exposure and mechanisms for health effects for important categories of occupational and environmental hazards.
- To become familiar with burden of disease methodologies for environmental and occupational risk factors.
- To learn about important legislative and regulatory elements that govern the management of environmental and occupational health risks.

**Learning Outcomes:**

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

- Recognize sources, pathways and health effects associated with major categories environmental and occupational risk factors.
- Develop an understanding of attributable health burdens from these risk factors at the global and national scales.
- Become familiar with specific legal and regulatory provisions concerning environmental and occupational hazards.

**Syllabus:**

1. The Occupation and Health Connection

   - Historical perspectives
   - Impact of occupational factors on health
   - Link between occupation and health
   - The Global agenda (ILO, WHO, Millennium Development Goals)
   - The Indian agenda (Five Year Plan)
2. **Overview of Occupational Health Hazards**
   - Overview of occupational safety and health hazards
   - Overview of common occupational diseases
   - Status of occupational health in the World and in India
   - Medical surveillance
   - Ethics and code of good practices in occupational safety and health

3. **Overview of industrial hygiene and safety**
   - Recognition, evaluation and control of occupational hazards: Chemical, Physical, Biological, Ergonomic, Psychological
   - Introduction to industrial safety: Mechanical safety, Electrical safety, Material handling, Industrial accidents

4. **Global and National Environmental Burden of Disease**
   - Occupational risk factors
   - Burden of disease attributable to major occupational risk factors
   - Occupational attributable fraction by disease
   - Preventing disease through healthy environments

5. **Standards and Guideline for Safety and Health**
   - Overview of legal framework of OSH in India
   - Factories Act, 1948, other important legislations:
     - OSHA, EU Standards,
     - ACGIH, International conventions, WHO Healthy Worker Agenda

6. **Environmental acts and Guidelines:**
   - Introduction to Environment Management systems
   - ISO 14001, OSHAS 18001,

**Text Books:**

**Reference books:**
1. Occupational and Environmental Medicine, Joseph LaDou, 3rd Edition 2002
4. OSH for Development, By Kaj Elgstrand and Nils F. Petersson (editors)

**Online Resources:**
2. Biomedical Waste Management

<table>
<thead>
<tr>
<th>C. No.</th>
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<th>Course Code</th>
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**Course Description**

The increasing amount of Biomedical wastes (BMW) being generated is becoming a serious problem to hospitals and has significant adverse impacts on public health and occupational health if improperly handled. Biomedical waste requires utmost care in handling, collection, processing and disposal due to inherent hazards of the waste. The basic goal of the course is to provide the fundamentals of and biomedical wastes and various aspects of their management right from generation through collection and disposal. Special emphasis will be given to the system approach to managing these wastes to meet regulatory requirements.

**Learning Objectives**

- To sensitize the students about health care waste and its impact on health and environment.
- Acquaint the students to existing legislation, knowledge and practices regarding health care waste

**Learning Outcomes**

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

- Possess the knowledge on the sources of generation, of hazardous and non-hazardous waste in health care settings and research laboratories.
- Demonstrate understanding on the environmental and occupation hazards of improper BMW management.
- Understand the good practices for a systematic approach in the management of BMW
- Gain knowledge in various management strategies and technological solutions in BMW management, treatment and disposal.
- Be familiar with the applicable legislations and regulations for treatment and disposal.

**Syllabus:**

1. **Introduction to Hospital Waste**
   - Definition Classification of hospital wastes
   - Types and composition: Types of solids, liquids, sharps, blood and blood tissue, radioactive material, biological and chemical material
   - Hospital effluents: Nature and composition, Levels of Generation in a small clinic,
nursing home, small and large hospitals, Storage of hospital waste; Types of bags and containers used for storage

2. Biomedical Waste Management Guideline
   - Requirement
   - Documentation of Biomedical waste types and guidelines
   - Bio-medical wastes (Management & Handling) Rules, 1998; and amendments

3. Principles of Biomedical Waste Management:
   - Segregation of biomedical waste
   - Handling and transport of hospital waste: Authorization and accidental spilling
   - Methods / treatments required for disposal of pathogens
   - Waste disposal methods
   - Techniques of waste management
   - Protocols for HW management

4. Waste prevention
   - Waste reduction activities
   - Waste recycling,

5. Biomedical Waste Treatment Facility
   - Introduction, location, land requirements,
   - Coverage area, types of equipment,
   - Infrastructure requirements,
   - Record keeping,
   - Waste collection, transport and storage facilities,
   - Precautions required.

Text Books:
3. The Environmental Protection Act, 1986.

Reference Books:
6. Bio-medical waste, Toxics Link Factsheet, Number, 21, 22, 23, 24, 2004..
<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Code</th>
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Learning objective:

- To understand the structures and purposes of basic components of prokaryotic and eukaryotic cells and organelles.
- To understand basis of disorders with genetic causes.
- To understand event in cell division, cell to cell communication.
32. Introduction to Human Genetics

I - Introduction to cell and chromosomes

Structure and morphology in various types of cells - Biochemical composition - Cellular organelles - Composition and components of nucleus - Chromosomes - Cell division and Mechanics of cell division and regulation.

II - Structure and functions of nucleic acids

Deoxy-ribo nucleic acids  ribonucleic acids  functions and their relationship - Types of mutations - Genetic variations and polymorphisms

III - Chromosomal basis of inheritance


III - Origin and detection of genetic disorders


IV Biochemical basis for the inborn errors of metabolism


V- Practical

I. Cell culture laboratory structure and maintenance
II. Preparation of glassware
III. Media composition and preparation
IV. Grouping of human metaphase chromosomes
V. Classification and identification of banded chromosomes
VI. Principle and application of G-banding
VII. Fluorescence In Situ hybridization (FISH)
VIII. DNA isolation

Learning outcome:

✓ Be able to describe the chromosomal basis of inheritance and how alterations in chromosome number or structure.
Be aware of the differences and similarities between diagnostic, predictive and carrier genetic testing.

Reference books


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<tr>
<th>Faculty of Biomedical Science, Technology and Research</th>
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<td>Department of Human Genetics</td>
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Learning objectives:

- To understand the concepts and theories of allele, phenotypes and genotypes using model organisms.
- To understand the inheritance patterns of genes and sex determination.
- To understand the concepts of linkage and recombination and chromosome mapping.

33. Principles of Genetics

I - Introduction to genetic principles

Definition: allele, phenotype, genotype - Mendel's experiments, testing phenotypes, gene differences and segregation, Monohybrid crosses, dihybrid crosses - Life cycle of some genetically important organisms: Neurospora Crassa, Sacharomyces cerevisiae, Arabidopsis thaliana, Drosophila melanogaster.

II - Dominance relations and multiple alleles

Allelic variation and gene function - incomplete dominance, over dominance, co-dominance- Multiple alleles: Blood group systems, RH and ABO incompatibilities, Histocompatibility genes and Antibody formation. Environmental effects on the expression of human genes: Penetrance and expressivity, Gene interactions, Epistasis, Pleiotropy.

III - Basis of inheritance

Historical development on the chromosome theory - Nature of chromosomes - Mitosis - Meiosis - Chromosome behavior and inheritance pattern in eukaryotes - Genetic basis of bacteria and viruses:
Conjugation, transformation and transduction - Nucleic acids: structure, functions, evidence for nucleic acids as genetic materials, replications, transformations, transduction.

**IV - Sex determination and linkages**

Sex chromosome, Y chromosome, compound sex chromosomes, sex determination, meiotic behavior of sex chromosome and non-disjunction, sex linkage, attached X, sex ratio. Inheritance pattern of linked genes - Recombination - Segregation - Linkage maps and linkage analysis - Exceptions to the Mendelian principle of Independent assortment - Frequency of recombination as a measure of linkage intensity - Crossing over as the physical basis of recombination, Chiasmata.

**V - Chromosome mapping**

Crossing over as a measure of genetic distance, recombination mapping with a two point and three point test cross, Recombination frequency and Genetic amp distance, Chiasmata distance and Genetic map distance. Hardy Weinberg equilibrium.

**Learning outcome:**

- To understand genes and their modes of functioning.
- To understand the essential concepts on genes, inheritance and gene functioning.

**Reference books**


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**Faculty of Biomedical Science, Technology and Research**

**Department of Human Genetics**

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**Learning objectives:**

- To understand the principles of physics as relevant to biological functions.
- To understand the principles, basic structure, functioning.
- To understand the application of instruments to analyze the biological samples.
34. Concepts in Biophysics & Instrumentation

I - Basics of Biophysics
Small and macromolecules: Properties and classifications - Electronic structure of atoms - Molecular Orbital - Molecular Interactions: Covalent and non Covalent interactions, Strong and weak interactions - Stereochemistry and chirality s: optical activity, principles and applications with macromolecular structure. Proteolysis of water - Hydrogen ion concentration - pH value - Acids, bases and salts - Biological importance of acids, bases and salts - Buffers and Buffering system.

II - Microscopy

III - Analytical techniques
Fundamental laws of photometry, Beer s Law, Lambert s Law, Colorimetry, Spectrophotometer (UV, IR, AAS, AES)Principles, instrumentation and macromolecular applications of UV -VIS spectroscopy, Fluorescence spectroscopy, CD and ORD, IR spectroscopy, Raman spectroscopy, ESR spectroscopy - X-ray diffraction - NMR basics and applications - Diffusion -Transport - Osmosis - Flow cytometry: principle and application - Ultracentrifugation and elutriation - Coulter counter - Particle analysis system

IV - Separation techniques

V - Imaging techniques

Learning outcome:

- To enable application of the theories and laws of physics to biological structure and functioning.
- To understand the principles and working of instruments commonly used to study biological material.

Reference books

**Faculty of Biomedical Science, Technology and Research**

**Department of Human Genetics**

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<td>Molecular, Recombinant DNA Technology &amp; Immunology</td>
<td>2</td>
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**Learning objectives:**

- To understand the relevance, basic concepts and principles of techniques used in molecular biology.
- To understand the various approaches and applications of rDNA technology.
- To utilize the knowledge on the relevance, basic concepts, theories and functions of the human immune system to understand complex mechanisms of immune system functioning.

**35. Molecular Genetics, Recombinant DNA Technology & Immunology**

**I - Principles of Genetics**
Definition: allele, phenotype, genotype - Mendel's experiments, testing phenotypes, gene differences and segregation, Monohybrid crosses, dihybrid crosses - Principle of independent segregation and assortment - Allelic variation and gene function - incomplete dominance, over dominance, codominance - Multiple alleles: Blood group systems, RH and ABO incompatibilities - Mendelian inheritance, Dominant, recessive, lethal, sex linked, sex influenced multi-factorial and mitochondrial inheritance.

**II - Chromosome basis of inheritance**
Genetic disease and detection methods : Nature of chromosomes - Chromosome behavior and inheritance pattern - Chromosome abnormalities, Numerical and structural chromosomal abnormalities & clinical phenotypes - Techniques- metaphase chromosome preparation, banding FISH technique Types, principles and applications - Molecular Methods: PCR and array technology.

**III - Introduction to genetic engineering and applications**
Introduction to Recombinant DNA technology and rationale of cloning a gene - Tools of Genetic Engineering: Concept of restriction and modification - Restriction endonucleases, Modifying enzymes, Ligases and Ligation strategies - Gene cloning vectors - Plasmids, bacteriophages and special vectors - Methods of gene transfer in bacteria including transformation. Different strategies of cloning Genomic libraries, cDNA libraries. - rDNA products for therapy.
IV - Immunology
History of immunology - Types of immunity: Innate and acquired immunity, Humoral and cell-mediated immunity - Cells, tissues and organs of human immune system. Antigens: Properties, Factors governing antigenicity; Haptens; Tumor, Viral, Bacterial antigens; - Antigen recognition, processing and presentation - Antibodies: properties; functions; structure; biosynthesis - Antigen-antibody interactions - Monoclonal antibodies - Vaccines.

V - Practical

I. Microscopy
II. Human chromosome preparation and identification
III. Isolation and quantification of DNA
IV. PCR
V. Agarose gel electrophoresis
VI. Restriction of DNA
VII. Ouchterlony double diffusion
VIII. Monoclonal antibodies

Learning outcome:

✓ To understand the implications of techniques used in molecular biology and genetics from the subject area concepts, theory, experimental, research and health-care perspectives.
✓ To understand the implications of rDNA from the subject area concepts, theory, experimental, research and health-care applications perspectives

Reference books

1. Thompson & Thompson Genetics in medicine, 6th edition, Nussbaum, McInnes, Williard, Saunders, 2004

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Learning objectives:

✓ To understand the relevance, basic concepts, theories and applications of stem cell genetics
✓ To utilize the knowledge on the relevance, basic concepts, theories and applications of stem cell genetics in understanding the complex mechanisms of stem cell gene functioning
36. Stem Cell Genetics & Regenerative Medicine

I. Fundamentals of stem cells
   Totipotency - Pluripotency - Stem cells sources  Isolation, cultivation and propagation of stem cells - Genetic basis of stem cells.

II. Embryonic stem cells
   Source of embryonic stem cells - Human and mouse embryonic stem cells - Genetics of pluripotency - Genetic manipulation of embryonic stem cells.

III. Adult stem cells
   Source and properties of adult stem cells - Stem cell replacement and development of organs - Hematopoietic stem cells.

IV. Stem cells applications
   Recent experimental and clinical therapy using stem cells - Neurodegenerative disorders, Cardiac disorders - Intellectual property rights - Potentials and issues associated with stem cells - Ethical issues and regulation of stem cell research.

V. Cancer stem cells
   Difference between normal and cancerous stem cell - Tumor resistance and therapeutic issues.

Learning outcome:

✓ To understand the implications of the functioning of genes in stem cells from the subject area concepts, theory, experimental, research and health-care perspectives
✓ To understand the applications of stem cell genetics including for tissue engineering and in vitro directed differentiation purposes

References books

Learning objectives:

✓ To understand the human genome.
✓ To understand recent technological developments adopted in the genome exploration.
✓ To understand gene silencing mechanisms.

37. Concepts in Human Genetics

I- microRNA:

microRNA and other non-coding RNA, Role of microRNA and noncoding RNAs in normal development, Role of microRNA in diseases: lymphocytic leukemia, prostate cancer, colitis associated cancer, microRNA as regulators of key oncogenes and tumor suppressor genes, RNAi, Segmental deletions, duplications, CNVs and their role in human diseases.

II- Epigenetics

Epigenetic mechanisms, Histones and DNA modifications, Methods of analysis of DNA methylation, Methods of studying histone modifications, Inter-individual variations in DNA methylation, Role of epigenetic mechanisms in human diseases: cancer, birth defects, epileptic disorders

III- DNA technologies

Principles and applications of Real-Time PCR, Microarray and its applications, cDNA array, SNP array, oligonucleotide array, GWAS, Traditional DNA sequencing and next generation sequencing techniques, disease gene identification by exome sequencing, Clinical applications of exome sequencing

IV- New approaches to Gene transfer techniques


V- Perspectives of Human Genome

Genetic databases, Human Genome ownership and patenting, Applications of Human Genome Project and ELSI. Basic concepts and goals of The Human Genome Diversity Project, The Environmental Human Genome Project, The Cancer Genome Anatomy Project, The SNP Project, Stem cell forum
Learning outcome:

- Be able to understand complexity of human genome.
- To acquire the required laboratory skills to perform, interpret and analyze core/widely used molecular biology techniques.

References books


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Learning objective:

- To understand the structures and purposes of basic components of prokaryotic and eukaryotic cells and organelles.
- To understand events in cell division and mutations.
- To understand basis of disorders with genetic causes related to nervous system.

38. Neurogenetics & Molecular Biology

I - Introduction

Structure and morphology in various types of cells - Biochemical composition - Cellular organelles - Composition and components of nucleus - Chromosomes - Cell division and Mechanics of cell division and regulation. Deoxy-ribo nucleic acids - ribonucleic acids - Functions of nucleic acids: replication, transcription, Genetic code, Translation - Post translation modification in protein synthesis

II - Basis and inheritance of genetic disorders

Mutation - Non-disjunction - Chromosomal abnormalities - Chromosome behavior and inheritance pattern in man - Single gene Mendelian disorders: autosomal dominant, recessive, sex linked dominant and recessive - Polygeneic and mitochondrial inheritance. Types of mutations - Genetic variations and polymorphisms in genetic disorders
III - Clinical genetics
Detection of chromosomal aberrations - Laboratory techniques used: Chromosome preparations, banding, DNA isolation and amplification - Genetic counseling - Concepts of Gene therapy - Totipotency - Pluriotipotency - Stem cells sources - Isolation, cultivation and propagation of stem - Genetics of pluriotipotency - Genetic manipulation of embryonic stem cells - Recent experimental and clinical therapy using stem cells - Potentials and issues associated with stem cells.

IV - Genetics of neuromuscular, bone and connective tissues disorders
Skeletal muscle disorders - muscular dystrophy, inflammatory myopathies; Neuromuscular junction disorders - myasthenia gravis; Peripheral nerve disorders-Charcot-Marie-Tooth disease; Motor neuron disorders - Spinal Muscular Atrophy; Genetically determined ataxias. Bone & Connective tissue disorders- Achondroplasia, Osteogenesis imperfecta, Mucopolysaccharidoses.

V - Practical:
I. Cell culture laboratory structure and maintenance
II. Micrometry
III. Culture of blood cells
IV. Grouping of human metaphase chromosomes
V. Classification and identification of banded chromosomes
VI. Principle and application of G-banding
VII. Fluorescence In Situ hybridization (FISH)
VIII. DNA isolation

Learning outcome:
✓ Be able to describe the chromosomal basis of inheritance and how alterations in chromosome number or structure.
✓ Be aware of the differences and similarities between diagnostic, predictive and carrier genetic testing.

Reference books

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<tr>
<th>Faculty of Biomedical Science, Technology and Research</th>
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<tr>
<td>Department of Human Genetics</td>
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<td>Course Number</td>
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<td>39.</td>
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</table>
Learning objective:

✓ To understand the structures and purposes of basic components of prokaryotic and eukaryotic cells and organelles.
✓ To understand basis of disorders with genetic causes related to kidney disorders.
✓ To understand event in cell division, cell to cell communication.

39. Renal Genetics & Molecular Biology

I - Introduction
Structure and morphology in various types of cells - Biochemical composition - Cellular organelles - Composition and components of nucleus - Chromosomes - Cell division and Mechanics of cell division and regulation-Deoxy-ribo nucleic acids - ribonucleic acids - Functions of nucleic acids: replication, transcription, Genetic code, Translation - Post translation modification in protein synthesis

II- Basis and inheritance of genetic disorders
Mutation - Non-disjunction - Chromosomal abnormalities - Chromosome behavior and inheritance pattern in man - Single gene Mendelian disorders: autosomal dominant, recessive, sex linked dominant and recessive - Polygenic and mitochondrial inheritance.Types of mutations - Genetic variations and polymorphisms in genetic disorders

III - Clinical genetics
Detection of chromosomal aberrations - Laboratory techniques used: Chromosome preparations, banding, DNA isolation and amplification - Genetic counseling - Concepts of Gene therapy-Totipotency - Pluoripotency - Stem cells sources - Isolation, cultivation and propagation of stem - Genetics of pluripotency - Genetic manipulation of embryonic stem cells - Recent experimental and clinical therapy using stem cells - Potentials and issues associated with stem cells.

IV - Genetics of renal diseases

V- Practical:
I. Cell culture laboratory structure and maintenance
II. Micrometry
III. Culture of blood cells
IV. Grouping of human metaphase chromosomes
V. Classification and identification of banded chromosomes
VI. Principle and application of G-banding
VII. Fluorescence In Situ hybridization (FISH)
VIII. DNA isolation

Learning outcome:
Be able to describe the chromosomal basis of inheritance and how alterations in chromosome number or structure.
Be aware of the differences and similarities between diagnostic, predictive and carrier genetic testing.

Reference books


Faculty of Biomedical Science, Technology and Research
Department of Human Genetics

<table>
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<tr>
<th>Course Number</th>
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<th>Course Title</th>
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<td>Genetic Counseling</td>
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</table>

Learning objective:

✓ To understand the relevance, basic concepts, theories and applications of genetic counseling.
✓ To practice genetic counseling concepts and approaches through case-studies and simulations.
✓ To be able to integrate the theory concepts and the practical application/practice of genetic counseling.

40. Genetic Counseling

I - Principle of Genetic Counseling
Definition and Goals of Genetic Counseling - Philosophy and Ethos of Genetic services and counseling: Voluntary utilization of services, Equal access, Client education, Complete disclosure of information - Non-directive counseling - Confidentiality and protection of privacy.

II - Components of Genetic counseling
Information gathering and interviewing techniques - Medical Genetic evaluation and establishing diagnosis - Risk assessment - Options - Psychological counseling.

III - Inheritance pattern and risk estimation
Inheritance pattern of genetic disorders - Consanguinity- Inbreeding co-efficient, Occurrence and risk estimation, empirical risk- Sensitivity and specificity of screening and diagnostic disorders.

IV - Counseling context and situations
Genetic counseling in pediatrics and for adult onset disease, Genetic counseling for reproductive issues- Cancer
V- Ethics in genetic counseling

Providers of Genetic counseling team - Medical documentation - Computer based resources for clinical genetics. ICMR guidelines- Fetal rights- PNT act 1994.

Learning outcome

✓ To understand the relevance, approaches and implications of genetic counseling from the subject area concepts, theory, practice and human health-care perspectives.
✓ To acquire the skills as required for genetic counseling.

Reference books


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<tr>
<th>Faculty of Biomedical Science, Technology and Research</th>
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<td>Department of Human Genetics</td>
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<td>Course Number</td>
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<td>41.</td>
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</table>

Learning objective:

✓ To become familiar with and practice good laboratory practices and standard operating protocols.
✓ To understand the relevance, concepts, rules and regulations required for obtaining accreditations for testing laboratories.
✓ To familiarize with the requirements as required for the accreditations for testing laboratories as put forth by regulatory/governing bodies/committees.

41. Good genetic laboratory practiceand accreditations for testing laboratories

I -Principle and components of genetic testing

Lay out of genetic laboratories - Genetic testing, Genetic counseling, Philosophy and Ethos of Genetic services, Types of testing-Cytogenetic testing- Molecular cytogenetic testing- DNA testing- Biomarkers of genotoxicity
II - Agencies of accreditation
Accreditation, Certification, Agencies- National (ISO, NABL, NATL), International (WHO, FDI, ABC),

III-Organization and facility
Standard Operating procedures, Institutional responsibilities, Facility manager responsibilities, Staff responsibilities- testing, equipments, reagents, materials, archives, waste disposal

IV - Records and reports
Standard Operating procedures for conduct of test, reporting the results, archives of records, specimen retention, Outsourcing and work flow.

V-Quality management
Quality control, audit (internal, external)- Ethics, Confidentiality, ICMR guidelines on ethical issues.

Learning outcome:

✓ To become familiar with and practice good laboratory practices and standard operating protocols.
✓ To become familiar with the documentation and other requirements required for the accreditations for testing laboratories (with relevance/emphasis to genetic testing).

Reference books
3. NABL- 112, Specific criteria for accreditation of medical laboratories.

<table>
<thead>
<tr>
<th>Faculty of Biomedical Science, Technology and Research</th>
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<tbody>
<tr>
<td>Department of Human Genetics</td>
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<td>Course Number</td>
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</table>

Learning objective:
✓ To understand the concepts and theories of phenotypes and genotypes and inheritance of genetic disorders.
✓ To understand principle of diagnostic genetic test methods
✓ To become familiar with and practice good laboratory practices and standard operating protocols.

42. Clinical Genetics - Principles and applications

I - Principle and components of genetic testing
Lay out of genetic laboratories - Genetic testing, Genetic counseling, Philosophy and Ethos of Genetic services, Types of testing- Cytogenetic testing- Molecular cytogenetic testing- DNA testing.

II - Cytogenetic testing
Indications, Type of sample, Sampling and transport conditions, Karyotyping - chromosome identification, merits and demerits of conventional cytogenetic testing.

III - Molecular Cytogenetic testing
Indications, Type of sample, Sampling and transport conditions - Fluorescence in-situ hybridization, fluorescence signal enumeration, merits and demerits of FISH.

IV - DNA testing
Organization of human genome, Structure and function of genetic material, Polymerases chain reaction - Types, principles and testing, Sequencing.

V - Practical:
Case studies

Learning outcome:

✓ To become familiar with and practice genetic tests.
✓ Be able to provide better patient care

Reference books

Learning Objectives

- To understand the concepts of tissue engineering, especially the relevance of three dimensional scaffolds, biomolecules and stem cells.
- To understand the application of the above concepts in recent trends and advances in cardiovascular biology and wound healing.

43. Trends in Tissue Engineering and Regenerative Medicine

UNIT I- Basic Biology of Tissue engineering-I
Introduction and history of Tissue Engineering, Molecular organization of cells,
Dynamics of the Extracellular Matrix, Cell Adhesion, migration and Signaling

UNIT II- Basic Biology of Tissue engineering -II
Morphogenesis and development.Role of the immune system- in injury, repair and regeneration,Basic
Principles of Stem cells,Stem cells in Tissue Engineering Techniques for characterization of cells.

UNIT III-Bio-Mimicry
Micro and Nanotechnology in tissue engineering, Biomaterial scaffolds and their properties,
Fabrication strategies for 3D scaffolds, The design of biomimetic environments; Bioreactors. Culture
of cells for Tissue engineering.

UNIT IV-Applications of Tissue engineering - I
Biology of Wound Repair - scar vs. regeneration, Bioengineered Skin tissue constructs. Recent
Advances in TE for wound healing.

UNIT V Applications of Tissue engineering - II
Cardiac Homeostasis and Regeneration. Tissue engineering strategies for Cardiac regeneration and
repair. Engineered Heart valves. Vascular tissue engineering.Recent Advances in TE the
Cardiovascular System

Learning Outcome:
To be able to have an overview of current status and challenges in Tissue Engineering in wound healing and the cardiovascular system.

**Reference Text Books:**


**Online resources:**

**Journals :**

Tissue Engineering Parts A, B & C

Biomaterials

Journal of Tissue Engineering and Regenerative Medicine

Journal of Regenerative Medicine and Tissue Engineering

Journal of Stem Cell and Regenerative Medicine

Course Transactor: Dr. Alan M Punnoose

Assistant Professor (Research)

Centre for Regenerative Medicine and Stem Cell Research

Central Research Facility

Sri Ramchandra University

Ext: 277

alanmathp@gmail.com

**Course: PBM-15GE 135, Translational Biology**

**Students: PG II nd year, 1st Semester, UG- Third year, 5th Semester**

| Department of Biomedical Sciences and Central Research Facility |
| Centre for Preclinical & Translational Medicinal Research |
| **Second Year** |
| **Course Number** | **Course Code** | **Course Title** | **Faculty code** | **L** | **T** | **P** | **C** | **Total Hours** |
| 44 | BGE 013 | Translational Biology | BMS | 3 | 3 | 3 | 45 |

**Learning objectives:**

- Bench to bedside - Molecules to man and man to molecules
- Understand strategies to convert basic science observation to therapeutic/diagnostic outcome and vice versa
- Choice of the non human system to address basic science/ translational strategies
44. Translational Biology

I - Introduction to Translational Biology

Development versus Cancer  Cell division versus Cell proliferation; Signaling cascades and check points or Molecular and Cellular Neuroscience Versus Drug Discovery for CNS diseases

II  Fundamental Biology derived Translations

Fundamental Biology based insights into diseases Rational drug design - Understanding of fundamental Biology Analogs- agonists antagonist; Genes and their effects

III  Selection of the model systems

Reductionist approach  Choice of the model organism- Aplaysia- C. elegans  Drosophila  zebrafish - mouse

IV - Details of the model systems and their contribution to drug discovery

C. elegans  Preclinical drug discovery, Reverse engineering  identification of mode of action of drugs; Repurposing of drugs

V  Translation  bench to bedside

Mouse models, Transgenics, knock outs and drug/biomolecule discovery

Learning outcome:

✓ Understanding the basic concepts of biology in the light of disease complications
✓ In depth knowledge of the available model systems and appropriate selection of the model system to address the specific diseases
✓ Be able to understand the cellular responses to environmental or physiological changes, or alterations of cell function.

Text books

Reviews/Research articles from journals

Reference Books


Online Resources:

1. Wormbook


Course Transactor: Dr. Jamuna R. Subramaniam, Associate Professor, CPTMR, CRF, SRU
## Department of Biomedical Sciences

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**Learning objectives:**
- To understand the relevance and basic concepts of entomology
- To understand the relevance of clinically significant insects and vector borne diseases

**45. Medical Entomology**

**UNIT I Introduction**
Insects, taxonomy, life cycle of insects, economic importance and detrimental effects of insects

**UNIT II External Morphology of insects**
External morphology - Head, antennae, mouth parts, thorax, legs, wings, abdomen and genitalia.

**UNIT III Anatomy of insects**
Digestive system, nervous system, respiratory system, reproductive system, circulatory system, excretory system

**UNIT IV Insects effecting humans**
Different types of infection- biting, venom, inflammation, infestation. Insects as vectors: mosquitoes, flies, fleas, ticks, mites.
UNIT V Diseases caused by insects and their control mechanisms

Factors effecting disease transmission, symptoms, control - Malaria, dengue, filariasis, sleeping sickness, plague, typhus, Chagas disease, Leishmaniasis.

Learning outcome:
- To understand the relevance and basic concepts of insect biology and vector borne diseases

Text Books

Reference Books
1. Insects and Diseases, Rennie Wilbur Doane, 1910, Henry Holt and Company

Web links
http://www.entsoc.org/
http://www.ent.iastate.edu/list/

Department of Biomedical Sciences

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Learning objectives:
- To understand the relevance, significance and implications of lifestyle disorders
- To understand the various types and causes of lifestyle disorders
- To understand the ways in which lifestyle disorders can be identified, managed and prevented

46. Lifestyle Disorders

UNIT I Modern Life style disorders
Deskbound and sleeping habits, junk food, anxiety. Food poisoning, Acidity.

UNIT II Dietary disorders
Food groups and concept of a balanced diet, obesity, metabolic syndrome, hypertension- their causes and prevention through dietary and lifestyle modifications

UNIT III Social health problems
Smoking, alcoholism, drug dependence and Acquired Immuno Deficiency Syndrome (AIDS).

UNIT IV Gastrointestinal disorders
Stomach disorders-Gastritis, Ulcer, Amoebiasis, Constipation, piles
Common ailments- cold, cough, fevers, diarrhoea, constipation- their causes and dietary treatment

Learning outcomes:
To understand the relevance, significance and implications of lifestyle disorders for the betterment of human life quality

Text Books
2. Text Book of Medical Biochemistry Dr. M.N. Chatterjee and Rane Shinde

Reference Books
1. P. Singh MD. Textbook of Nutrition and Health; First Ed; 2008; Academic Excellence
2. Biochemistry with Clinical Correlation- Thomas M. Devlin

Webpage link
http://www.dailldiet.in

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<th>Course Number</th>
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<td>BGE 016</td>
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</table>

Learning objectives:
✓ To understand the significance of advances in biotechnology for their practical applications
✓ To understand the ways in which biotechnology can be utilized for industrial applications

47. Applied Biotechnology

UNIT I Environmental Biotechnology
Water and waste water treatment process: Drinking water treatment process - disinfection of water, sewage treatment (domestic and industrial waste water)
UNIT II Bioremediation
Concept of bioremediation and biotransformation. Bioremediation of xenobiotics in environment - ecological consideration, decay behavior and degradative plasmids, molecular techniques in bioremediation

UNIT III Role of enzymes and microbes
Biopestisides, bioleaching, biomining, control of air pollution

UNIT IV Industrial Biotechnology
Isolation of industrially important organisms, important commercial products produced by microorganisms

UNIT V Food Biotechnology
Microorganisms as food and supplements - production of mushroom and spirulina, assessment of microbiological quality of various foods. Food processing in preservation of food, Quality control and quality assurance in food and pharmaceutica industry, good manufacturing practices in pharmaceutical industry

Learning outcomes:
✓ To understand the significance of industrial application of biotechnology in all major areas of environment, agriculture, animal and human health-care.

Text Books

Reference Books
3. Modern Industrial Microbiology & Biotechnology, Nduka Okafor
5. Lows, P. and Ellis H. 1990. Food Processing. Prentice Hall, Reston Virginia, USA

Web Links
www.biospace.com
www.nature.com/nbt

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<th>Course Number</th>
<th>Course Code</th>
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Learning objectives:
To understand the relevance, basic concepts and theories regarding microbes associated with food stuff
To utilize the knowledge on the relevance, basic concepts, theories and functions of the food-associated microbes and their implication in human health

48. Food Microbiology

UNIT I Food and Microorganisms
Food as a substrate for microorganisms  factors influencing growth of microorganisms: pH, water activity, oxidation-reduction potential, nutrient content
Microorganisms important in food microbiology - Molds, Yeast and Bacteria  General characteristics and role in food industry

UNIT II Preservation of food
General Principles, concept of growth curve, asepsis
Methods of preservation  high temperature, low temperature, drying, food additives, radiation

UNIT III Microbial Spoilage of Food
Contamination, preservation and spoilage of different kinds of foods  Milk & milk products, Vegetables & fruits, Meat and meat products, Canned foods

UNIT IV Food Products of Microbial Fermentations
Microbial culture for food fermentations
Products of fermentations: bread, beer, wines, vinegar, fermented vegetables  sauerkraut, pickles, fermented dairy products - cheese, oriental foods  soy sauce, tempeh, idli, fermented fish

UNIT V Food and Diseases
Food-borne illness  Botulism, gastroenteritis, Vibrio infection, poisoning, parasitic infections, intoxications  plant, animal and microbial
Food sanitation practices, food control

Learning outcomes:
✓ To understand food-associated microbes and their implications in human health

References:
1. Food Microbiology, 2nd Edition By Adams
3. Food Microbiology by Frazier, 4th Ed.
Learning objectives:

✓ To understand the relevance, basic concepts and theories regarding assays and techniques used to study/analyze natural compounds
✓ To understand the techniques and the applications of in vitro bioassays to analyze natural compounds

49. In vitro Bioassays of Natural Products

UNIT I Extraction Technology
Collection and authentication of plant material & drying, Size reduction, Extraction, Filtration, Concentration, Drying & reconstitution. Conventional Methods Used to Recover Natural Products- Soxhlet extraction, Maceration, Steam distillation, Accelerated solvent extraction, Percolation and Decoction.

UNIT II Phytochemical Screening
Qualitative tests for phytoconstituents- phenols, alkaloids, flavonoids, steroids, tannins, saponins, terpenoids, glycosides.

UNIT III Toxicity testing
Cytotoxicity: MTT assay, Cell lethality using Trypan blue, Hemolytic assay, Genotoxicity- Onion root tip assay

UNIT IV Natural products as anti-oxidants
Formation of free radicals, scavenging role of plants as antioxidants and its curative properties- Quantitative DPPH assay, nitric oxide scavenging assay, lipid peroxidation, reducing power activity

UNIT V Bioactivity assay

Learning outcome:
To gain knowledge to perform bio-assays independently in the natural compounds as well as in biological samples.

Text Books

1. Phytochemical methods by Harborne
2. Quality control of herbal drugs by Pulok mukherjee
Reference Books

Web Links
1. pubs.acs.org/journal/jnprdf
2. pharmacy.olemiss.edu/ncnpr

Department of Biomedical Sciences

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<td>BGE 019</td>
<td>Nutrition in Health &amp; Disease</td>
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Learning objective:
- To enable the students to have a clear understanding of dietary management in health and disease condition.

50. Nutrition in Health & Disease

UNIT I Definition for Nutrition, balanced diet-carbohydrate, lipids, proteins, vitamins, minerals. PCM - Kwashiorkar and marasmus, obesity, Measurement of energy expenditure, calorimeter, BMR and its measurement, Calorific values of foods, RQ, SDA.

UNIT II Dietary managements with reference to Gastro Intestinal problem-upper GI tract- peptic ulcer disease, lower intestinal tract Diarrhea, cystic fibrosis, inflammatory bowel diseases, large intestine disease Diverticular diseases, Irritable bowel syndrome, constipation.

UNIT III Nutrition intake during Fatty liver, Hepatitis, cirrhosis, hepatic coma and Gall bladder diseases- Cholecystitis and Cholelithiasis, Pancreas Pancreatitis.

Common food allergy, Food intolerance, Lactose intolerance. Requirements during infancy, adolescence, adulthood, pregnancy, lactation and old age.

UNIT IV Dietary managements with reference to coronary heart diseases and hypertension, Diabetes mellitus, renal disease-Glomerulonephritis, Nephrotic syndrome, Renalfailure- acute, chronic and kidney stone problem.

UNIT V Dietary managements with reference to AIDS, Cancer, Surgery and Nutritional support. Dietary management in Dehydration and water intoxication, Management in acid base imbalance.

Learning outcomes:
- To enable the students to have a clear understanding of diet and its health implications along with the management of diet-related health issues.

Text books
1. William s Basic Nutrition and Diet Therapy Staci Nix.
2. Nutritional Biochemistry - Swaminathan
Reference books

1. Human Nutrition  Catherine Geissler and Hilary Powers

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<tr>
<th>S. No</th>
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3. Lipid disorders-John Reckless and Jonathan Morell
4. Diet management  Rekha Sharma

Department of Bioinformatics

**GENERIC ELECTIVE (GE)**

Department of Bioinformatics

**ODD & EVEN**

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51. Basic Computing

Learning objectives:

- To familiarize with basic concepts of computer and developer tools
To familiarize with internet concepts, office packages and various advancements in networking.
To incorporate computing concepts and its application in their core domain of expertise

UNIT I - Introduction to Computer
Importance of computer characteristics of computer - history of computer generations of computer - types of computer.

UNIT II - Hardware
Information processing cycle peripheral - input devices memory unit types of memory - output devices external storage devices Communication devices - Networks types of networks Internet email.

UNIT III - Software
Types of software programming languages execution modes - Windows - File system - Graphical applications

UNIT IV - Office Packages
MS word- MS Power point MS Excel - MS Access MS Publisher.

UNIT V - Advance Network Technologies
Telemedicine Multimedia Technology Image Processing Computerized data processing HTML. Recent Advances relevant to the core -course

Learning outcome:
- Be able to identify computer hardware and peripheral devices
- Be familiar with software applications
- Understand file management and accomplish creating basic documents, worksheets, presentations and databases
- Distinguish the advantages and disadvantages of networks
- Explore the Web and how to conduct research
- Identify computer risks and safety

Reference Books
1. Introduction to computers & Data processing Shelly, Gray. B
2. Information Technology Dennis P Curtin
3. An Introduction to Computer Applications in medicine N.F. Kember
4. Mastering Microsoft office 2007 Alison Balter s

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52 BIOSTATISTICS

LEARNING OBJECTIVE:
✓ The candidate to understand and apply the Biostatistics.
✓ The candidate to use the software independently for the data analysis.
✓ To make informed decisions based on data
✓ To correctly apply a variety of statistical procedures and tests
✓ To know the uses, capabilities and limitations of various statistical procedures
✓ To interpret the results of statistical procedures and tests

UNIT I: Introduction to Biostatistics
Introduction - Graphical representation of data  Data collection - Diagrammatic and Graphical Presentation of data - Types of data - limitations.

UNIT II: Measure of Central Tendency & Measure of Dispersion

UNIT III: Probability and Probability distributions
Probability - Theorems of probability  Baye’s Theorem - Probability Distributions - Discrete & Continuous distributions - Binomial Distribution- Poisson Distribution- Normal Distribution.

UNIT IV: Correlation & Regression Analysis
Correlation Analysis - Types of correlation - Rank Correlation Coefficient - Regression analysis - Types of Regression -Assumptions - Comparison to Correlation.

UNIT V: Hypothesis Testing
Introduction -Types of sampling  Hypothesis testing - Type of errors  Parametric & Non-parametric tests - Chi-square, t-tests, ANOVA.

PRACTICAL (20 HOURS)
Computational Statistics: Problem solving using statistical software SPSS/ OPNEPI / Excel.

LEARNING OUTCOME:
✓ The candidate will be able to understand and apply the Biostatistics.
✓ The candidate will be able to use the software independently for the data analysis.
✓ Students will be able to
develop skills in SPSS
✓ To determine the correct procedures to use in a given situation
✓ To explain how the central limit theorem applies in inference
✓ To interpret the meaning of confidence intervals in context
✓ To interpret the results of hypothesis tests
✓ To make an informed decision, based on the results of inferential procedures

REFERENCES
2. Biostatistics Principle & Practice  Mcgraw Hill Education.

Department of Bioinformatics
ODD & EVEN
53. INTERMEDIATE MATHEMATICS

LEARNING OBJECTIVE:

✓ The candidate to understand and apply the mathematical concepts.

UNIT I: Linear Algebra

Solving of simultaneous equations-Permutation & Combination-Partial fraction - Binomial theorem, exponential and logarithmic series.

UNIT II: Vector Algebra

Introduction to Vector algebra- Types of Vectors Operation on Vectors Dot and Cross product of Vectors.

UNIT III :Analytical Geometry

Introduction to 2D and 3D geometry Circles Cone - Spheres.

UNIT IV :Calculus

Tangent and Normal to the curve - Angle of intersection of two curves - Increasing and decreasing function - Maxima and Minima - Rate of Change in biological calculation.

UNIT V :Differential Equation

First order and higher degree equation-Second order equation with constant co-efficient Particular integral of polynomial-Homogeneous equation.

LEARNING OUTCOME:

✓ The candidate will be able to understand and apply the mathematical concepts.

REFERENCES:

2. Concepts of Modern Mathematics - Ian Stewart
4. Essential Calculus with Applications - Richard A. Silverman
Learning Objectives

- To know the importance of computers in biology
- To understand software tools for biological sequence analysis
- To learn the concepts associated to Genomics and apply the same in various fields

Unit I Computer Fundamentals

Characteristics of computer, history, generations, types, classification Hardware, Software; Operating System - Linux, Windows. Internet and search engines, Office Packages - MS Word, MS Excel, MS PowerPoint, internet.

Unit II Biological Databases

Bioinformatics and its relation with molecular biology, Molecular Resources, Primary & Secondary databases, Public databases - NCBI, EBI, DDBJ, Database File formats, Submission & retrieval tools

Unit III Sequence Alignment

Introduction, Sequence similarity, identity and homology, Dot matrix analysis, Local and global alignments, Sequence based searches; BLAST Introduction, Definition, Types, Scoring matrices

Unit IV Multiple Sequence Alignment & Phylogeny

Introduction, Progressive alignment method - ClustalW, Phylogenetic trees - types & topology, Methods - Maximum Parsimony, Distance methods, Maximum Likelihood approach

Unit V Genomics
Introduction  Evolution  Genome Organisation of Prokaryotes, Eukaryotes & Organelles  Human Genome Project – Genome Annotation  SNPs & Mutation  Gene & Genome Duplication  Gene Loss

UNIT VI Proteomics
Components  Protein Str. Prediction  Mass Spec - Analysis in Proteomics  Disease link-

UNIT VII Computer Aided Drug Design
Principles - Molecular Modelling  docking  QSAR - Applications

PRACTICAL: 30 HOURS
1. MS Office Packages
2. Submission & Retrieval tools
3. Sequence Editing & Alignment
4. BLAST
5. Phylogenetic analysis
6. Genome Browsers
7. Model Organism Databases
8. Mutation Databases
9. Proteomics & Str. Bioinformatics (Demo only)

LEARNING OUTCOMES
✓ Get to know effective use of Office package
✓ Understand the biological sequence analysis
✓ The student will be able to understand the concepts associated to Genomics and apply the same in various fields

REFERENCES
2. Bioinformatics sequence and Genome analysis  David W. Mount, 2004, 2ed
3. BLAST. The Definitive Guide. Basic Local Alignment Search Tool  Korf, Yandell, Bedell
4. Introduction to Bioinformatics - Attwood, Smith, Parry-Smith
55. Hospital Information Management Systems

Learning Objectives:

✓ To train Medical & Para-Medical and Management Graduates in the specialty of the Hospital Administration to meet the growing demand of Hospital Information Administrators at the middle level of Information-management.
✓ To enable such persons to take up consultancy in the Hospital Information Planning and Management.
✓ To enable them to take up higher courses in learning / specialization in the field of Hospital Information Management System, in due course of time.

UNIT I - Knowledge Management - HMS and its components  What is HIMS  components applications  Role of KMO


UNIT III - DBMS system - components  implementation - Open sources and Commercial Systems case Study- internet and HIMS interaction and its application.

UNIT IV - Data Analytics - Data Mining - Artificial intelligence - Big Data issues- Mobile Computing - Health Care Information System Planning.

UNIT V - Patient Management: EMR  HMR/ HER - LIMS -Gadgets and Devices - Information Security  ISO Audit system ( ISO 27000 ) - eGovernance - Recent Advances & HIMS as a Profession.

Practical :


Learning outcome:

The Students will be able to understand various aspects like:
Collecting, storing and using information has always been an integral part of the practice of medicine. More complex and technology-based thereby creating an increasing need for medical graduates to be competent in information handling skills ranging from simple record-keeping to accessing and using computer-based data. The technical skills to undertake such tasks it is important that graduates appreciate the role of informatics in the day-to-day care of patients and the advancement of medical science in general.

Reference books:
2. Hospital management: An Evaluation by A.K. MALHOTRA

Department of Bioinformatics

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56 - CHEMoinformatics

LEARNING OBJECTIVES

- To learn the representation of chemical structures
- To know the approaches for protein structure analysis
- To understand the principles of macromolecular interactions

UNIT I: Introduction

History of cheminformatics, Applications of cheminformatics, Evolution of cheminformatics, Future scope of cheminformatics, Data and data source in chemistry, Searching chemical structures, Chemical structure file formats.

UNIT II: Chemical Compounds Representation

Representation of chemical compounds, Manipulations in 2D and 3D structures of chemical compounds, Representation of chemical reactions, Molecular descriptors, Calculations of physical and chemical data, Calculations of structural deciphers.

UNIT III: Protein Structure Prediction
Prediction of protein structure from sequences, Protein folding problem, Protein structure Databases - PDB, MMDB, Molecular representation, Ramachandran plot, Protein Structure Prediction; Homology modeling; Threading and ab initio modeling, Energy minimization

UNIT IV: Virtual Screening


UNIT V: Molecular Docking

Structure based Drug Design- Binding site identification, Shape complementarily, Simulation mechanics of docking, Search algorithm and scoring function, Applications

UNIT VI: Drug Development

Drug discovery process, Strategies in drug designing, Pharmacokinetic action of drug on human body, Prodrug design and applications, Strategy for target identification and validation, ADME prediction

PRACTICAL: 30 HOURS

2. Sketching molecules (Marvin Sketch)
3. Protein structure databases (PDB)
4. Protein visualization (Rasmol, DS Visualizer, Chimera)
5. Structure file formats (Open Babel)
6. Homology modelling (Swiss-Model)
7. Molecular docking (Argus Lab)
8. Prediction of drug properties (ORISIS Property Explorer)

LEARNING OUTCOMES

✔ Get to know the representation of small molecules and proteins
✔ Able to understand the drug discovery process
✔ Have practical exposure of in-silico drug design

REFERENCES

1. Computational Approaches in Cheminformatics and Bioinformatics by Rajarshi Guha, Andreas Bender, Wiley, 2012
2. Practical Chemoinformatics by Muthukumarasamy Karthikeyan, Renu Vyas, Springer India, 2014
3. Cheminformatics by Frederic P Miller, Agnes F Vandome, John Mc Brewster, alphascript publishing, 2010
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Nanodiagnostics

UNIT 1 Nanoparticles and Diagnostics: Introduction to nanodiagnostics (need for nanoparticles), Gold nanoparticles and detection of macromolecules (protein, nucleic acids). Quantum dots and Magnetic nanoparticles and their application in molecular detection. Nanowires and CNT and their applications

UNIT 2 Nanopores and crystals: Use of Nanocrystals in Immunohistochemistry - Imaging Applications of Nanoparticles Study of Chromosomes by Atomic Force Microscopy - Applications of Nanopore Technology for Molecular Diagnostics DNA Protein and DNA Nanoparticle Conjugates, Single nanopore for DNA sequencing.

UNIT 3 Protein based Nanotechnologies: Nanoarrays - NanoProTM System - Nanofluidic/Nanoarray; ProteinNanarrays - Fullerene Photodetectors for Chemiluminescence Detection on Microfluidic Chips - Protein Microarray for Detection of Molecules with Nanoparticles; Protein Nanobiochip; Protease-Activated QuantumDot Probes - Single-Molecule Detection

UNIT 4 Nucleic Acid based Nanotechnologies: Devices to Detect a Single Molecule of DNA-Self-Assembling; nanoprinting of DNA, RNA, Nucleic acid chips; lab on a chip (LOC), Lateral flow devices for on filed detection (Point-of-Care Diagnostics), Colorimetric detection of NA using NPs,


UNIT 6 Biosensors: Cantilevers as Biosensors for Molecular Diagnostics Carbon Nanotube Biosensors - FRET-Based DNA Nanosensors. Ion Channel Switch Biosensor Technology - Electronic Nanobiosensors - Electrochemical Nanobiosensors - Quartz Nanobalance Biosensors - Viral Nanosensors PEBBLE Nanosensors - Microneedle-Mounted Biosensors Optical Biosensors- Nanowire (NW) Biosensors - Nanoscale Erasable Biodetectors

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Objectives | Learning outcomes
To impart knowledge on nanomaterials and their applications | On successful completion of the course, the student will be able to
∑ comprehend the types and features of nanomaterials
∑ Applications of nanoparticles with macromolecules
Text Books:

1. Biological molecules in Nanotechnology by Stephen Lee and Lynn M Savage

Reference Books:


Online Resources:

http://www.iinano.org/research
http://www.nanodiainc.com/

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Objectives

To impart knowledge on novel strategies for treatment of diseases.

- Understand and appreciate the applications of biotechnology
- Explain the types of novel therapeutic agents
- Understanding novel pharmaceutical agents for drug delivery
- Defining new treatment modalities available

Health care Biotechnology

UNIT 1
Peptides, Oligosaccharides, Gene therapy:
Overview Introduction to endogenous peptide, proteins & modifications. Oligosaccharide synthesis, heparin, Glycoproteins, Polysaccharide bacterial vaccines, Approaches to carbohydrate based cancer vaccines, Gene therapy, Antisense therapy, Ribozyme.

UNIT 2
Cardiovascular Drugs: Myocardial Infarction agents, Endogenous vasoactive peptides, Hematopoietic agents. Anticoagulants, antithrombotics and haemostatis

UNIT 3
Endocrine Drugs: Sex hormones and analogs - Diabetes Mellitus, Breast Cancer, Hypothyroidism, Hyperthyroidism, Pituitary drugs, Topical corticosteroids, Agents affecting the immune response


UNIT 6 Cosmetics & other consumer products: Proteins, Peptides, Enzymes and Their Applications in Personal Care, Biotechnology in Skin Care, anti-aging, Anti-malarial insecticide

Text / Reference Books:

4. Biotechnology in Personal Care (Cosmetic Science and Technology) by Raj Lad (Editor), CRC Press; 1 edition (March 6, 2006)

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Objectives

To provide knowledge on the biotechnology aspects of therapeutic agents.

Learning outcomes

The student would understand:

- the biotechnological approaches to therapy
- Understand the principles of the new biotechnology based assays
- the therapeutic uses of plant products

Pharmaceutical Biotechnology

UNIT 1  Introduction to Pharmaceutical Biotechnology:

Overview of products, classification of pharmacologic agents based on chemistry and source. Phytopharmaceuticals: Screening tests for phyto constituents alkaloids, and terpenoids. Three examples of commercial natural products from marine and terrestrial organisms.

UNIT 2  Pharmaceutical assays for activity

*in vitro* assay systems based on enzymes and antimicrobial growth inhibition assays, *in vivo* assays based on Cell lines; tissues, organ, animal models; , transgenic animal-diabetes; hepatitis

UNIT 3  Vaccines:

Vaccine design and production, classification, genetically recombinant vaccines, Advantages & disadvantages Examples  Hepatitis B vaccines, Cholera Vaccines.
UNIT 4  Immunology
Antisera  hyper immune gamma globulin  monoclonal antibodies  uses.

UNIT 5  Novel Pharmaceutical Agents
Genetherapy, Recombinant proteins, Probiotics and neutraceuticals.

UNIT 6  Economic and Legal Considerations in Pharmaceutical Biotechnology
FDA guidelines- preclinical trials, acute, sub acute, chronic and teratogenic studies. Clinical trials- Phases I, II and III, ICMR guidelines for design and conduct of clinical trials, licensing, and drug control.

Text Books:

References Books:

Online Resources:
www.uic.edu/depts/cphb/CPB>Welcome.html
http://www.cnbc.com/id/10000904
http://www.eapb.org/
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**Objectives**

To provide training in plant tissue culture techniques

**Learning outcomes**

The student would have become proficient in aseptic techniques; initiate and establish plant cell cultures.

**Theory: Plant tissue culture**

**UNIT 1**

Introduction to cell and tissue culture, Tissue culture media and aseptic techniques. Initiation and maintenance of callus and suspension cultures. Protoplast isolation, culture and fusion: Selection of hybrid cells and regeneration of hybrid plants: symmetric and asymmetric hybrids, cybrids.

**UNIT 2**

Embryo culture and embryo rescue, Anther, pollen and ovary culture for production of haploid plants and homozygous lines. Cryopreservation, slow growth for germplasm conservation.

Liquid Cultures of Plant Cells: Initiation and maintenance of callus and suspension cultures; Bioreactors and their applications.

**UNIT 3**

Plant transformation technology: Outline of transformation technology. Vectors and methods for gene transfer in plants. Markers and reporters used for plant transformation. Applications of transgenic plant technology: insect resistance (Bt genes), Biopharming-Therapeutic proteins in transgenic plants

**Laboratory exercises**

1. Preparation of media
2. Initiation and Organ culture
3. Callus induction and propagation
4. DNA isolation from plant tissues
5. PCR analysis of plant DNA with ITS primers/ MATK primers
6. Plant genome analysis- using different genes / regulatory elements

**Text Books:**


**Reference Books:**

Online Resources:

NPTEL.nic.in
Published on Apr 16, 2013:Youtube; http://shomusbiology.weebly.com

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Objectives

To impart knowledge on concepts of marine biota, marine bioactive products and the use of GE tools to produce commercially important products

Learning outcomes

On successful completion of the course, the student will be able to understand marine ecosystem and its importance to importance to humans in Biotechnology perspective

Marine Biotechnology

UNIT 1 Introduction:

Marine Ecosystem, Marine Environment zonation: Pelagic, Benthic, Sub-littoral and Deep-Sea Environments; General classification and taxonomy of marine organisms: Bacteria, fungi, viruses, microalgae, invertebrates and vertebrates.

UNIT 2 Biological community structure and associations: Symbiosis, commensalism and antagonisms among different groups of organisms

UNIT 3 Marine microbiology

Microenvironments: Biofilm formation, Biofouling Process, Quorum Sensing (QS); Survival in Adverse Conditions- Barophilic, thermophilic and halophilic, Bioremediation (PAHs, aliphatic hydrocarbons, heavy metals); Marine microbial chemical classes and therapeutic effects

UNIT 4 Marine Bioprospecting

Marine organisms: Defense mechanisms (physical, chemical cues and/or epiphytic load), Types of bioactive compounds with reference to antimicrobial, anticancer, pharmacological- analgesic, histaminic and other properties

Isolation and identification of select marine bioactive compounds (alkaloids, flavonoids and polyketides) and depsipeptides. Marine Pharmaceutical companies (PharmaMar, Novartis, Hoffman La Roche, etc) and an overview of their products and their statuses in clinical trials and market

UNIT 5 GE Tools and methodologies in marine science

Genetic Engineering of marine organisms: Micro and macroorganisms as research subjects- Transgenic fish: Growth hormone and anti-freeze proteins- methods, stages of
transformation, vectors used, design of vectors, Production and identification of proteins and depsipeptides from invertebrates: Sponges, Molluscs and tunicates

UNIT 6 Commercial production of marine products

Algal biotechnology- Properties, production and uses of: single cell protein, hydrocolloids (agarose, carrageenan, alginates), pigments (carotenoids and xanthophylls) and other by products

Text Books:


Reference Books:


Online Resources:

1. http://www.marinebiotech.eu
2. http://www.lsi.umich.edu

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Objectives

To impart knowledge on

1. Classification of antibiotics
2. Mechanism of action
3. Mechanism of resistance
4. Combined Antibiotic therapy
5. Plant Products as Antimicrobial Agents

On successful completion of the course, the student will be able to

- Find the mechanism of action of the antibiotics
- Determination of Minimum Inhibitory Concentration of the Antibiotic
- Selecting the right choice of antibiotics for the resistant micro-organisms
- Use appropriate antibiotics for combination therapy in the case of drug resistance
Antimicrobial Agents

UNIT 1 Classification, structure and mode of action of antibacterial, antifungal, antiviral antibiotics

UNIT 2 Resistance to antimicrobial drugs, genetics of drug resistance and its spread. Biochemical mechanisms of drug resistance.

UNIT 3 Molecular principles of drug targeting against antibiotic resistant bacteria

UNIT 4 Peptide antibiotics, Phytochemicals as antimicrobial agents.

UNIT 5 Combination therapy - additive, synergistic and antagonistic antibiotic

UNIT 6 Practicals:

Growth Inhibition Assays:

Antibiotic Sensitivity Assay, Gradient Plate Technique, Minimum Inhibitory Concentration of Antibiotic, Bioautography

Text Books:


Reference Books:

1. Antimicrobial Agents, 2012 Varaprasad Bobbarala


Online Resources:

http://www.microbiol-bg.com/CLSI.pdf

http://www.gxccl.com/download/upload/CLSIM100.pdf

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Objectives

To impart knowledge on concepts of taxonomy, production and phytoremediation using algae

Learning outcomes

The student will have a thorough understanding on the algal taxonomy, commercially important products and phytoremediation using algae.

Algal Biotechnology

UNIT 1 Taxonomic classification of micro and macroalgae- Taxonomic classification of micro and macroalgae: Habit, habitat and distribution, morphological features (appearance,
pigments and life cycle, ecology: Cyanophyta (Spirulina, Nostoc and Anabaena), Xanthophyta, Chlorophyta (Chlorococcus, Hematococcus and Ulva); Phaeophyta (Dictyota and Laminaria); Rhodophyta (Chondrus, Dunaliella and Gracilaria) and fossil algae. Numerical taxonomy of algae: dendrogram and phenogram, cluster analysis

UNIT 2 Phytoconstituents of algae:
Proteins and amino acids, lipids, waxes, glycerol, vitamins, pigments (chlorophylls, carotenoids and phycobiliproteins) and polysaccharides: agar agar, algin and carageenans, Single cell Proteins (SCPs)

UNIT 3 Algaculture:
Isolation of pure microalgal cultures: Types of culture media for microalgae, Isolation of pure cultures, Kinetics and Growth patterns, factors affecting growth (temperature, light, mixing, pH, salinity, oxygen and nutrients), Measurement of algal growth. Substrates and production system for SCP

UNIT 4 Production systems for macroalgae: Raceway pond culture and photobioreactors, harvesting- Centrifugation, flocculation and filtration. Extraction and processing of agar-agar and carageenans
Biofuels: Methane and hydrogen production, energy and chemicals, Biofertilizers: Liquid seaweed fertilizer as phosphate solublizers and nitrogen fixers

UNIT 5 Phytoremediation: Algae used, remediation methods for treating heavy metals, dye decoloration and sewage water treatment

UNIT 6 Algae and pollution
Harmful Algal Bloom (HAB)- red tide and associated hazards- shellfish poisoning, Eutrophication, Algae as indicator of pollution

Reference Books:

Online Resources:
http://algae.ucsd.edu/research/
http://www.oilgae.com/ref/glos/algal_biotechnology.html
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**Objectives**

To impart knowledge on fungi and their importance in genetics and disease

**Learning outcomes**

On successful completion of the course, the student will be able to understand

Basics of fungal biology; molecular genetics in fungi and diseases; how to study and grow fungi in lab

---

**Fungal Biology and Genetics**

**UNIT 1**

Fungi: Structure; diversity and characteristics of major fungal classes; **Yeast biology**: Life cycle of Yeast; Parasexual life cycle and its genetic implications

**UNIT 2**

Genetics of Fungi: life cycle of *Neurospora crassa*; tetrad analysis and linkage analysis- Gene linkage and chromosome mapping, tools for studying crossing over in *Neurospora* and yeast three point cross. **Fungal model systems**: Wild type and mutants isolation; types of mutants - functional mutants (auxotrophs, conditional lethals, reverse mutants); complementation; applications of model fungi

**UNIT 3**

**Extra-chromosomal elements**: Mitochondrial genome, mitochondrial plasmids, 2-micron plasmid, killer plasmid, linear plasmids

**UNIT 4**

**Epigenetics and genetic elements**: Epigenetic gene silencing in filamentous fungi: a) RIP b) MIP c) Quelling; Heterothallism and mating type switch; Transposable genetic elements in filamentous fungi retrotransposons, rterotransposons (transposon trapping) in fungi

**UNIT 5**

**Fungal transformation**: Vectors for fungal transformation; fungal transformation and its application: Yeast 2-hybrid system and its variations - one-, and three- hybrid system in the study of nucleic acid-protein interaction.

**UNIT 6**

Fungal disease of humans and detection: Lifecycle of type members- dermatophytosis; candida; cryptococci; Molecular tools of detection of fungi
Text Books:

Reference Books:
1. Essential Fungal Genetics. 2002 Moore D. & Frazer N. Springer

Online Resources:
2. http://www.fgsc.net/

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Objectives
To provide basic principles in virology

Learning outcomes
The student have understood the basics of virology; understood how they are isolated and studied; molecular aspects of viruses infecting bacteria and plants.

Viruses of bacteria and plants

**UNIT 1** General properties of Viruses, Viroids, prions, satellite viruses, morphology and structure of viruses, classification of viruses, transmission of viruses

**UNIT 2** Isolation and purification of viruses, *in vitro* cultivation; and *in planta* cultivation methods; Assay of viruses and their quantification

**UNIT 3** Bacteriophages Molecular structure of M13, phi X174, Lambda viruses and their applications.Vectors derived from bacterial viruses and their applications

**UNIT 4** Plant Viruses classification, transmission of viruses and vectors, biology of type viruses Infection, symptoms, Plant viruses as useful tools Genome organization & replication: (+) RNA viruses e.g.TMV; Potato virus X; Cucumber mosaic virus

**UNIT 5** Genome organization & replication: dsRNA viruses, (-) and ambisense RNA viruses- Tospo viruses - Tomato spotted wilt virus.

**UNIT 6** Genome organization & replication : DNA viruses e.g., CaMV; Geminiviruses; Subviral agents
Text Books:
4. Basis of disease, 7\textsuperscript{th} ed..Vinay Kumar, Abul K Abbas, N Fausto

Reference Books:
1. Fields Virology, 4\textsuperscript{th} ed. Eds, D M Knipe, PM Howley. Lippincott Williams and Wilkins.

Online Resources:
- www.freebookcentre.net
- www.txbiomed.org/departments/virology
- www.ictvonline.org

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Objectives
To impart knowledge on concepts in genetic recombination and repair of DNA as a basis of evolution

Learning outcomes
On successful completion of the course, the student will be able to understand-
- the basis of recombination and linkage
- mechanisms and types of recombination;
- concepts in repair during recombination

Genetic Recombination and Repair

UNIT 1  Genome organization: Gene concept; genome organization; complexity of eukaryotic genome; Chromosome structure and organization; chromosome numbers

UNIT 2  Recombination and enzymes: Genetic recombination in bacteria, models and mechanism, role of recA proteins and other recombinases. Molecular basis of recombination: Double strand break- repair model; Rec BCD pathway in E. coli; Homologous recombination in eukaryotes; Role of Spo 11 and MRX protein in Meiotic recombination; Gene Conversion

UNIT 3  Homologous and site-specific recombination: Homologous Recombination: Holliday junction. FLP/FRT and Cre/Lox recombination.

UNIT 4  Non-Homologous recombination and Transposons and Retroposons: Non-homologous recombination: Transposons and Retroposons: An Introduction with
examples: insertional sequences and Complex transposons - Tn9 and Tn3

UNIT 5  **Excision Repair system:** Photoreactivation, Excision repair, post replication, recombination and SOS repair, Rec gene repair mechanism; Proof reading activity of DNA polymerases, Repair of double-strand breaks.

UNIT 6  **Recombination repair and other repair systems:** DNA repair: Excision repair; Mismatch repair; Recombination repair; NHEJ; Translesion DNA synthesis, Direct reversal of damaged DNA, Post-replication repair, Error-prone repair

Text Books:

Reference Books:

Online Resources:

http://star.mit.edu/genetics/tutorial/index.htm
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Faculty of Management Sciences

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Objectives

1. To improve one's personal knowledge of the holistic management of stress
2. To teach them stress prevention & Stress management techniques
3. To introduce the concept of Work Life Balance

Stress Management

Unit I : Stress Meaning Sources of Stress Adaptive & Maladaptive Behavior Types of Stress

Unit II : Stress Prevention Strategies The Power of Perception Thinking & Choosing Mindfulness Importance of Values Spirituality Time & Life Management Money Management Social support, relations & Communication Positive Beliefs

Unit III : Stress Management Strategies Relaxations Autogenic Guided Imagery Yoga & Meditation Complementary & Alternative Health Problem Solving Procrastination

Work Life Balance

Unit V : WLB Challenges & Organization’s responses  Work Life Imbalance  Aggravating & Minimizing factors  WLB practices in Indian Context

Learning Outcome
Students will have a general idea about the fundamentals of stress management and work life balance

Text Books
1. Stress Management for Life: A Research-Based Experiential Approach  Michael Olpin, Margie Hesson
2. Work Life Balance  Concepts & Perspectives  PVL Raju

Reference Books
4. Stress Management and Prevention: Applications to Daily Life  David D. Chen et al

Web Resources
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**Objectives**

1. To help the students understand process of team development, factors affecting team performance and managing them effectively.
2. To expose the students to Leadership traits, styles and influencing team members.
3. To make them aware about role of leadership in change management

**Unit I**
- Nature of Team
- Team development process
- Stages of team development
- Types of Team
- Team composition and diversity.

**Unit II**
- Factors affecting team performance
- Group dynamics
- Complexities of cooperative work
- Promoting effective team work.

**Unit III**
- Conflict management
- Groupthink
- Managing Team
- Team member
- Team leader
- Leadership Grid
- Leadership styles
- Motivating team members
- Essence of motivation.

**Unit IV**
- Leadership Traits
- Character and integrity
- Influencing Team
- Ethics and Values
- Building excellence
- Emotional intelligence
- Laws of leadership.

**Unit V**
- Coaching and Mentoring
- Working with power and politics
- Leadership and diversity
- Change
- Organization.

**Learning Outcome**

Students will be equipped with the ideas to make the team an integral part of an organization and framework of leadership in managing them effectively.

**Text Books**

1. Groups That Work (and Those That Don’t): Creating Conditions for Effective Teamwork
   Hackman J. R.
2. Team-Work and Group Dynamics
   Stewart G.L., Sims H. P., Manz C. C.
3. Effective Leadership
   Robert. N. Lussier & Christopher. F. Achua.

**Reference Books**

Web Resources
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Objectives
1. To make the students aware about influence of emotions in the way we act and react.
2. To familiarize them with the concepts of Positive and negative emotions, EQ and its importance.
3. To expose them with the role of empathy and trust in relationship

Unit I:
Introduction Concept Nature Levels of EI EQ & IQ Competencies Self-awareness, self-regulation, Motivation, Empathy & Interpersonal skills.

Unit II:
Emotional Intelligence & Personality Know thyself Emotional Knowledge of yourself Mind & Emotions Recognizing Positive & Negative Emotions.

Unit III:
Relationship between emotions, thoughts & behavior Understanding EQ and its importance in life and at workplace Managing emotions in challenging situations

Unit IV:
Role of Empathy and trust in Relationship Enhancing ability to recognize and respond to other’s emotions

Unit V:
Applying EI in organizations Flandling frustrations how to deal with conflicts creating effective working relationships

Learning Outcome
Students will be prepared to overcome challenging situations and empathize with others. Also helps to build stronger relationship and achieve personal and career goals.

Text Books
1. Emotional Intelligence by Daniel Goleman
2. Emotional Intelligence at Work A professional guide by Dalip Singh Response Books (A division of Sage Publications)
Reference Books
1. Emotional Intelligence - The Vivekananda way, by A R K Sarma, Sri Sarada Book House

Web Resources

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Objectives
1. To make students aware of the basic principles of computer networks
2. To familiarize the student with the concept of Cryptography
3. To impart awareness about cyber-crimes and its preventive measures

Unit I : Basics of computers
- Computer organization
- peripheral Devices
- Software
- System Software
- Application Software
- Operating system
- Computer Languages
- Compiler & Assembler

Unit II : Networks
- Networks
- Local Area Network
- Wide Area Network
- Wireless Local Area Network
- Metropolitan Area Network
- Storage Area Network
- Personal Area Network
- Enterprise
- Private Network
- Virtual Private Network

Unit III : Components
- Hosts
- routers
- Switches
- Kirks
- protocols
- applications
- Humans & Services agents

Unit IV : Cryptography
- Basics
- Plaintext
- Cipher text
- Cipher
- Key
- Cryptanalysis
- Cryptology
- Encryption
- models
- Symmetric
- Asymmetric

Unit V : Cyber Crimes
- Basics
- Types
- Hacking
- Theft
- cyber stalking
- Identify Theft
- Malicious software
Learning outcome:

Students will understand and able to apply the nuances of computer networks and security

Text book:


Reference Books:

1. Warland, PravinVaraiya, High performance communication networks
2. IrvanPepelnjk, Jim Guichard, Jeff Apcar, MPLS and VPN architecture

Web Resources

1. http://www.edunotes.in/Home

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Objectives

1. To create highly knowledgeable and skilled professionals conversant with every area of healthcare and hospital management,
2. To meet the increasing demand for competent professionals in this segment.
3. To know about various tools and techniques for managing quality given by quality gurus
4. To make them understand about the quality systems

Unit I : Introduction to quality in Healthcare -Basic Quality Concepts Historical Perspective on Quality; Global and Indian - Quality in Service Sector, emphasis on Healthcare Sector - Various Quality Terminologies used in Healthcare

Unit II : Quality & Accreditation in Healthcare Evolution of Quality Accreditation in Healthcare Role of Accreditation and Regulation in Healthcare Framework of an Accreditation System Accreditation Standards like the NABH, NABL & JCI

Unit IV : Quality Assurance Process in Healthcare   Patient Safety Measures and QA in Patient care services   Hospital Information systems, EHR/EMR.   Monitoring of Quality in Healthcare   Monitoring clinical and Managerial Indicators Measuring, Monitoring & Improving Patient Satisfaction

Unit V : Quality Improvement Tools   TQM, Principles & application   LEAN Healthcare   7-QC tools   5S, KAIZEN, Overview about 6-sigma   Quality Audits   Clinical Audits   System Audits.

Learning Outcome
Students will learn about the quality improvement tools, accreditation & quality assurance process in healthcare set up

Text Book
1. Step by Step Quality Hospital Care (English) 1st Edition (Paperback) by Jan, Farooq|Author; Tabish, Sayed Amin|Foreword by; -JAYPEE BROTHERS MEDICAL PUBLISHERS.-NEW DELHI

Reference Books
1. Quality Management in Health Care: Principles and Methods Paperback Import, 24 Feb 2004 by Donald E. Lighter (Author), Douglas C. Fair (Author)- Jones and Bartlett Publishers, Inc

Web Resources
### Objectives

1. To introduce the Medical tourism concepts
2. To provide the practical orientations & functions of International patient care
3. To familiarize about the various dimensions of Medical Tourism

### Unit I

### Unit II

### Unit III
- Medical Tourism - Hidden Dimensions - A Service Industry Perspective on Medical Tourism - Understanding the Darker Side of Medical Tourism

### Unit IV

### Unit V
- Introduction - Ayurvedic Therapies: One of the Ways for Cashing in on Medical Tourism - Medical Tourism Packages in India for Health Check-ups - Medical Tourism - Conclusion & Recommendation.

### Learning Outcome

Students will get to know the importance and concepts involved in International patient care and medical tourism

### Text Book
1. Medical Tourism Global Outlook & Indian Scenario - by Percy K. Singh
2. Medical Tourism: The Ethics, Regulation, and Marketing of Health Mobility - Michael Hall

### Reference Books
3. Medical Tourism - By John Connell
4. How to Plan a Successful Medical Tourism Trip   Irene Little, Shai Gold, Dan Corman.
5. The Complete Medical Tourist   David Hancock

Web Resources

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Objectives:
1) To provide orientation about the healthcare concepts
2) To familiarize students with the basics concepts of health policy
3) To give overview of health economics and health insurance

UNIT  1: Health Organization:
Type of Health Organization including International Organizations - Private & Voluntary Health care provider  Distribution of Healthcare services

UNIT  2: Health Policy
National health policy  Health for all by 2000 AD  Health system in India- Health planning & Management  Evaluation of health care system.

UNIT  3: National Health Programme
Health programs in Indian - Introduction - Malaria, T.B, Blindness, AIDS, Leprosy, Iodine Deficiency disorder (IDO) programme,

UNIT  4: Health Economics
Introduction  Micro & Macroeconomics  Law of Demand  Law of Supply - Demand for Health Services- Health as an Investment  Health expenditure

UNIT  5: Health Insurance
Introduction  Definition  Concepts of Health Insurance - Health insurance plans  Private health insurance  Health plan Vs. Health Insurance
Learning Outcomes:

Students will have an overview about the basic concepts of Health policy, Health Economics and Health insurance.

Text Books:

1) Preventive and Social Medicine by K. Park, Banarsidas Bhanot Publishers
2) Managerial Economics by S. Sankaran, Margham Publications

Reference Books:

1) Mediclaim and Health Insurance by Kshitij Patukale, Prabhat Prakashan Publications
2) Introduction to Health Economics (Understanding Public Health) Paperback Import, 1 Oct 2011, by Lorna Guinness (Author), Virginia Wiseman (Author)

Online Reference:

1) Health-Care-Handbook-Elisabeth-Askin-ebook/dp/B0088CMAUU

(The Health Care Handbook [Kindle Edition] - by Elisabeth Askin (Author), Nathan Moore (Author), William Peck (Foreword))


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Objectives

1. To understand how to design and lead R&D processes and manage R & D Organization.
2. To develop an understanding about intellectual property rights
3. To equip students with skills and knowledge needed to undertake the research project competently

Unit I : Introduction historical perspective validation and evaluation basic research applied research technology in R&D successful R&D management basic condition Elements vision, mission, strategy Deming cycle (PDCA), competency matrices.

Unit II : Structural Components Organizational Environment, Functional Organization, organization structure for innovation. Creativity Tools Climate - Innovation Pathways, sources, business analysis techniques.

Unit III : Quality management system, Good management practice, Quality environmental management system- Data recording. TQM in R & D Quality procedures, Continuous improvement, measurement techniques, Benchmarking
Unit IV: Performance management, reviewing and monitoring, appraisal schemes, T & D, skill requirements, skills gap assessment Career Management & Development - Succession planning.

Unit V: Intellectual property patents types, procedure. Publications categories Science Citation Index impact factor citation metrics. Financial Control Budgets, Plans, Costs, research grants & funding, project proposal writing.

Learning Outcome
To ensure an effective, efficient and sustainable R & D

Text Book
1. Alan Glasser, Research and Development Management, Prentice-Hall, 1982

Reference Books
3. Management of Research and Development Organization: Managing the Unmanageable Jain & Triandis
4. The Management of Research and Development George F Thompson
5. Research and Development in the Chemical and Pharmaceutical Industry Barnfield
6. Successful Management of Research & Development Andreas Holzinger

Web Resources
1. www.wisegeek.com/what-is-research-and-development-management.htm#didyouknowout
http://www.investopedia.com/terms/r/randd.asp
## Course Title: Hospital Operations Management

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### Objectives

1. To train working professionals in healthcare industry in all of functional and managerial aspects of healthcare
2. To ensure transfer of evolving industry standards to academic activity and
3. To provide framework to development of human resources in the healthcare industry

### Unit I
- Healthcare organization models: Classification of hospital based on ownership - Classification based on functionality and bed size - Management of the hospital

### Unit II
- Managing Clinical departments: In-Patient service - Out Patient service - Emergency service - Operation Theatre - ICU - Nursing Service - Lab service - Radiology service

### Unit III
- Managing Non-clinical and supportive departments: CSSD - Pharmacy Service - Blood Bank - House-keeping - Dietary service - Bio-Medical Engineering Department - Medical Records Department

### Unit IV
- Designing standard operating protocols - Department KRA (Key Result Area) & KPI (Key Performance Indicator) - Effective clinical and non-clinical communication - Identifying patient touch points - Counseling staff who deal with patients regularly - Counseling patients and attenders

### Unit V
- Patient-centered care - The 8 dimensions of healthcare - picker institute: Emergence of patient family centric care - Patients Preferences - Emotional Support & Physical comfort - Information & Education - Coordination of Care - Access to care - Continuity & Transition
Learning Outcome
1. Students will learn about the process, functions and structure of clinical, non-clinical & Support services of various hospital

Text Book
1. Hospital Administration & Management: A comprehensive Guide Dasgupta
2. Hospital & Healthcare Administration Gupta, Kant

Reference Books
1. Hospital Waste Management & its Monitoring Sharma
2. The Hospital Administrator George MA
3. Putting Patients First: Best Practices in Patient-Centered Care Susan B Frampton, Patrick A Charmel&Planetree (Editors)

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Objectives
1. To make students think out of the box so as to become entrepreneurs instead of employees
2. To incorporate entrepreneurial skills in young minds.
3. To make them understand the characteristics needed for the successful entrepreneur

Unit I : Introduction
- Business opportunities
- Exploring opportunities
- perceiving and sensing opportunities
- environment scanning
- Factors
- SWOT
- PESTEL Model

Unit II : Business Environment
- Forms of Business organization
- Business Plan
- Business Ideas
- Generating Ideas
Feasibility  Difference between Business Plan and Feasibility Study

Unit III  :  Entrepreneurs
Entrepreneur  Definition  Characteristics  Entrepreneurship  Concept  Definition  Functions  Need  Myths  Advantages  Disadvantages  Process  Types of Entrepreneurs  Difference between Entrepreneur and Employee

Unit IV  :  Entrepreneurial Characteristics
Entrepreneurial Competencies  Values  Core Values, Innovation and Creativity  Ownership  Attitudes  Features  Sources  Motivation  Process  Theories  Challenges faced by Entrepreneurs

Unit V  :  Enterprise Growth Strategies
Expansion  Franchising  Types  Mergers and Acquisitions  Growth through Mergers and Acquisitions  Types of mergers  Types of acquisitions  Value addition  Types  Value Chain

Learning outcome:
Students will be equipped with the skills required for the successful entrepreneur

Text Book
1. Entrepreneurial development& management  Vasant Desai
2. Entrepreneurship: An Evidence-based Guide  Robert A. Baron

Reference Books
4. Entrepreneurship - KP Sharma
5. Entrepreneurship: Back to Basics  Gordon B. Baty, Michael Blake

Web References
2. http://bbahome.blogspot.in/2013/02/entrepreneurship-development.html
Course Number | Course Code | Course Title | L | T | P | C | Total Hours
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77 | GGE 011 | NGO Management | 3 | - | - | 3 | 45

**Objectives**

1. To introduce the students to NGO sector
2. To introduce basic managerial skills for a NGO
3. To make them understand about the changing trends in NGO

**Unit I**

- NGOs Concepts
- Background
- Role of NGOs
- History of NGOs
- Concept of Civil Society
- Role of civil society in social change
- Civil Society Movement in India

**Unit II**

- Agencies supporting NGOs
- Legal Framework for NGOs
- Issues in NGO Management challenges of NGO Management, Development issues, Development indicators

**Unit III**

- Strategy and planning for NGOs
- Elements of Strategy, SWOT analysis, Process of Management
- Planning, Organization, Delegation, Co-ordination, Core-Competency and Capacity Building

**Unit IV**

- Social Marketing
- Principles and Concepts
- Marketing Mix
- Social Marketing Vs Commercial Marketing
- Fundamental Component of Social Marketing.

**Unit V**

- Issues & Challenges of NGO Management
- Changing trends in NGO
- Schemes for NGO

**Learning Outcome**

Students will learn about the basics of NGO and the changing trends & the challenges in NGO

**Text Book**

1. Management of NGO  David Lewis
2. Strategic Management and Policy Issues of NGOs by O P Goel

**Reference Books**

1. Preventive & Social Medicine  K.Park
2. Taxation of Trusts and NGOs by Manoj Fogla
3. NGOs Management in India by Snehlatha Chandra

**Web Resources**

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Objectives
1. To familiarize students with basics of internet marketing strategies
2. To make them aware about concepts of website monetization
3. To make them understand the current trends in marketing

Unit I : Introduction to Marketing
- Marketing basics
- Evolution of marketing
- Relationship marketing
- Marketing Process
- Marketing mix
- Target Marketing

Unit II : Overview of Social media marketing
- Web participative technology
- Social media sites
- 4 Zones of social media marketing
- 5th P of marketing

Unit III : Website Monetization
- Basics
- Pay Per Click (PPC)
- Cost Per Impression (CPI)
- Banner advertising
- Affiliate programs
- Data monetization
- Paid membership program
- Other ways of monetizing a website

Unit IV : Strategic Social Media Marketing & Segmentation
- Strategic Overview
- Planning process
- Facts
- Implications
- Social consumers
- Segmentation

Unit V : Current trends
- Viralness
- Big data & social media
- Digital communities
- Influencers
- Diffusion of innovation in a wired world

Learning Outcome
Students will be equipped with knowledge and skills required for social media marketing

Text Book


Reference Books

1. 500 Social Media Marketing Tips by Andrew Macarthy (Author), Jon Finegold (Editor) Create Space Independent Publishing Platform

2. The Social Media Marketing Paperback Import, 4 Dec 2009 by Dan Zarrella (Author) O'Reilly.

3. Social Media Analytics by Marshall Sponder (Author), McGraw-Hill Professional

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Objectives

1) To know the basics of information systems.
2) To understand concepts related to application of HIS.
3) To familiarize with Health care Information Systems.

UNIT 1: Basics of Computers, Internet and Networking
Basics of Computers Hardware Software - Hospital use of Internet, Intranet, Extranet Virtual Private Networks (VPN) Telecommunication Local Area Network Wide Area Network Teleconferencing.

UNIT 2: Information Systems in Healthcare
Introduction to Healthcare Information Hospital as a system - Need for computerization in hospitals.

UNIT 3: Hospital Information system
Definition of Hospital Information System Scope Objectives Need Characteristics Structure of Hospital Information System (HIS) Benefits & Barriers in adopting HIS

UNIT 4: Application of Hospital Information system
Application of HIS in Hospitals Clinical Information System Administrative Information Systems Support Service Information Systems Laboratory Information Systems Radiological Information system.
UNIT 5: E- Healthcare
Introduction to E- healthcare concepts  Definition - Forms of e- health - Medical Transcription Telemedicine E- prescribing.

Learning Outcomes
1) Students will have a general idea about the utilization of Information technology in healthcare setting

Recommended Books:
1) Management Information System  Laudon & Laudon
2) Information systems for hospital administration  Charles J. Austin, Health Administration press.

Reference Books:
1) Health Information Systems (Concepts, Methodologies, Tools and Applications) Rodrigues & Joel
2) Management Information System  Hitesh Gupta

Online Reference:
1) http://www.wipro.com/industries/healthcare/solutions/hospital-information-system-his/

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Objectives:
1) To provide orientation about the marketing concepts
2) To familiarize students with the basics concepts of Marketing research
3) To give overview of consumer behaviour

UNIT 1: Basics of Marketing
Market-Classification of markets- Marketing Importance of marketing- Products-types- Evolution of marketing-Marketing mix-Pricing-types-Sales promotion-methods

UNIT 2: Marketing Research
Marketing information systems - assessing information needs, developing & disseminating information - Market Research process - Other market research considerations

UNIT 3: Consumer Behaviour
Introduction-Buying motives-Buying decision Process-factors influencing buying behaviour-Customer retention-Need-Importance-Advantages-Customer Relationship Management (CRM)

UNIT 4: Product
UNIT 5: New Product Development

Introduction  Types  New Product  Challenges - Success  Failure  Organizing New product development

Learning Outcomes:

Students will have an overview about the basic concepts of marketing.

Text books:


Reference books:

1) Marketing Management by Prof. P.K. Chopra, Bhawna Mehra, Wiley India Private Limited
2) Marketing Management: An Indian Perspective - by Prof. Vijay Prakash Anand, Wiley India Private Limited

Online Reference:


Objectives

- To make the students understand the objectives and process of training.
- To make them familiarize about various issues relating to design and delivery of training programme.
- To make them aware about training and development methods followed in an organization

UNIT I
Scope and cost of human resource development - a systems model to training- strategy

UNIT II
HRD- Building employee commitment; orientation and socialization.

UNIT III
Need assessment - purpose and methods of need assessment- three levels of need assessment-identifying training objectives.

UNIT IV
Training phase - learning principles - training methods - management development programmes - new employee orientation.

UNIT V
Evaluation phase - evaluation levels and purposes - evaluation designs - using evaluation to improve training - utility of training programmes - benchmarking HRD.

UNIT VI
Human resources development in the future - small business applications - training for special purposes - global HRM training - information technology and HR training.

Learning Outcomes
- Students will be equipped with knowledge and nuances involved in training and development.

Text Books

Reference Books

Web Resources

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Objectives:
- To make the students understand basics of Industrial Relations in India
- To make them gain conceptual understanding of Trade unions.
- To familiarize them with concepts of dispute Settlements to promote peace in an industry.

UNIT I
Indian industrial relations Concept Importance Evolution-Indian industrial worker

UNIT II
Trade unionism - Origin and Growth of Trade Union- structure - Trade Union Act

UNIT III

UNIT IV
Industrial Employment (Standing Orders) Act 1946 Interpretation Certification

UNIT V
Application of Model Standing Orders- Contradiction - Penalties and Procedures.

UNIT VI

**Learning Outcomes:**
- Students will be equipped with knowledge to resolve industrial relation problems and promote industrial peace.

**Text Books:**

**Reference Books:**

**Web Reference:**
2. Journal of Industrial Relations - [http://www.uk.sagepub.com/journals/Journal201768](http://www.uk.sagepub.com/journals/Journal201768)

### Faculty of Management Sciences

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<td>Labor Law</td>
<td>3</td>
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**Objectives:**
- To make the students aware about various legislative measures taken by Government towards the healthy industrial Jurisprudence.
- To give an overview of Legal Principles governing the employment relationship at individual and collective level.
- To familiarize the students about the practical problems inherent in the implementation of labour statutes.

**UNIT I**

Industrial legislation - Growth of industrial labour force - Characteristics of industrial labour

**UNIT II**


**UNIT III**

Mines Act Committees Mining Operations Management

**UNIT IV**


**Unit V**

An overview of Minimum Wages Act - Employees State Insurance Act- Maternity Act
UNIT VI


**Learning Outcomes:**
Students will be able to appreciate the application of labour laws - Legal Provision relating to a) Wages b) Working Conditions and Labour Welfare c) Industrial Relations d) Social Security

**Text Books**

**Reference Books**

**Web Resources**
2. E-Journal: Journal of Industrial Relations - http://www.uk.sagepub.com/journals/Journal201768

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<td>BASICS OF HOSPITAL MANAGEMENT</td>
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**Objectives:**
1) To provide orientation about the hospital functions
2) To familiarize students with the basics concepts of hospital Management
3) To give overview of hospital operations

**UNIT 1 Introduction to Management**
Introduction - Definition  Steps - Planning  Organizing  Staffing  Directing  Controlling

**UNIT 2 Introduction to Clinical service**
Types of Hospitals - Organization and administration of various clinical services: Outpatient services In-patient services - Emergency services - Operation theatres Nursing services - ICU's.

**UNIT 3 Hospital Support services**
Organization and Administration of various Support services: CSSD  Diet  Medical records

**UNIT 4 Hospital Ancillary Services**
Organization and Administration of various Ancillary services: Housekeeping  Linen and Laundry-Engineering services  Transportation

**UNIT 5 Hospital Diagnostic and Therapeutic services**
Organization and Administration of various Diagnostic and Therapeutic services: Radiology - Laboratory  Pharmacy - Blood bank

**UNIT 6 Safety and Risk management**
Hospital waste management  Nosocomial infection  Disaster management  Hospital security service - Occupational safety in hospitals
Learning Outcomes:
Students will have an overview of hospital functions and management.

Text Books:
1) Principles of Management by Sakthivel Murugan, New Age International Publishers
2) Hospital Administration DC Joshi & Mamta Joshi, Jaypee Brothers Medical Publishers (P) Ltd

Reference Books:
1) Principles of Hospital Administration and Planning by B. M. Sakharkar, Jaypee Brothers Medical Publishers (P) Ltd
2) Total Quality Management by V. JayaKumar, Lakshmi Publications
3) Forensic Medicine and Toxicology by VV. Pillay, Paras Publication

Online Reference:
1) http://www.hospitals-management.com/
2) http://www.hospitalmanagement.net/

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<td>PERSONALITY &amp; CAREER DEVELOPMENT</td>
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Objectives
1. To help the students to develop soft skills for pleasing & winning attitude
2. To guide students in shaping their personality for professional career
3. To develop confidence among the students to face the interview

Unit I: Managerial Skills: Communication - Motivation - Leadership skills
Team Building - Conflict Management - Positive Attitude - Business Etiquette

Unit II: Personality Development
Personality Concept - Significance - Determinants of Personality - Emotional Intelligence

Unit III: Career Management
Concept of career - Career management - Stages - Personality and Career Choice

Unit IV: Interview Skills
Preparing for Interview - Body language - Analysis of Strengths and weaknesses - Job interviews - Tips for interviews - Group Discussion

Unit V: Resume Writing
Introduction - The Purpose of a Resume - How Long Your Resume Should Be - The Order of Information on Your Resume - Changing Your Resume
for Each Application - What Your Resume Should Include - What Your Resume Should NOT Include- Reviewing Your Resume

Unit VI : Professional Skills

Presentation skills  Time Management  Stress Management
Negotiation Skills  Success Management

Learning Outcomes
1. Students will be equipped with the requisite skills and knowledge needed for success in their career

Recommended Books:

Reference Books:
2) D.P. Sabharwal , Personality Development Hand Book, Prakash Books India Pvt.Ltd.

Online Reference:
1) http://www.abebooks.com/Personality-Development-Career-Management-Pragmatic-Perspective/4261354195/bd
2) http://listovative.com/top-12-most-important-essential-personality-development-tips/

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OBJECTIVE:
1. To familiarize the students about the Consumer Behavior
2. To make students to understand the concept of Brand Management
3. It helps students to develop the ability and enable to design the best marketing Strategy.

UNIT- I
Introduction: the application of consumer behavior , principal to strategic marketing , consumer Research,Consumer Psychographics , constructing a psychographic inventory, application of Psychographic analysis .

UNIT-II
The nature of consumers attitude : structural models of attitudes , measurement of attitudes , social class, life style profiles of the social classes Influence of culture of consumer behavior , characteristics of culture , the measurement of cultural personal influence and opinion leadership process , measurement of opinion Leadership .

UNIT-III
Consumer decision making; Four view of consumer Economic man, Passive man, Cognitive man, Emotional man, Consumer decision process

UNIT IV
Comprehensive models of consumer decision making Nicosia Model Howard Sheth Model, Engel Kollat-Black well model.

UNIT V

UNIT VI
Managing Brands; Brand creation, Brand Extensions, Brand-Product relationships, Brand Portfolio; Brand Assessment through Research, Brand identity, Position, Image, Personality Assessment and Assessment and change.

Learning Outcome:
Students will be equipped with the knowledge on the basic concepts of Consumer Behaviour and Brand Management

Text Books:
2. S.A.Chunawalla, Product Management Himalaya Publication House

Reference books:

Web Resources:

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OBJECTIVES:
1. To familiarize students about the Advertising and Sales Promotion
2. To develop the ability to design the best marketing Strategy
3. To make them understand the concept of analyzing the factors influencing the purchase decision

UNIT I
Advertising and the Marketing process, Media Planning and selection campaign planning and launching, Message designing and development, Advertising Budgeting, Corporate Advertising.

UNIT-II
Client-Agency Relationship  The role and working of Ad Agency Measurement of Advertisement Effectiveness DAGMAR approach Pre testing , Post-testing techniques of measuring Advertisement effectiveness .

UNIT III
Sales Promotion  Consumer Promotion , Dealer Promotion , Sales force Promotion , Sales force planning and Execution  Recent trends- Elementary knowledge of public relation .

UNIT - IV
Introduction of Sales management  Understanding basics of selling  Meaning, important and scope , Selling , Salesmanship , Selling process , Selling Skills.

UNIT-V
Sales Organization and Territory management  Importance of sales Organization , Types of sales organization , Rates , Responsibilities of Sales Manager, Sales Forecasting and Budgeting , Territory Management , Sales Quotas

UNIT-VI
Sales Displays and Sales Promotion - Sales Force Management  Meaning , importance of Sales Force , Recruitment , Selection of Sales Force, Training , Compensation , Motivation , Performance Education and controlling of Sales Force.

Learning Outcome:
Students are equipped with the Advertising and Sales Promotion and to develop the ability to design the best marketing Strategy

Text Books:
2. Chunwalla  Sales Management  Himalayan Publication House

Reference Books :
1. Chunawalla and Sethia  Advertisement Management  Himalayan Publication House

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Objectives:
1. The purpose of the course is to educate future managers to meet international challenges.
2. The course provides foundations that are useful for explanation and prediction of International Business.
3. It helps students to understand the ways of controlling international business activities.

Unit I
Process of international marketing, domestic vs. international marketing - characteristics of MNCs benefits of international marketing

Unit II
World market environment political legal culture

Unit III
Marketing research and information system market analysis and foreign market entry strategies consumer behaviour in the international context

Unit IV
International marketing decisions; product strategies product planning branding and packaging distribution strategies channels physical distribution and documentation;

UNIT V
Promotion strategies personal selling publicity, sales promotion advertising internet marketing; pricing strategies

Unit VI
Trade distortions and marketing barriers, legal protection

Learning Outcome:
Students will be equipped with the knowledge and skills required to meet international challenges and control over International business activities

Text Books:

Reference Books:
1. International Marketing Management: Text and Cases (SAGE Texts)-U.C.Mathur, Sage India
2. International Marketing Paperback, Rajagopal , Vikas Publishing House

Web References:
1. E-Book: International Marketing by Curry, Jeffrey Edmund

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Objectives:
4) To provide orientation about the marketing concepts
5) To familiarize students with the basics concepts of Marketing research
6) To give overview of Services marketing and branding of hospital

UNIT 1: An introduction to Marketing & Market Research
Introduction - Definition Importance Need Want Demand Products Types Service vs. Products - Evolution of Marketing - Marketing research process Barriers to marketing research Forecasting & demand measurement
UNIT  2: Managing Customer Relationship
Creating customer value  Satisfaction  Loyalty  Maximizing customer lifetime value  Customer relationship management  Customer databases.

UNIT  3: Product
Introduction - Product levels  Product Classification  Product differentiation  Product mix  Product hierarchy  Product length  Product analysis  Product and brand relationship.

UNIT  4: Branding
Introduction  Concepts of Brand  Role of Brand  Scope of branding  Brand equity  Brand value chain  Branding decisions  Brand revitalization.

UNIT  5: Services Marketing
Classification of services  Characteristics of services and their marketing implication  Selecting appropriate tools for marketing

UNIT  6: Branding of a Hospital Facility
Brand name and concept  Positioning hospitals  USP  Brand image  Image building  long term and short term activities - Service Quality.

Learning Outcomes:
Students will have an overview of marketing and services marketing concepts

Text Books
1) Marketing Management  by Philip Kotler, Pearson Publication.
2) Services Marketing  by Parasuraman, Zeithaml,

Reference books:
1) Marketing Management by Prof. P.K. Chopra, Bhawna Mehra, Wiley India Private Limited
2) Marketing Management: An Indian Perspective - by Prof. Vijay PrakashAnand ,Wiley India Private Limited

Online Reference:
2) http://books.google.co.in/books/about/Services_Marketing_and_Management.html?id=WyLvk u0kx9gC&redir_esc=yServices Marketing and Management - by Audrey Gilmore, SAGE, Business & Economics

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<td>PGE 001</td>
<td>Herbal Drug Technology</td>
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G ELECTIVE SUBJECTS

1. HERBAL DRUG TECHNOLOGY  (Theory & Practicals)

Learning Objectives:
To impart knowledge about the various technological aspects of herbal products

- To understand the concepts of traditional system of medicine.
- To provide basic knowledge about quality control of herbal drugs.
- To achieve a high degree of proficiency and develop competence in Formulation and standardization of various herbal products.

Learning outcomes:
On completion of the course the candidate shall be able to
- Explore the advanced techniques for the search of new products from natural sources.
- Comprehensive knowledge of various systems of medicine.
- Understand industrial requirements for quality control and quality assurance of herbal drugs.
- Develop skills in Formulation and standardization of herbal products.

SYLLABUS:

THEORY  (30 Hours) Credit- 2

Unit-1: (4 Hours)
Introduction to herbal drug technology, Basics for herbal drug development, Rationale of the selection of the plant extracts and doses, Preclinical research and discipline, Problems encountered in current drug discovery process.

Unit 2 : (4 Hours)
An Introduction to Traditional Herbal Dosage Forms in Ayurveda, Siddha and Unani. Salient features of preparation and standardisation of some of the important class of formulations as per respective Pharmacopoeial methods.

Unit 3: (7 Hours)
Quality control of Herbal Drugs - Botanical identification of plant material, Sampling, Macroscopic evaluation, Presence of foreign matter, Microscopic evaluation, Determination of moisture content, Determination of volatile oil content, Extractable matter, Ash values, Crude fibre, Determination of hazardous chemical contaminants and residues, Biological contaminants.
Unit 4: (5 Hours)
Phytochemical standardization - application of various chromatographic methods in separation and identification of Phytopharmaceuticals, fingerprint technique and its importance.

Unit 5: (10 Hours)
Polyherbal as Dosage Forms Methods of preparation and quality control of Tablets, Capsules, Liquid Preparations, syrups, linctus, suspensions, Ointments, Liniments, Gels, Pastes, Lotions, Sprays and Powders.
Herbal Cosmetics - Benefits of using herbs in cosmetics, Importance of Herbals in Hair, Importance of Herbal skin care products.

PRACTICALS: (30 HOURS) Credit- 1
1. Standardisation of raw materials.
2. Extraction techniques such as maceration, percolation etc.
3. Preliminary phytochemical screening of herbal extracts.
4. Standardisation of Churna.
5. Standardization of Lehya.
6. Standardization of Arishta.
7. Isolation, Detection and Standardization of Volatile oil from Fennel.
8. HPTLC study of herbal extracts.

REFERENCES:
Compulsory reading:
2. Clark’s Isolation & Identification of Drugs by A.C. Mottal
3. Phytochemical Methods of chemical Analysis By Harborne
4. Quality control methods of Herbal drugs by Pulok V. Mukherjee.

Suggested reading:
1. Pharmacopical standards for Ayurvedic formulations CCRAS Delhi
2. HPTLC- Quantitative Analysis of Pharmaceutical Formulations by P.D. Sethi.
3. Herbal drug Industry by R.D. Chaudhri

Online reading:

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2. GREEN CHEMISTRY (Theory & Practicals)
Learning objectives
- To study the alternative method to Avoid fuming chemicals.
- To provide solventless synthesis using alternative techniques.
- To solve environmental problem using green chemistry

Learning outcome:
At the end of the course, students will acquire knowledge

- On using various natural energy to perform various chemical reaction.
- Procedures to avoid exposure to furious chemicals.
- Synthesis of organic chemicals in short duration.

**SYLLABUS:**

**THEORY**

**Unit 1**

Principles of green chemistry
Prevention of waste, atomeconomy, less hazardous chemical syntheses, designing safer chemicals, safer solvents and auxiliaries, design for energy efficiency, reduce derivatives, renewable feedstock, catalysis, design for degradation, real time analysis for pollution prevention, and inherently safer chemistry for accident prevention.

**Unit 2**

Solvents:
- Supercritical solvents - Super critical carbondioxide and super critical water
- Ionic liquids - Room Temperature Ionic Liquids
- Fluorous Solvents

**Water the ultimate green solvent:**
- Important properties of water
- Chemical process in water
- Fizzy water
- Biochemical oxygen demand
- Water treatment

**Unit 3:**

Energy
- Energy sources
- Renewable energy sources
- Storage and release of energy by chemicals
- Conversions between forms of energy
- Radiant energy from the sun

To combat with green chemistry
- Acid rain
- Global warming
- Prevention of smog
- Genome sequencing
- Biodegradation.

Hazard reduction:
- Feed stocks
- Reagent
- Media and catalyst

**Unit 4:**

Background, theory, super heating effect, solvents and mechanism
- Microwave assisted chemical reaction
- Grinding Technique

**PRACTICALS:**

| 1 | Introduction | 3 |
| 2 | Acetylation Of Primary Amine - Preparation of acetanilide | 3 |
| 3 | Diels-Alder reaction between furan and maleic acid | 3 |
| 4 | Benzil-Benzilic acid rearrangement | 3 |
5 Nitration of Salicylic acid 3
6 1,1 bis 2 naphthol 3
7 Synthesis of dihydropyrimidinone 3
8 Synthesis of biodiesel 3
9 Microwave assisted knovenegal reaction 3
10 Synthesis of TBAB 3

REFERENCES:

Compulsory reading:
1. Green Chemistry Stanley E Manahan Chemchar research Inc 2005
3. Alternative Solvents for Green ChemistryFrancesca M. KertonPublished by the Royal Society of Chemistry

Suggested reading:
1. Eric LichtfouseJan SchwarzbauerDidier RobertEnvironmental ChemistrySpringer Berlin Heidelberg New York
2. Monograph on Green Chemistry Laboratory ExperimentsGreen Chemistry Task Force Committee, DST
4. A Grinding-induced Catalyst- and Solvent-freeSynthesis of Highly Functionalized 1,4-Dihydropyridines viaa Domino Multicomponent ReactionSupplementary Material (ESI) for Green ChemistryThis journal is © The Royal Society of Chemistry 2011

Online reading:
1. www.rsc.org

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IN VITRO SCREENING METHODS (THEORY & PRACTICAL)

Learning objectives
To train the students in
• Various stages of drug discovery process
• In sight in to alternative to animal experimentation
• General description about the type of cell lines and their culture techniques
• In vitro pharmacological screening of drugs
• In vitro toxicological screening of drug candidate

Learning outcomes
By the end of this course student will be able to identify and describe
• The various specialized cell culture techniques
• Current use of In vitro methods in toxicology testing of drugs and formulation
• Current use of In vitro methods in pharmacological testing of drugs and formulation

Syllabus
Theory (30 Hours) Credit-2
Unit I (6 hours)
Strategies in drug discovery and evaluation

Unit II (6 hours)
Specialized Cell Culture Techniques
Lymphocyte preparation, autoradiography, time-lapse recording, confocal microscopy, cell synchrony, culture of amniocytes, somatic cell fusion, cell hybridization, production of monoclonal antibodies, DNA transfer.

Unit III (6 hours)
In vitro methods for screening cardiovascular activity
Adenosine receptor binding assay, α & β-adrenoreceptor binding assays, Inhibition of angiotensin converting enzyme, Endothelin receptor antagonism, Calcium uptake inhibiting activity, Positive inotropic activity. Blood coagulation tests, platelet aggregation in whole blood, erythrocyte aggregation, determination of plasma viscosity, euglobulin lysis time, platelet aggregation and deaggregation in platelet rich plasma or washed platelets (BORN method).

Unit IV (7 hours)
In vitro methods for screening central nervous system activity

Unit V (5 hours)
In vitro Toxicity Assays
Brine-Shrimp lethality assay, Brine-Shrimp micro well cytotoxicity assay, Crown gall tumor inhibition assay (Potato Disc Antitumor Assay)

Practical (30 Hours) Credit-1
1. Isolation of DNA from green peas
2. Isolation of DNA from cauliflower
3. Identification of isolated DNA by electrophoresis technique
4. In vitro DPPH assay
5. In vitro nitric oxide scavenging activity
6. In vitro total antioxidant assay
7. In vitro reducing power assay
8. In vitro anti-inflammatory activity by membrane stabilization method
9. In vitro antiarthritic activity by protein denaturation method
10. In vitro anti platelet activity by whole blood method

REFERENCES:
Compulsory Reading

Suggestive Reading

Online Reading

1. http://envfor.nic.in/division/committee-purpose-control-and-supervision-experiments-animals-cpsea

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INTELLECTUAL PROPERTY RIGHTS (Theory)

Learning Objectives:
This subject seeks to equip students with a broad understanding of the international intellectual property rights system, the main forms of intellectual property rights and the relevant international institutional framework. Its specificity is to provide students with a broad understanding of intellectual property in the context of sustainable development. Overall, it seeks to equip students with the necessary analytical tools to understand intellectual property in its broader environment, with particular emphasis on the situation of developing countries.

The objectives of this subject are to:
1. Acquaint the learners with the basic concepts of Intellectual Property Rights
2. Develop expertise in the learners in IPR related issues
3. Sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

Learning outcomes
At the end of the course, students would be able to
1. Understand the implications of Patents, Copyrights and Designs, Trademarks and Geographical Indications.
2. Understand the relevance and impact of IP Law on academic/scientific works/studies.
3. Recognize the intellectual property likely to be produced in the academic and professional environment.
4. Understand the different forms of infringement of intellectual property rights.
5. Demonstrate appreciation and critical awareness of pertinent IP issues in the academic and professional lives.
6. Demonstrate and develop basic skills of legal reasoning, individual critical thinking and group interaction, as well as interpretative, analytical and argumentative skills in oral and written forms of communication.
Syllabus
Theory (45 Hours) Credit-3

Unit 1: Concepts of Intellectual Property (9 Hours)

Unit 2: Patent Law and Act (9 Hours)

Unit 3: Patentability Criteria (9 Hours)

Unit 4: Types of IPR (10 Hours)
Patents, Copyright, Trademarks, Trade secrets, Industrial Design, Geographical Indications, Layout designs of Integrated Circuits and Protection of Plant Varieties and Farmers' Rights, Biodiversity and traditional Knowledge

Unit 5: IPR in different sectors (8 Hours)
IPR in Cyber space, IPR in Pharma sector, IP licensing, IP insurance, Securitisation of IP.

REFERENCES:
Compulsory Reading:
1. Managing IPR by Vinod D.Sople
2. Law relating to Intellectual Property by Dr.B.L.Wadhera.

Suggested Reading:

Online Reading:
2. www.wipo.org
3. www.wto.org

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Good Manufacturing Practice (GMP) Theory

Learning Objectives:
- To provide the student with an objective of understanding the core principles and practice of Good Manufacturing Practice (GMP) for active pharmaceutical ingredients (APIs) under an appropriate system for managing quality.
- To know the principle and practices of cleaning and sanitations in manufacturing process.
- To know about the rules and regulations required for the manufacture & sale of pharmaceutical products.
- To ensure that APIs meet requirements for quality & purity that they purport to possess.

Learning Outcomes:
- After the completion of course, students would be able to,
- Lead a processing plant in establishing and maintaining Good Manufacturing practices.
- Demonstrate their understanding of concept of Quality Assurance and Quality control in a GMP environment
- Follow proper documentation procedures as outlined in Good laboratory and Good Manufacturing Practices.
- Demonstrate their ability to design a sterile gowning procedure/technique to an industry standard.
- Apply root cause of analysis tools to solve/analyze problems.
Students will be conversant in all core elements of GMP as practiced in a real world work place setting.

**Syllabus**

**Theory**  
(45 Hours)  
Credit-3

**UNIT I: 8 Hrs**
Introduction to GMP, History of GMP, GMP definitions, Food and drug Law, Core principles of GMP, Ethics, motivating employees in GMP compliance, Good documentation practices, quality assurance and audits.

**UNIT II: 10 Hrs**
Physics, Chemistry and Biology of sterilization methods, process chemical sanitization and maintenance of sterility.

**UNIT III: 10 Hrs**
Validation, product complaints, adverse events and device complaints, product and device stability.

**UNIT IV: 10 Hrs**

**UNIT V: 7 Hrs**
Root cause analysis, Lean six sigma, statistical process control, ICH Q9, risk management and ISPE Risk Mapp.

**REFERENCES:**

**Compulsory Reading:**

**Suggested Reading:**

**Online Reading:**
## PG ELECTIVE SUBJECTS

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### GOOD CLINICAL PRACTICE (Theory) 45 Hours/Sem Credit-3

#### Learning Objectives:
To train the student on:
- The ethical requirement for conducting clinical trials
- The rights, safety and wellbeing of trial subjects
- Conceptualizing, designing, conducting, managing and reporting of clinical trials
- Preparing clinical study reports and reporting in common technical document
- Quality control and assurance in conduct of clinical trial

#### Learning Outcomes:
By the end of the course the student will be able to identify and describe:
- International Conference on Harmonization (ICH) process and its guidelines
- Its structure and relationships to roles and responsibilities of the sponsor and the investigator
- Adverse event reporting requirements for both investigators and sponsors
- The responsibilities of an Institutional Review Board / Independent Ethics Committee (IRB/IEC)
- Material and regulatory requirements for conducting clinical trials

#### SYLLABUS:

**THEORY**

**Unit-I** 8 hrs

**Unit-II** 7 hrs
Role and Responsibilities of Investigators
Investigator - Qualification and agreements, resources, Informed Consent of Trial subjects, Records and Safety Reporting.

**Unit-III** 8 hrs
Role and Responsibilities of Sponsors
Sponsor- Quality Assurance and Quality Control, Contract Research Organization, Trial design management, data handling, Record keeping, Notification/submission to Regulatory Authority, confirmation of Review by IRB/IEC, Investigational products, ADR Reporting, Monitoring, Audit

**Unit-IV** 7hrs
Institutional Review Board/ Independent Ethics Committee
The Role of an IRB/IEC, Composition, Functions and Operations, Documentation.

**Unit-V** 8hrs
Clinical Trial Protocol and Protocol Amendments
General Information, Objectives and Purpose, Trial design, Preparation of synopsis and protocol ,Selection and withdrawal of subjects, Assessment of Safety and efficacy, Statistics, Data handling and Record keeping.

**Unit-VI** 7hrs
Investigator's Brochure
Introduction, General considerations, Contents- Table of contents, Summary, Physical, chemical and pharmaceutical properties and formulation, Non clinical studies, Nonclinical pharmacology, Pharmacokinetics and product metabolism in animals, Safety and efficacy, Marketing experience, Summary of data and guidance for the investigator.

REFERENCES

Compulsory Reading:

Suggested Reading:
2. Davidson’s Principle and Practice of Medicine, EDs Christopher, Haslett, Edwin R.Chilvers.
5. Comprehensive Pharmacy Review- Shargel Leon
6. A textbook of Clinical pharmacy practice- Parthasarthi G.

Online Reading:
4. Principles of Good Clinical Practice McGraw, Michael J; George, Adam N; Shearn, Shawn P; Hall, Rigel L; Haws, Jr, Thomas F First edition
5. FDA GCP: http://www.fda.gov/Regulatory_Information/Guidances/ucm122049.html
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**PHARMACOVIGILANCE (Theory)**

**Learning Objectives:**
The aim of this programme is to equip students with a basic understanding of the concepts and practice of pharmacovigilance. By the end of the programme, students should be able to:

- Demonstrate an understanding of, and critically evaluate, issues surrounding the risks and benefits of drug use in humans including the cause, manifestations and consequences of adverse drug effects (ADEs), the manner of which these are detected and monitored, and the related historic and legal frameworks.
- Understand that Pharmacovigilance is vital to ensure the continued safety of medicines.
- Generate independent, evidence based recommendations on the safety of the medicines.

**Learning Outcomes:**
Upon completion of this course a student should be competent to understand and participate in:

- Regulatory aspects in Pharmacovigilance (USFDA, European, Canada, India).
- Reporting Requirements (Expedited Reporting Requirements in Post-authorization Phase & Reporting requirements in special situations in the post authorization phase).
- Preparation of Annual Safety Reports and Periodic Safety Update Reports.
- Key differences in the Pharmacovigilance Regulatory Environments of various countries.
- Establishing a Pharmacovigilance Database and Signal Detection Tools.
- Diagnosis and Management of Adverse Drug Reactions.

**SYLLABUS:**

**THEORY**

45 hours  Credit-3

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<td>Unit</td>
<td>Medical Evaluation of Adverse Events in Pharmacovigilance</td>
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<td>UNIT III</td>
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<td>Unit</td>
<td>Epidemiological methods</td>
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<td>IV</td>
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<td>Unit V</td>
<td>Pharmacovigilance Database, Signal detection, Risk Assessments and management, safety specification, Signal analysis and follow up.</td>
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<tr>
<td>Unit VI</td>
<td>Pharmacovigilance laws and Guidelines</td>
<td>10</td>
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</table>

**REFERENCES:**
Compulsory reading:
3. An Introduction to Pharmacovigilance Waller, Patrick; John Wiley & Sons
5. Pharmacovigilance from A to Z - Barton L. Cobert & Pierre Biron, Blackwell Science

Suggested reading:
1. Practical aspects of signal detection in Pharmacovigilance by CIOMS, 1st edition
2. Pharmacovigilance medical writing: A good practice guide by Justina Orleans Lindsay, 1st edition
3. Drug safety data: How to analyze, summarize and interpret to determine risk by Michael J. Klepper, Barton Cobert, 1st edition

On line reading:
1. http://www.pharmacovigilance.co.in/

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3. ANALYTICAL INSTRUMENTATION TECHNIQUE (Theory & Practicals)

Learning Objectives:
- To impart knowledge about analytical instruments and their applications pertaining to Pharmaceutical Industry.
- To design appropriate analytical methods for newer drugs
- To impart hands on training on method development and validation requirements of pharmaceutical dosage forms.

Learning outcomes:
At the end of the course the students will be able to:
- Operate the different sophisticated instruments used in industry for various analytical purposes
- Understand the basic principles of spectroscopy and chromatography and their applications in industry
- Characterize drugs and chemicals by IR spectroscopy

Syllabus

Theory

(30 Hours) Credit-2

Unit I
UV SPECTROSCOPY
Introduction, Fundamental law of photometry, Deviations of BEER’S Law, Instrumentation, Terminology, Electronic transitions, application

UNIT II
INFRARED SPECTROSCOPY
Introduction, Principle, Factors Influencing vibrational Frequency, Instrumentation, Sampling Techniques, Applications

UNIT III
CHROMATOGRAPHY
Introduction, types, Theoretical principles, Development of chromatogram, Qualitative and quantitative analysis by chromatography.

UNIT IV
HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY
Introduction, Principle, Instrumentation and its applications

UNIT V
HIGH PERFORMANCE LIQUID CHROMATOGRAPHY
5 hours
Introduction, Principle, Instrumentation and its applications

UNIT VI
GAS CHROMATOGRAPHY  
Introduction, Principle, Instrumentation and its applications  
5 hours

Practicals: (30 hours) Credit-1

1. Quantitative estimation of formulations containing single drug or more than one drug using instrumental techniques.
2. Interpretation of simple organic compounds using UV, IR,
3. Chromatographic analysis of some pharmaceutical formulations.

REFERENCES:

Compulsory Reading:

Suggested Reading:

Online Reading:
3. www.chromatography.com
### B. LIST OF ABILITY ENHANCEMENT / SKILL ENHANCEMENT COURSES

**Faculty of Allied Health Sciences**

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## Faculty of Biomedical Sciences

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*- Syllabus provided within the B Sc (Hons) AHS Program*
Learning objectives:

At the end of the programme, the student will be able to

- Describe basic concepts in electricity & electronics
- Identify and tackle technical issues related to instrumentation
- State the bio-medical device learning needs
- Associate in any combination of therapeutic techniques

Unit- 1: Electricity

Introduction, Production of electricity, AC current, DC current, Fundamentals of electrical charges, Static electricity, Production of electric charge, Characteristics of a charged body, Characteristics of lines of forces, Potential energy, Current electricity, Units of electricity, Resistance (In series and In parallel), Resistors, Types, Construction, Uses, Ohms law, Capacitor, Definition, Different types of capacitors, Charging, Discharging, Uses, Potentiometer, Construction, Working, Application and uses, Milliammeter, Working, Construction, Uses, Voltmeter, Construction, Working, Uses, Rheostat, Variable rheostat, Devices used in regulating intensity of current..

Demonstration Classes:

1. Designing a simple electric circuit
2. Measurement of AC & DC voltages
3. Verification of earthing/grounding connection
4. Demonstration of resistance
5. Measuring instrument- multimeter
6. Production of electric charge through friction

Unit- 2: Electronics

Conductors, Insulators, Semiconductors, Diode, Construction, Uses, Rectifiers, Half wave rectification, Full wave rectification, Transistor, Types, Construction, Transistor as amplifier, Diode, Triode, Tetrode, Construction, Working, Triode as amplifier, Oscilloscopes

Demonstration Classes:

1. Conductors versus insulators
2. Rectification of alternating current using diodes
3. Basic amplifier circuit
4. Pulse generators using oscilloscope
Unit- 3: Magnetism & Electromagnetism

Molecular theory of magnetism, Properties of magnetism, Magnetic effect of an electric current, Electromagnetism, Electro-magnetic induction, Self Induction, Mutual induction, Transformers, Types (variable and auto), Static transformer, Construction, Working, Uses, Choke coil

Demonstration classes:

1. Molecular theory of magnetism
2. Transformers - choke coil and its parts

Unit – 4: Mains Supply & Electric Shock

Mains supply, Distribution, Wiring, Distribution in a house, Fuses, Power plugs, Electrical switches, Grid, Construction, Working, Uses, Sources of electrical hazard, Potential adverse effects of A.C & D.C - Electric shock, Types, Effects, Treatment, Causes, Precautions

Demonstration classes:

1. Power plugs & switches – inner view
2. AC & DC current measurement using multimeter

Learning Outcomes:

After the completion of the course, students will demonstrate the ability to

- Identify and solve equipment related problems
- Apply knowledge of physical concepts in the field
- Ability to use technical skills in patient care equipments

Reference:


Online Resources:

Learning objectives:

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

- List different common terminology used to describe communication disorders.
- Explain the difference between speech language da communication, deaf and hearing impaired,
- Recognize three – four manifestations of different types of Communication disorders
- Explain strategies to facilitate communication and rehabilitation
- Recognize different aids used to facilitate communication
- Identify red flags for appropriate referral for assessment and habilitation

Syllabus

Unit 1: Human Communication

Definition of speech, language and communication, functions of communication, modes of communication, speech and language developmental milestones, mechanism of speech production, classification of speech and language disorders, identification and referral.

Unit 2: Communication disorder

Manifestation of speech, language disorders in children, manifestation of speech, language disorders in adults, speech therapy- who, what, when and why, facilitating communication at the bedside, alternative and augmentative communication.

Unit 3: Hearing

Hearing mechanism: anatomy and physiology, causes of hearing loss, types and degree of hearing loss and its impact on communication, understanding the audiogram.

Unit 4: Aural rehabilitation

Definition and scope, hearing aids and cochlear implants, assistive listening devices, facilitating communication in adults with hearing loss, facilitating communication in children with hearing loss, prevention of hearing loss.

Learning Outcome:

After the completion of the course, students will demonstrate the ability to
Identify red flags for referral, assessment and habilitation of communication disorders.
Identify three to four manifestations of different types of communication disorders.
Explain different aids to facilitate communication
Explain strategies to facilitate communication and habilitation.

References:

Online resources:
http://www.cirrie.buffalo.edu/encyclopedia/en/article/50/

Learning objectives:
At the end of the course the student will be able to
✓ Define the impact of noise on hearing and factors that determine the extent of hearing loss.
✓ Summarize the auditory and non-auditory effects of noise
✓ List the auditory test used for screening individuals with noise induced hearing loss
✓ Describe hearing conservation program.

Syllabus:
Unit 1: Noise measurements

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Definition of noise, various types of noise in community, industry, music, traffic. Instrumentation and procedure for indoor and outdoor noise measurements, Sound Level Metre (SLM), Noise dosimeter and its operations

Unit 2: Hearing mechanism

Structures and functions of external, middle and inner ear, properties of sound, pathophysiology of noise induced hearing loss

Unit 3: Auditory and non-auditory effects of noise

Auditory effects of noise on hearing: temporary threshold shift, permanent threshold shift, recovery patterns, and histopathological changes. Non auditory effects of noise on health, sleep disturbance, stress, effect on work and performance, damage risk criteria & occupational hazards of noise.

Unit 4: Audiological screening to detect noise induced hearing loss

Pure tone audiometry screening, otoacoustic emissions screening, speech audiometry, analyse the patterns of noise induced hearing loss in audiogram, base line and periodic monitoring assessment

Unit 5: Hearing conservation

Definition of hearing conservation, need for hearing conservation programme, steps in hearing conservation programme, ear protective devices (ear plug, ear muffs, helmets, special hearing protectors), noise cancellation headphones.

Learning Outcomes:
After the completion of the course, the student will be able to

✓ Describe the functioning of the ear, how it is affected by noise, and ways to control noise in community & workplace
✓ Explain the components of audiometric testing and describe the audiogram and its uses
✓ Select and use proper hearing protection whenever excessive noise is encountered
✓ Describe the elements of a noise monitoring program

References


Online Resources:


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**Learning objectives:**

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

- Explain/contrast the processes involved in speaking and singing.
- Speak/sing in an appropriate voice with correct vocal pitch, volume, quality and intonation.
- Develop awareness of posture and coordinated breath support that is required for effective speaking and singing.
- Establish and modify practices that are required to maintain vocal health, in order to facilitate good speaking/singing and prevent voice disorders.

**Syllabus:**

**Unit 1: Vocal sound and its production**

Brief overview of anatomical structures and functions of breathing apparatus, phonatory apparatus, resonatory apparatus and their coordination, Contrast between speech and song, Voice parameters and their production, Measurement of voice, terminologies and applications.

**Unit 2: Vocal health and voice disorders**

Concept of voice use, misuse, abuse and care, professional voice users- risk and effects of training, vocal pedagogy, vocal habits, non-vocal habits, vocal hygiene, voice rest, identification of voice problems, first aid for voice deviances/disorders, health and lifestyle, effects of environment, management options.

**Unit 3: Development of vocal technique**

Techniques of breathing and breath support, techniques of voicing, tone quality and volume, techniques of balancing resonance and pitch blends, techniques of good diction, production of vowels, and consonants, application of the techniques in speech and song.
**Unit 4: Vocal practice and use**

Building balanced practice routines for speaking and singing, breath control and coordination training, vocal range enhancements, delivery of speech/song, accent, stress, intonation, facial expression, rate and style, vocal ornaments.

**Unit 5: Essentials of vocal training and execution**

Aspects of motivation, practice, patience, perseverance, self analysis, performance anxiety, vocal health check, use of technology such as microphone, feedback devices, mastering of techniques, warming up and cool down techniques, techniques to develop endurance and stamina, aspects related to growth, ageing and the related, general health

**Practical Classes:**

1. Identifying organs of voice production mechanism & illustration of working of the speech/song apparatus
2. Analysis of the parameters of voice, components of speech and song
3. Observation of voice disorders, eliciting causes, analysing vocal and non vocal habits, voice use/abuse patterns
4. Development of voice use hierarchy, vocal hygiene program and checklist
5. Learning techniques of posture and movement
6. Learning techniques of breathing, breath support and coordination
7. Learning techniques of vocal warm up, vocal stretching and contraction
8. Learning techniques of resonance
9. Learning techniques of articulation and prosody
10. Staging of learnt techniques through speech/ elocution, debate, song

**Learning Outcomes:**

After the completion of the course, students will demonstrate the ability to

- Communicate in a natural voice that is suited for him/her
- Use techniques of posture and voice in communication
- Maintain good vocal health

**References:**


**Online Resources:**
2. [www.wikihow.com/develop-a-perfect-speaking-voice](http://www.wikihow.com/develop-a-perfect-speaking-voice)

**FACULTY OF ALLIED HEALTH SCIENCES – TRAUMA CARE MANAGEMENT**

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**B.SC TRAUMA CARE MANAGEMENT**

**III SEMESTER-**

**BASIC LIFE SUPPORT AND COMMON EMERGENCIES**

**Objectives :**

The student will be able to:

A. Perform adult and pediatric (infant and child) one and two-rescuer CPR

B. Perform adult and pediatric (infant and child) foreign body airway obstruction (choking) techniques

C. Integrate the automatic external defibrillator into resuscitations

**Unit-I**

- Introduction of BLS
Basic Anatomy of Cardiovascular system & its function chain of survival

Unit-II
- How to do CPR/AED

Unit-III
- Foreign body airway obstruction

Unit-IV
- Post resuscitation care

Unit-V
- Paediatric Basic Life Support / Neonatal resuscitation

Recommended Books:
1. Emergency Care in Streets – Nancy Caroline, Mosby’s Paramedic text book
2. American Heart Association Basic Life support Provider Manual

Reference Books:
1. Basic Life Support Patient Care Standards - Ontario
2. Adult Basic Life Support - Resuscitation Council (UK)

Online References:
1. www.americanheartclasses.com

Common Emergencies

Objectives:
For each of the following core emergency medicine areas, the student should be able to:

• obtain a rapid, accurate history.
• perform an appropriate, focused physical examination.
• develop a working differential diagnosis.
• outline an approach to management, considering all available therapeutic methods

Unit-I
- Burns

Unit-II
Convulsions

Unit-III
- Toxicology
  - general approach
  - stings
  - bites

Unit-IV
- Chest pain

Unit-V
- Electrical injuries

Recommended books:
1. Emergency Care in Streets – Nancy Caroline,
2. Barbara- Paramedic practices today

Reference Books:

Online References:

M.SC TRAUMA CARE MANAGEMENT

II SEMESTER
TRIAGE, TRAUMA CARE MANAGEMENT, TOXICOLOGICAL EMERGENCIES

Semester II- TRIAGE, TRAUMA CARE AND TOXICOLOGICAL EMERGENCIES

Objectives:
1. To develop competence in all aspects of management of patients with critical illness and those acutely injured.
2. Independently assess and resuscitate the severely injured.
3. Prioritize management of the severely injured.
4. Understand pathophysiology, and management of the critically ill trauma patient including monitoring and treatment of: severe traumatic brain injury, severe respiratory failure, shock states, sepsis, coagulopathy and bleeding diatheses, thrombo-embolism,
abdominal compartment syndrome, fluid and electrolyte disorders, transfusion therapy and acute renal failure. 

5. Understand strategies to prevent secondary insults in trauma.

TRIAGE:

Unit-I

- Triage
- Introduction to EMS
- Roles and responsibilities
- Well being of the paramedic

Unit-II

- Legal
- Ethics
- Regulatory issues
- Air transport
- Infection control
- Check list of ambulance

TRAUMA CARE

Unit –III

- Introduction to Trauma care
- Mechanism of injury
- Initial assessment- first degree survey
- Secondary survey

Unit-IV

- General approach to the trauma victims
- Immobilization
- Lifting & moving

Unit-V

- GCS/RTS
- Shock

Recommended books:

1. Tintinallis Emergency Medicine - 7th edition
2. Pre hospital trauma life support

Reference:
1. Barbara- Paramedic practices today, Mosby’s EMT-B text book

2. Textbook of Basic Disaster life support

Online references:

1. www.cdc.gov/
2. https://www.facs.org/.../trauma/

COMMON TOXICOLOGICAL EMERGENCIES

The student should have enhanced broad educational goals, including:

- recognize of systematic Toxicological problems and patient management abilities in the emergency setting;
- expanded knowledge of common emergencies, their diagnosis and management
- improved emergency clinical skills, including both diagnostic and therapeutic procedures

Unit-1

- Toxicology
  - Introduction
  - Routes of entry
  - Reconition,
  - Identification of poisoning incidence
  - General management

Unit-II

- Drug overdose
  - Paracetamol
  - TCA
  - Opiates
  - Benzodiazepines
  - Digoxin

Unit-III

- Other poisoning
  - CO
  - Cyanide
  - Hydrocarbons
  - Paragent
  - OPC
  - Cavities
  - Corrosives
Unit-IV

- Drug abuses
- Alcoholism
  - Ethanol
  - Methanol
  - Medical consequences, sudden shifting syndrome
  - Body packers of chronic alcoholism

Unit-V

- Stings and bites
  - Scorpion
  - Snake
  - Dog
  - Cat
  - Rat
  - Human
  - Leech
  - Jelly fish
  - Honey bees

Recommended books:

1. Goldfrank's Toxicologic Emergencies
2. Tintinalli's Emergency Medicine - 7th edition

Reference Books:

1. Toxicology Secrets by Louis Ling
2. Rosens Emergency Medicine

Online references:

1. www.aemonline.org/
2. www.barnesandnoble.com
Learning Objectives

✓ Understand the basic food groups, their nutrient composition and function
✓ Be informed about the concept of balanced diet and tips for planning a healthy menu
✓ Gain knowledge looking out for nutrition labeling and be able to make healthier food choices
✓ To inculcate good eating habits

Culinary Skills for Optimal Nutrition

I - Introduction Foods and Nutrients
Foods - definition, basic four and five food groups - cereals and millets, pulses, fruits and vegetables, fats and oils, sugar and jaggery,
Foods and Nutrients, Functions of Foods - energy yielding, body building and protective foods, balanced diets, vegetarian vs non vegetarian foods, Functional foods and Dietary supplements,

II - Food Safety and Quality
Food adulteration, common adulterants used and methods of identification, nutrition labeling, food standards,

III - Malnutrition and Role of Food Choices in Malnutrition
Malnutrition – over and under nutrition, food and nutrient intake, dietary pattern, food fads, food choices and habits, Factors influencing food choices and intake

IV - Methods of Cooking and Preservation
Cooking methods – moist heat, dry heat, advantages and disadvantages, changes during cooking, nutrient preservation while cooking
Preservation techniques, advantages and disadvantages

V - Sensory Evaluation
Principles and techniques of sensory evaluation, interpretation tools

VI - Nutritional Requirements and Meal Planning
Basic nutritional requirements through different stages of life cycle, basic principles of meal planning, revisiting concept of balanced diets

Learning Outcome

- Appreciate the concept of balanced diet
- Apply the principles of good nutrition and healthier food choices in day to day life
- Become an informed consumer

Text Books

Reference Text
2. Parker R O. Introduction to Food Science, Thomson Delmar Learning, 200

Practicals

Learning Objectives
To enable the learner to understand

- The use of household measures and cutlery
- To develop the skills healthy dishes using the food groups
- To be able to identify food adulteration

Practicals
1. Introduction to cutlery and crockery
2. Introduction to weights and measures
3. Art of table setting
4. Market survey on food labeling
5. Preparation of few commonly consumed cereal preparations
6. Preparation of few commonly consumed pulse dishes
7. Vegetable cooking without nutrient loss
8. Preparation and display of fruit salads
9. A day’s menu for an adult sedentary worker
10. A day’s menu for an 8 months old infant
11. Nutritious snacks for a preschooler
12. Nutritious lunch for a school going boy and girl
13. A day’s menu for an 16 year old boy and girl
14. Consistency modified menu for a 80 year old
15. Simple tests to identify food adulteration
16. Sensory evaluation of the prepared items

Learning Outcome
At the end of the transaction the learner will be able to

- Identify the common food adulterants
- Plan suitable menu for different age groups in a family
- Prepare commonly consumed home-made foods with preserved nutrients
- Appreciate the taste of good nutrition

<table>
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<tr>
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<th>Course Code</th>
<th>Course Title</th>
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<td>1</td>
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<td>Bakery and Confectioneries</td>
<td>2</td>
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Learning Objectives

- To impart knowledge pertaining to the science of baking.
- To acquire basic skills of bakery and confectionery

**Bakery and Confectionery**

Time allotted: 30 hours

I - Introduction, role of various ingredients
Historical perspective. Introduction, scope of bakery & confectionery, bakery terms. Organisation chart of bakery.

Structure of wheat grain, milling of wheat and role of bran and germ

Flour – Types, composition, role of constituents, quality assessment

Leavening agents – functions, and factors affecting their action

Role of sugar, eggs and cocoa

Fats and fat replacers – Properties, functions and role in bread making

Salt – Function and role in dough making and fermentation.

Other ingredients : Milk products, emulsifiers, improvers, dried fruits etc.

II - Setting up a bakery unit

Bakery layout –approvals for setting up of a Bakery – Government procedure and Bye-laws.

- Selection of site
- Selection of equipment
- Layout design
- Electricity

III - Methods, Characteristics of bread making

Bread – Basic recipe and its variations (whole wheat, multigrain, addition of spices and herbs)

Methods- straight dough method, delayed salt method, no time dough method, sponge and dough method

Bread making process - Commercial

a. Chemical dough development
b. Mechanical dough development
c. Batch / Continuous dough mixing
d. Dividing and rounding
e. Intermediate proofing, moulding, panning
f. Proofing
g. Baking
h. Depanning
i. Cooling, slicing, packaging

External characteristics - volume, symmetry of shape, Internal characteristics - colour, texture, aroma, clarity and elasticity.

IV - Preparation and Evaluation of Cakes and Confectionery

Basic methods of cake preparation – Types, recipe and balancing of recipe, Correct temperature for baking, different varieties of cakes.biscuits, crackers and cookies.
Confectionery – types (crystalline and non-crystalline candies, fudge, marshmallows) preparation, ingredients and their role. Storage of confectionery products

Types of icing-butter icing, glaze icing, royal icing, marshmallows, fudges.

Evaluation of characteristics of baked products, common faults
a. Standard and statutory regulation for bakery products.
b. Nutritional aspects of bakery products.

Practicals Cake and confectionery preparation and bakery visit

1. Cakes by different methods (e.g., sponge cake; Madiera cake; Genoise; fatless sponge; rock cake; tea cakes, fruit cake)
2. Biscuits & Cookies: Plain biscuits; piping biscuits; cherry knobs; langue-de-chats; (catstongue) salted biscuits; nut biscuits; coconut biscuits; melting moment; macaroons; tricolour; chocolate biscuits; marble biscuits; nan-khatai; short bread biscuits. Ginger biscuits; cheese biscuits; cream fingers.
3. Flaky/Puff pastry-khara biscuits; veg patties; chicken patties; mutton patties; cheese straws; patty cases;
4. Icing: Fondant; American frosting; Butter cream icing; Royal icing; gum paste; marzipan; marshmallow; lemon maringue; fudge; almond paste; glace icing.
5. Toffees: Milk toffee; chocolate; stick jaws; liquor chocolate.
6. Ice Cream: Vanilla, Strawberry, Chocolate, Pineapple, Mango.
8. Pudding: ginger pudding; cold lemon soufle; chocolate mousse; fruit trifle.
9. Indian sweets- gulab jamun, coconut burfi, carrot halwa.
10. Visit - partly and fully mechanized bakery units.

Learning Outcomes

After going through this course, the students will be able to:
- Develop skill in various baking procedures
- Know various kinds of ingredients used and working knowledge of equipments needed for baking
- Start a small bakery unit at home

Text Books

Reference Book


Web references

1. www.bakersjournal.com
2. www.nchm.nic.in/nchmct_adm/writereaddata/upload/.../1386722436.pdf

SRI RAMACHANDRA UNIVERSITY
SYLLABUS FOR CHOICE BASED CREDIT SYSTEM (2015)

ENGLISH - 1

SEMESTER 1


CREDITS: 2

NO. OF HRS: 30

GENERAL OBJECTIVE:
This course is designed to build spoken and written English competency of the students needed to function effectively in academic setup.

LEARNING OUTCOME:
This course is designed to help the students to

1. Speak and write grammatically correct sentences in English.
2. Develop effective writing skills.
3. Build fluency in English

UNIT: I GRAMMAR (10hrs)
1. Remedial Grammar: Parts of speech; Types of sentences, question tags
2. Modal verbs;
3. Tenses
4. Concordance

UNIT: II VOCABULARY (4hrs)
1. Word formation – prefixes and suffixes
2. Medical terminology
3. Words often misused or confused
4. Idioms and phrases

UNIT: III WRITING SKILLS (6hrs)
1. Letter writing - permission, leave and other official letters
2. Note making methods
3. Jumbled sentences - cohesion
4. Paragraph Writing

UNIT: IV SPOKEN COMMUNICATION (7hrs)
1. Pronunciation of commonly mispronounced words
2. Day to day conversation  
3. Telephonic conversations  
4. Group Discussions

UNIT : V LISTENING AND READING SKILLS (3 hrs)

1. General Listening and reading comprehension

Textbook Recommended:

2. English for Colleges and Competitive Exams by Dr. R. Dyvadatham, Emerald Publishers. (Approx. Cost Rs. 150)

References:
High School English Grammar and Composition by Wren & Martin.
J. C. Nesfield, English Grammar Composition & Usage, Macmillan India Limited.
Practical English Usage, Michael Swan
Speak in English, Lakshminarayanan,K.R
Practical Communication By Abraham Benjamin Samuel

Online sources:
http://www.letterwritingguide.com/
http://www.englishchick.com/grammar/

SRI RAMACHANDRA UNIVERSITY
SYLLABUS FOR CHOICE BASED CREDIT SYSTEM (2015)

ENGLISH - II

PLACEMENT:
SEMESTER II
COURSE : B.Sc., (E.T.C.T), B.Sc., (AHS), B.Sc., (Clinical Nutrition)
CREDITS: 2
NO. OF HRS: 30

GENERAL OBJECTIVE:
This course is designed to build spoken and written English competency of the students needed to function effectively in academic setup and clinical setup.

LEARNING OUTCOME:
This course is designed to help the students to

1. Speak and write grammatically correct sentences in English.
2. Develop effective writing skills needed for clinical task.
3. Build fluency in English needed for clinical tasks.

UNIT : I APPLIED GRAMMAR (10 Hrs.)

1. Identifying errors in sentences - word order, tenses, Prepositions
2. Transformation of sentences : Reported, Voice
3. USAGE: Either … or…, Neither… nor…, So… that…, Such… that…, Not only… but also…, unless…

UNIT: II VOCABULARY (3 Hrs.)
1. Abbreviations in Medical field
2. Medical idioms & Phrases

UNIT: III WRITING (6 Hrs.)
1. Letter writing - Letter to the editor
2. Curriculum Vitae, covering letter
3. Creative writing - invite, posters
4. Essay writing

UNIT: IV SPOKEN COMMUNICATION (8 Hrs.)
1. Telephone etiquette
2. Importance of Stress, Intonation and rhythm
3. Speaking:
   - Describing simple process
   - Filling a form etc., - Asking and answering questions
   - Debate/Oral Reporting

UNIT: V LISTENING AND READING SKILLS: (3 Hrs.)
Listening and reading comprehension exercises.

Textbook Recommended:
2. English for Colleges and Competitive Exams by Dr. R. Dyvadatham, Emerald Publishers. (Approx. Cost Rs. 150)

References:
High School English Grammar and Composition by Wren & Martin.
J. C. Nesfield, English Grammar Composition & Usage, Macmillan India Limited.
English for Nurses by Sharma Lohumi, Elsevier India Pvt. Ltd.
Professional English for Medicine, Eric H. Glendinning Ron Howard, Cambridge Publication.
Career English for Nurses by Selva Rose, Orient Black Swan.
Malcolm Goodale, Professional Presentations, Cambridge University Press.
Practical Communication By Abraham Benjamin Samuel.

Online sources:
http://www.letterwritingguide.com/
http://www.englishchick.com/grammar/

SRI RAMACHANDRA UNIVERSITY
SYLLABUS FOR CHOICE BASED CREDIT SYSTEM (2015)
SUBJECT: COMMUNICATION AND SOFT SKILLS
COURSE: B. Sc., (Biomed) PLACEMENT:
SEMESTER – III
CREDITS: 2 NO. OF
HOURS: 30 hrs.
GENERAL OBJECTIVE:
This course is designed to equip the students with communication skills needed both in academic and professional setup.
LEARNING OUTCOME:
This course is designed to help the students to
1. Build fluency in English.
2. Develop effective writing skills.
3. Communicate effectively in both academic and professional setup
4. Develop Interpersonal skills.

UNIT : I ASPECTS OF COMMUNICATION ( 4 hrs)
- Importance of communication
- Process,
- Barriers

UNIT: II SPEAKING ( 6 hrs)
1. Oral Reporting
2. Telephonic conversation and telephone etiquette
3. Seminars- Presentation Skills

UNIT – III READING: (6 hrs )
- Reading for different purposes
  • General Articles
  • Essays
  • Journal Articles
- Reading techniques
  • Skimming and scanning
  • Predicting the content
  • Understanding the Gist
  • SQ3R technique

UNIT – IV WRITING (7 hrs)
- Letter writing, Memos and Email
  • Techniques in writing
  • Paragraph and Essay writing
  • Report writing – Scientific writing

UNIT – V SOFT SKILLS (7hrs.)
1. Active Listening Skills
2. Assertive Skills
3. Body Language
4. Interview Skills

Prescribed reading: Bacon’s Essays: - Of Goodness and goodness of nature
- Of travel

Poetry: Death of a Bird – A.D. Hope


Reference Books:
2. English and soft skills by S.P. Dhanavel, Orient Black Swan
3. Effective English Communication by Krishna Mohan and Meenakshi Raman, Tata McGraw – Hill

Publishing Company Limited.

Online sources:
http://www.letterwritingguide.com/
http://www.englishchick.com/grammar/

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SRI RAMACHANDRA UNIVERSITY
SYLLABUS FOR CHOICE BASED CREDIT SYSTEM (2015)

ENGLISH - 1

PLACEMENT:
SEMESTER 1
CREDITS: 3
NO. OF HRS: 45

GENERAL OBJECTIVE:
This course is designed to build spoken and written English competency of the students needed to function effectively in academic setup.

LEARNING OUTCOME:
This course is designed to help the students to
1. Speak and write grammatically correct sentences in English.
2. Develop effective writing skills.
3. Build fluency in English

UNIT : I         GRAMMAR                                                            (14 Hrs)
1. Remedial Grammar : Parts of speech; Types of sentences, question tags
2. Modal verbs;
3. Tenses
4. Concordance
5. Transformation of sentences : Reported, Voice

UNIT : II       VOCABULARY                                                         (6Hrs)
1. Word formation – prefixes and suffixes
2. Medical terminology
3. Words often misused or confused
4. Abbreviations
5. Idioms and phrases;

UNIT : III      WRITING SKILLS                                                  (10 Hrs)
1. Letter writing - permission, leave and other official letters
2. Note making methods
3. Jumbled sentences - cohesion
4. Paragraph Writing (free writing on a given topic/autobiographical writing)

UNIT : IV   SPOKEN COMMUNICATION                                           (10Hrs)
1. Pronunciation of commonly mispronounced words
2. Day to day conversation
3. Telephonic conversations
4. Oral Reporting  
5. Group discussions  

UNIT : V  PRESCRIBED LITERATURE READING:  

POETRY  
- Ode to the West Wind by P.B. Shelley  

ESSAYS  
1. Bacon’s Essay - Of Parents and children  
2. Bacon’s Essay - Of ambition  
- Taken from Bacon’s Essays by Ramji Lall  

Textbook Recommended:  
2. English for Colleges and Competitive Exams by Dr. R. Dyvadatham, Emerald Publishers. (Approx. Cost Rs. 150)  

References:  
High School English Grammar and Composition by Wren & Martin.  
J. C. Nesfield, English Grammar Composition & Usage, Macmillan India Limited.  
Practical English Usage, Swan and Mitchael  
Speak in English, Lakshminarayanan.K.R  

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http://www.englishchick.com/grammar/  

SRI RAMACHANDRA UNIVERSITY  
SYLLABUS FOR CHOICE BASED CREDIT SYSTEM (2015)  
ENGLISH - II  
PLACEMENT:  SEMESTER  
II  
CREDITS: 3  
45  
NO. OF HRS: 45  

GENERAL OBJECTIVE:  
This course is designed to build spoken and written English competency of the students needed to function effectively in academic setup and clinical setup.  

LEARNING OUTCOME:  
This course is designed to help students to  
1. Speak and write grammatically correct sentences in English.  
2. Develop effective writing skills needed for clinical task.  
3. Build fluency in English needed for clinical tasks.  

UNIT : I  APPLIED GRAMMAR (10 Hrs)  
1. Identifying errors in sentences - word order, tenses, Prepositions  
2. Transformation of sentences : Reported , Voice  
3. USAGE : Either …or…, Neither… nor…, So… that…, Such… that…, Not only… but also…, unless…  

UNIT : II  VOCABULARY (6 Hrs.)  
1. Prefixes & suffixes – root word – Meaning (Medical)  
2. Medical terminology & abbreviations in Medical field  

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3. Medical idioms & Phrases (Medical)
4. Phrasal verbs

UNIT : III WRITING
1. Letter writing - Letter to the editor
2. Curriculum Vitae, covering letter
3. Creative writing – invite, posters
5. Paragraph writing- comparison, Comparison –contrast, interpreting graphs
6. Essay writing

UNIT IV : SPOKEN COMMUNICATION
i) Importance of Stress, Intonation and rhythm
ii) Describing a process ( General/ Specific)
iii) Oral reporting/Seminar
iv) Group Discussion/ Seminar/Debate

UNIT : V PRESCRIBED LITERATURE READING:
POETRY
Death of a Bird – A.D. Hope

ESSAYS
Bacon’s Essay - Of Goodness and goodness of nature
Bacon’s Essay - Of travel
Taken from Bacon’s Essays by Ramji Lall

Textbook Recommended:
2. English for Colleges and Competitive Exams by Dr. R. Dyvadatham, Emerald Publishers. (Approx. Cost Rs. 150 )

References:
High School English Grammar and Composition by Wren & Martin.
J. C. Nesfield, English Grammar Composition & Usage, Macmillan India Limited.
English for Nurses by Sharma Lohumi, Elsevier India Pvt. Ltd.
Professional English for Medicine, Eric H. Glendinning Ron Howard, Cambridge Publication.
Career English for Nurses by Selva Rose, Orient Black Swan.
Malcolm Goodale, Professional Presentations, Cambridge University Press.
Practical Communication By Abraham Benjamin Samuel.

Online sources:
http://www.letterwritingguide.com/
http://www.englishchick.com/grammar/

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SRI RAMACHANDRA UNIVERSITY
SYLLABUS FOR CHOICE BASED CREDIT SYSTEM (2015)
ENGLISH - 1

COURSE : BBA
SEMESTER 1
CREDITS: 4

GENERAL OBJECTIVE:
This course is designed to build spoken and written English competency of the students to function effectively in academic setup.

LEARNING OUTCOME:
This course is designed to help students to
4. Speak and write grammatically correct sentences in English.
5. Develop effective writing skills.
6. Build fluency in English
7. Enjoy and appreciate literary work.

UNIT I: POETRY & ESSAYS (6 hrs)

i) Poetry:
   • Gift by Alice Walker
   • Solitary Reaper by William Wordsworth.

ii) Bacon’s Essay - Of friendship

iii) Bacon’s Essay - Of ambition
   - Taken from Bacon’s Essays by Ramji Lall

UNIT II: GRAMMAR: (16 hrs)

i) Remedial study of grammar
ii) Modal Verbs
iii) Types of Interrogative sentences
iv) Concordance
v) Tenses

UNIT III: VOCABULARY (12 hrs)

i) Enlargement of vocabulary using Dictionary and Thesaurus
ii) Word Formation - Prefix and suffix.
iii) Words often confused and misused.
iv) Technical Terminology.
v) Idiomatic Usage and Phrases.

UNIT IV: WRITING SKILL (12 hrs)

i) Writing letters regarding permission, leave and other official letters.
ii) Note Making
iii) Paragraph Writing
iv) Creative Writing - Advertisement

UNIT V: SPOKEN COMMUNICATION (10 hrs)

i) Learning to read the phonetic symbols, Correct pronunciation of commonly mispronounced words
ii) Day – to- day conversations
iii) Organizing and presenting speech
iv) Telephonic conversations
v) Body Language

UNIT VI: LISTENING AND READING SKILLS (4 hrs)
i) General passages for comprehension

Textbook Recommended:
4. English for Colleges and Competitive Exams by Dr. R. Dyvadatham, Emerald Publishers. (Approx. Cost Rs. 150)

References:
High School English Grammar and Composition by Wren & Martin.
J. C. Nesfield, English Grammar Composition & Usage, Macmillan India Limited.
Practice English Usage, Michael Swan
Speak in English, Lakshminarayanan.K.R

SRI RAMACHANDRA UNIVERSITY
SYLLABUS FOR CHOICE BASED CREDIT SYSTEM (2015)

ENGLISH - II
COURSE : BBA
SEMESTER 2
CREDITS: 4
NO. OF HRS: 60

GENERAL OBJECTIVES:
This course is designed to build spoken and written English competency of the students to function effectively in academic setup and business set up.

LEARNING OUTCOME:
This course is designed to help students to
1. Develop effective writing of business letters.
2. Build fluency in English to present views and opinions and negotiation skills needed for business communication.
3. Speak and write grammatically correct sentences in English.
4. Develop a range of vocabulary needed for their general and professional tasks.
5. Enjoy and appreciate literary work.

UNIT I : POETRY & ESSAYS (6 hrs)
i) Poetry:
   - The Death of a Bird – A.D. Hope
   - Ode to the West Wind by P.B. Shelley

   ii) Bacon’s Essay - Of Goodness and goodness of nature
   iii) Bacon’s Essay - Of travel
   - Taken from Bacon’s Essays by Ramji Lall

UNIT II: APPLIED GRAMMAR: (16 hrs)
i) The correct usage of the structure of sentences and paragraphs.
ii) Active and Passive voice
iii) Reported Speech - Direct and Reported Speech – Tense changes in reported speech
iv) Conditional sentences
v) Prepositions
vi) Either ...or..., Neither ..... Nor......, So....that......, Such .....that....., Not only ....but also....., Unless....

UNIT III: VOCABULARY (12 hrs)
i) Phrasal verbs
ii) Professional English terms related to Management and Marketing.
iii) Business Idioms and Phrases

UNIT IV: WRITING SKILL (12 hrs)
i) Writing Business Letters and Circulars
ii) Minutes writing
iii) Preparing a survey Inventory
iv) Preparing resumes and Application
v) Paraphrasing

UNIT V: SPOKEN COMMUNICATION (10 hrs)
vi) Stress, Intonation and rhythm.
vi) Debate: Presenting Views and Opinions
vii) Preparing professional presentation

UNIT VI: LISTENING AND READING SKILLS (4 hrs)
i) General passages for comprehension

Textbook Recommended:

1. Developing Communication skills by Krishna Mohan and Meera Banerji, Macmillan India (Approx. Cost Rs. 220)

References:
High School English Grammar and Composition by Wren & Martin.
J. C. Nesfield, English Grammar Composition & Usage, Macmillan India Limited.
Anne Laws, Negotiations, Orient Black Swan Private Limited
Cate Farrall and Marianne Lindsley, Professional English in Use for Management, Cambridge University Press.
Arthur McKeon and Ros Wright, Professional English in Use for Marketing, Cambridge University Press.
Malcolm Goodale, Professional Presentations, Cambridge University Press.
Business Communication, ICFAI Center for Management Research.
Carol M, Lehman, Debbie D. Dufrene, Mala Sinha, BCOM: A south – Asian Perspective, Cengage Learning Pvt. Ltd.

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SRI RAMACHANDRA UNIVERSITY
SYLLABUS FOR CHOICE BASED CREDIT SYSTEM (2015)
FOUNDATION ELECTIVE FOR POST GRADUATES
FUNCTIONAL LANGUAGE SKILLS

CREDITS : 2
HOURS:30

GENERAL OBJECTIVES:
This course is designed to enable the students to enhance their proficiency in their language and
to acquaint them to their professional needs.

LEARNING OUTCOME:
The students will be able to
1. Speak fluently
2. Develop effective writing skills
3. Work collaboratively

UNIT – I
SPEAKING SKILL (6 HRS)
1. Art of public speaking
2. Giving opinion
3. Making presentation

UNIT – II
READING & WRITING SKILL (9HRS)
A. METHODS OF READING
1. KWL technique
2. SQ3R technique

B. WRITING
1. Creative writing
2. Sequencing of sentences
3. Paraphrasing skill
4. Art of condensation
5. Interpreting data

UNIT – III
PROFESSIONAL SKILL (4 HRS)
1. Elevator pitch
2. Facing an interview
3. Resume writing and cover letter

UNIT – IV
GRAMMAR (6 HRS)
1. REMEDIAL GRAMMAR
2. VOCABULARY
   a. Word formation
   b. One word substitution
   c. Homonyms
   d. Phrasal verbs & idioms

UNIT : V
SOFT SKILLS (5 HRS)
1. Verbal and non verbal communication & its barriers
2. Team building

3. SOCIAL COMMUNICATION ETIQUETTE
   1. Greeting
2. Introducing
3. Complimenting

Suggested Text Book:
Personality Development and soft skills by Barun K. Mitra

Reference Books:
2. Communication Skills for Engineers and Scientists by Sangeeta Sharma and Binod
Mishra, PHI
Learning Private Limited, New Delhi.

2. English and soft skills by S.P. Dhanavel, Orient Black Swan
3. Effective English Communication by Krishna Mohan and Meenakshi Raman, Tata
McGraw –Hill
Publishing Company Limited.

4. Technical Communication – Principles and Practice, by Meenakshi Raman and
Sangeetha
Sharma, II edition, Oxford University Press.
5. Developing Communication Skills by Krishna Mohan and Meera Banerji, II edition,
Macmillan.
(P) Ltd.,
New Delhi.

Online reference:
http://www.studygs.net/reading_essays.htm

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I Origin and Evolution of Biodiversity
General account on Darwin’s theory of evolution; The evolution of populations; Concepts of
species; Mechanism of speciation.
Three Domains of life–Archaea, Bacteria and Eukaryota;
Evolutionary relationship among the three domains.

II Bacteriology

Ultra structure of bacterial cell
Comparison of Archaebacteria and Eubacteria
Gram positive and Gram negative Bacteria
Bergey’s Classification of Bacteria
Shapes of bacteria
Reproduction- vegetative, asexual, sexual (conjugation, transformation and transduction)
Bacterial genome and plasmid
Economic importance of Bacteria

III Phycology

Cyanobacteria: Cell structure, thallus organization,
Structure and life history of Nostoc and Anabaena.

Outlines of Fritschs classification of algae
Types of alternation of generation
Range of vegetative and reproductions in Chlorophyceae, Xanthophyceae, Phaeophyceae and Rhodophyceae
Important features of life cycle of Oedogonium, Vaucheria, Ectocarpus, and Polysiphonia
Economic importance of Algae

IV Mycology

General characters and classification of Fungi
Range of vegetative structure and reproduction in fungi
Important features of life cycle of Pythium, Erysiphe, Aspergillus, Puccinia, Agaricus, and Alternaria.
General account of Lichens
Mycorrhizae,

V Virology

Discovery of Virus
Replication, lytic (T4 phage) and Lysogenic cycle (Lambda phage);
Types-DNA virus (coliphage T32), RNA virus (TMV), Retro virus (HIV);
Viriods and Prions

Text Books
4. Dubey R C and D K Maheswary : *A Text Book of Microbiology* : S Chand and Co
   New Delhi

Reference Books

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Learning objectives:
✔ To understand the relevance and importance of human rights
✔ To understand the relevance and importance of value education
To understand the regulations and help-groups that support human rights and value education

I Basic concepts: Rights, duties - Nature of rights: absolute/reasonable; universal/relativistic; discriminatory/justifiably differential; Linkage with core concepts of liberty, equality, fraternity and justice.

II Classification of rights and duties - Rights – moral, social, cultural, economic, civil and political; Duties – towards self, family, community, society, nation/state, humankind and mother earth.


IV General Problems Relating to Human Rights - Poverty and illiteracy; Discrimination – Caste, Class and Gender.

V Institutions for implementation of human rights – Human rights and duties in India, National human rights commission, Protection and enforcement of human rights and duties.

Learning outcome:

- To understand the human rights and value education from the national and global perspectives
- To obtain insights for the integration of such values in real-life situations

Text Books


Reference Books


Web Links

www.ohchr.org/EN/Issues/Pages/WhatareHumanRights.aspx
Learning objectives:

- To understand the principles, basic structure, functioning and application of instruments as can be utilized to study biological material.

I Accidents & Safety Measures
Basic causes of accidents, common types of laboratory accidents. Safety measures and first aid in laboratory.

II Distillation and calibration

III Units of measurement
S.I and CGS unit, strength, molecular weight, equivalent weight, normality, molarity, molality. Calculations in grams and moles, Solutions and their concentrations.

IV Concept of pH & Measurement
Definition, PKa value, methods of measurement of pH, pH paper, pH meter.
Analytical balance- Principle, working, maintenance.

V Error in chemical analysis
Accuracy, precision, methods of eliminating or minimizing errors. Methods of expressing precision: Mean, median, deviation, average deviation and coefficient of variation.

Learning outcome:

- To gain competency in the principles governing instruments commonly applied to study biological material.
- To gain competency to proper reporting of results in terms of units of measurements, etc.

Text books
1. Text Book of Practical Clinical Biochemistry by Harold Varley
3. Text book of Medical Biochemistry by Chatterjee Shinde
Reference Books
1. R. Gopalan, Analytical Chemistry, S. Chand and Co., New Delhi

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Learning objectives:
- To understand the concepts, significance and relevance of public health and hygiene
- To understand the health hazards as associated with public health and hygiene

I Introduction
Definition and Concept of Public Health, historical aspects, public health system in India and in the rest of world

II Aspects of health

III Epidemiology
Introduction, principles and concepts, study design, analysis methods, presentation and interpretation of epidemiological data

IV Hygiene concepts
Definition, importance, personal hygiene, medical hygiene, food hygiene, industrial hygiene.

Learning outcomes:
✓ To understand public health and hygiene issues, their relevance and significance as can be practiced in real-life situations.

**Text Books**


**Reference Books**

2. An Introduction to Public Health, Caryl Thomas, 1949, John Wright and Sons Ltd.,

**Web links**

### B. LIST OF Skill Enhancement Courses (SEC) - (SE) OFFERED BY SRU DEPARTMENTS

<table>
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### Objectives

**To impart knowledge on concepts of**

**On successful completion of the course, the student will be able to understand**

### Regulatory issues in Biotechnology

**UNIT 1**

UNIT 2  
Biosafety containment facilities, biohazards, genetically modified organisms (GMOs)(microorganisms, plants and animals), living modified organisms (LMOs) and their regulations and maintenance

UNIT 3  
Drug safety and efficacy, pre-clinical and clinical studies. Market approval pathways for new drugs /biopharmaceuticals/biologics in USA, Europe, Japan and India. Orphan drug laws; clinical trials and its regulation; patent expiry and entry of generics and biosimilars

UNIT 4  
Agricultural Biotechnology – transgenic plants, advantages and disadvantages of transgenic plants; effect of on ecosystem, food chain, regulation of the modified plants

UNIT 5  
Animal Biotechnology – generation of transgenic animals, animal models, stem cells – their applications and regulations; impact of these organisms on the society and environment

Text Books:

2. “Clinical Trials or Drugs and Biopharmaceuticals.” Lee, Chi-Jen; etal., CRC / Taylor & Francis, 2011

Online Resources:

http://icmr.nic.in/bioethics.html
http://www.agbioforum.org/v3n4/v3n4a15-belson.html
http://www.biotech-now.org/tag/biotech-regulatory-issues

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Objectives

To impart knowledge on concepts of intellectual property rights (IPR) and its importance

Learning outcomes

On successful completion of the course, the student will be able to understand the issues related to IPR and the impact of IPR in the society

IPR issues in Biotechnology
UNIT 1  Concepts of Technology and Technology Transfer. Role of IPRs in Technology Transfer. Trade-Related Aspects of IPRs (TRIPs). WTO. Patents. IPR protection worldwide.


UNIT 3  Implications of technology transfer. Intellectual property, protection of IPR: Choice of IPR protection, foreign patent protection, ownership and transfer of patent rights, employment contracts, management of IPR

UNIT 4  Biotechnology and Patents: Protection of biotechnological inventions, patenting of genes, DNA sequences & genetic resources, patenting life forms, broad patents in biotechnology, biotechnology industry & patents, patent imbroglio, PBR,

UNIT 5  Benefits and problems from IPR, IPR and developing countries, ICBD, Indian response to IPR upheaval

Text Books:


Online Resources:

http://agropedia.iitk.ac.in/content/intellectual-property-rights-issues-and-concerns

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Semester – ODD/EVEN; Category: Skill Enhancement Courses (SEC) - (SE)
### QC and Certification of Labs

**UNIT 1**
Objectives of QC, Customer Satisfaction, Capability; Terms Relating to Management, Management System, Quality Management System, Quality Policy, Quality Planning, Quality Control, Quality Assurance, Quality Improvement, Continual Improvement, Effectiveness, Efficiency; Relating to Process and Product - HACCP

**UNIT 2**
Validation and Regulatory Affairs: An Introduction to FDA Operations & Industry Compliance Regulations, The Fundamentals of Regulatory Compliance with respect to Good Clinical Practice (GCP), Good Manufacturing Practice (GMP), Good Laboratory Practice (GLP), Good Hygiene Practices (GHP).

**UNIT 3**
An Introduction to the Basic Concepts of Process Validation & how it Differs from Qualification (IQ, OQ & PQ) Procedures, A Review of Prospective, Concurrent, Retrospective Validation & Revalidation including the use of Statistical Process Control (SPC) Techniques.

**UNIT 4**
Overview of methods of evolution, FDA and ICH guidelines, Development and validation, Basic statistical concepts, Specificity: sample preparation, separations,: detectors, Linearity, Accuracy, Precision, Limits of detection (LOD) and quantification (LOQ), Minimum detectable amount (MDA), Sample stability and method robustness

**UNIT 5**


**Text Books:**


Online Resources:
1. http://www.foodsafety.unl.edu/haccp/

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Objectives
To impart knowledge on concepts of bioethics, human and animal ethics and their regulations

Learning outcomes
On successful completion of the course, the student will be able to understand human and animal ethics and apply it in their research

**Bioethics**

**UNIT 1**

Introduction:

Introduction to Bioethics: Principles of Bioethics in Biomedical Research

Use of Animals in Biomedical Research: Guidelines by CPCSEA on the norms, practices, facility, care and use of the animals used in experimentation

**UNIT 2**

Acts and Rules in Bioethics for animal experimentation: Prevention of cruelty to animals, breeding of animals used for experimentation, Experimentation on animals

**UNIT 3**

Ethical consideration on human participants: Ethical guideline for Biomedical Research on Human participants. Ethical Review Procedures.

**UNIT 4**


**UNIT 5**

Role of NIH on bioethical issues, Role and Responsibility of IEC, IRB and FERCAP. Funding for Bioethical Research, Protection of third party information in Research.

**Text Books:**
2. A Companion to Bioethics, edited by Helga Kuhse and Peter Singer

Online Resources:

1. http://icmr.nic.in/bioethics.html

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Objectives

To understand the fundamental in database management

Learning outcomes

On successful completion of the course, the student will be able to understand

Database system, Datamodels, SQL etc..

UNIT 1 Introduction

Database System Versus File Systems, Characteristics of Database, Database Concepts, Data Models, Database Languages & Interfaces, Database System Structure, Database System Applications

UNIT 2 Data Models

ER Model: Keys, Constraints, Design Issues, Extended ER features, Reductions of ER Schema to Tables. Relational Model: Structure, Relational Algebra; Hierarchical Model, Network Model

UNIT 3 Structured Query Language

Basic Structure, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Integrity: Domain constraints, Joined Relations.

UNIT 4 Relational Database and Storage

Pitfalls in Relational Design Database, Functional dependencies, Decomposition Normal Forms – 1NF, 2NF, 3NF & Boyce-Codd NF, Data Storage – Ordered indices, Hashing concepts - Security and Authorization
UNIT 5  Concurrency control techniques & Information retrieval


Text Books:

Reference Books:

Online Resource:

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<tbody>
<tr>
<td>To understand the fundamental in Web designing.</td>
<td>On successful completion of the course, the student will be able to understand Internet, HTML, Java script.</td>
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Web Designing

UNIT 1  Web Fundamentals


UNIT 2  Introduction to HTML

Concept of Web server, web client, Basic HTML tags, structure of an HTML program,
text formatting, text styles, lists, images, tables, links, image maps, frames, forms.

**DHTML**

**UNIT 3**  *Introduction to Java script*

Embedding Java script in web pages, Basic programming techniques, data types and literals, type casting, variables, arrays, operators, programming constructs, functions, dialog boxes, Javascript document Object model, handling of various objects like window, location, Navigator, history, document etc, handling web page events using Javascript.

**UNIT 4**  *Web Hosting: Creating the Web Site; Saving the site; Working on the web site; Creating web site structure; Creating Titles for web pages; Themes-Publishing web sites*

**UNIT 5**  *Web designing tools: Adobe Photoshop: Introduction; Pixlr: Introduction, tools available; Ink designing tool: Introduction; Invision Designing tool; Infogram Designing tool.*

**Text Books**


**Reference Books**


**Online Resource**

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**Objectives**

To impart knowledge on concepts of scientific writing and SPSS tools

**Learning outcomes**

On successful completion of the course, the student will be able to understand and apply good scientific writing skills in their publications.

---

**Scientific communication and SPSS tools**

**UNIT 1**

**Introduction:**

Introduction to scientific writing; writing a professional resume

**UNIT 2**

Oral and Poster presentation: constructing and delivering effective technical presentations; design and create a scientific poster

**UNIT 3**

Scientific writing: writing technical reports – types of technical reports, effective packaging of your work and results; writing a publishable scientific paper

**UNIT 4**

Developing competitive and persuasive research proposals: survey of funding, establishing timeline, formulation of content, proposal packaging, the competition and reviewers

**UNIT 5**

SPSS: brief description and history of SPSS, creation of a small data file and computation of new variables, descriptive statistics, comparative statistics, graphing and printing data

**Text Books:**


**Reference Books:**


Online Resources:

1. http://www.sciencecommunication.info/

2. https://blogs.nottingham.ac.uk/makingsciencepublic/2013/05/21/science-communication-bridging-theory-a
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Student Advisor: [Signature:]
Head of Department: [Signature:]

Time of Submission: [Date]

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