SRI RAMACHANDRA
MEDICAL COLLEGE AND RESEARCH
INSTITUTE (DEEMED UNIVERSITY)

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
Updated upto 2018
683
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Revised and Updated upto June 2018
## Elective Courses Offered Under the CBCS, 2015 updated upto June 2018

### A. LIST OF GENERIC ELECTIVE COURSES OFFERED BY SRU DEPARTMENTS [Credits = 3]

<table>
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<tr>
<th>S. No.</th>
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## Faculty of Biomedical Sciences & Technology

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## Faculty of Management Sciences

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## SRMC & RI

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**Faculty of Physiotherapy**

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*Courses included from 2017 onwards as theory or practicals.*

**B. LIST OF ABILITY ENHANCEMENT COURSES OFFERED BY SRU DEPARTMENTS [Credits = 2]**

**Faculty of Allied Health Sciences**

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**Faculty of Biomedical Sciences & Technology**

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* Syllabus provided in the respective programmes*
## C. LIST OF SKILLS ENHANCEMENT COURSES OFFERED BY SRU DEPARTMENTS [Credits = 2]

SE- indicates Theory Courses; SL- indicates Practical Courses

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Generic, Ability & Skills Enhancements Electives
### Generic Elective and Skilled Enhancement Course

**GENERIC ELECTIVE AND SKILLED ENHANCEMENT COURSE**

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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 Allied Health Sciences - Department of Clinical Psychology

<table>
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<tr>
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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)

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Course Transactor: Ms. Rishikulya.A, Student Counsellor,< kulyarishi@gmail.com>

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

ORGANIZATION BEHAVIOUR

Unit I: Basics of Organizational Behavior (OB)
Introduction - Definitions - Contributing fields to organizational behaviour and Behaviour model for organizational efficiency-Organizational components that need to be managed

Unit II: Evolution of Management Concepts
Classical theories of management- Process management theory - Classical theories - Human relations era, Hawthorne studies, Need Hierarchy Theory, X and Theory Y. Modern management theories: Re-engineering, Bench marking, Empowerment,
Unit III: Personality, Learning and Motivation in Organization
Introduction - Determinants of personality - Personality traits The Myers-Briggs Type Indicator (MBTI), Locus of control, Self esteem and self monitoring - Risk taking - Types of personality. Theories of learning-Processes

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 and Stress Management

LEARNING OUTCOMES:
At the end of the course student will learn about
- The basic concepts of organizational behaviour
- Will understand about the concept of modern management emerged
- They will understand about the key concepts of psychology which are applied in organizational behaviour
- 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:
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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LEARNING OBJECTIVES:
To understand the importance of behavioural 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 health promotion

HEALTH BEHAVIOUR

Unit I - Introduction

Unit II – Links between stress, personality and illness
Personality and illness: Psychosomatic medicine – the four humors and personality – Eysenck’s personality dimensions – type A and B personality – locus of control
Unit III - Major lifestyle diseases I
Coronary Heart Disease (CHD): Psychosocial risk factors – modification of risk factors – psychological management of Cardio vascular diseases

Unit IV - Major lifestyle diseases II
Diabetes: Types of diabetes – lifestyle changes as a cause for diabetes – management
Cancer: Psychological factors related to cancer – cancer related health behaviour – psychological intervention

Unit V - Health enhancing behaviours
Promoting health: Role of behaviour in disease and disorder – health related behaviours: healthy diet, sleep and health, benefits of exercise – accident prevention

LEARNING OUTCOMES:
By the end of the course the students will be able to
Appreciate the impact of behavioural and psychosocial components 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 prevention of illness and health promotion

Text Books:

References Books:

Online Resources:
✓ 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)
✓ Health news http://www.health-e.org.za/health-categories/

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Course Transactor: Ms. Rishikulya.A, Student Counsellor;<kulyarishi@gmail.com>
Learning Objectives

- To understand the basic concepts of psychology related to Human Behaviour
- To understand the Individual differences in Learning, memory, Intelligence and motivation
- To understand the nature of emotions and its role in human interactions.

27. Basic Psychology

Unit-1
Definition- Methods in psychology- Brief history of psychology and the various perspectives –Models of mind – Brain and Behaviour.

UNIT -2
Sensation and Perception: Basic concepts in sensation-Absolute threshold, Sensory adaptation-Vision and Hearing perception- Depth Perception, perceptual Constancies- illusions- Attention-determinants of attention

Memory: Stages of memory- Kinds of Memory- process of memory- long term memory- Forgetting-Methods for improving memory.

UNIT-3
Emotions -Physiology of Emotion-Autonomic changes-Brain and Emotion arousal- patterns of bodily response

Learning –Conditioning – Classical conditioning-Operant conditioning- principles of reinforcement-kinds of reinforcement- Individualized learning

UNIT-4

UNIT-5
Intelligence: Nature of Intelligence- Measurement of Intelligence, Characteristics of Intelligence tests, Types of tests.

Motivation :Motives , Needs, Drives and incentives- Biological motives- Hunger , thirst, sleep, sex, Stimulus motives , Sensory stimulation, affiliation, achievement, Power , Aggression, Frustration and conflicts of motives.

LEARNING OUTCOMES:

At the end of the course students will learn:

- To understand the key concepts and principles of psychology
- To understand the relationship between brain behaviour mechanism
- To explain various concepts like perception, memory and learning
- To describe the role of motivation, intelligence and attitude in human behaviour.

REFERENCES

Text books:
Reference books:

Online Resources:
1. Psychology Basics: [http://psychology.about.com/od/psychology101/u/psychology-basics.htm](http://psychology.about.com/od/psychology101/u/psychology-basics.htm)
2. Introduction to psychology: [http://psych.wisc.edu/braun/281/Outlines.html](http://psych.wisc.edu/braun/281/Outlines.html)

### DEPARTMENT OF PSYCHOLOGY
### UG SEMESTER 1

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Course Transactor: Dr. P. N. Thomas

**LEARNING OBJECTIVES:**

- To create awareness about addiction and its dangers
- To be able to identify if anyone is using a drug and what to do to help
- To be able to develop a prevention programme

**Psychology of Addiction**

**Unit I:** What is addiction? How is it different from abuse and harmful use?

**Unit II:** Signs of intoxication and withdrawal features of commonly used substances such as alcohol, nicotine, cannabis, opiates and sedatives

**Unit III:** What are the reasons for a person to become addicted to a substance? What is the role of genetic and environmental factors in the development of addiction?

**Unit IV:** What to do to help an addict? Predominant psychological methods used in the management of addiction. Prevention strategies.

**LEARNING OUTCOMES:**

At the end of the course student will

- be aware of addiction and its dangers
- be able to identify if a person is using any of the commonly used substances and know what to do to help
- know about the risk factors for the development of addiction
- be able to develop a prevention strategy

**REFERENCES**

Text books:
Reference books:


Faculty Allied Health Sciences - Department of Accident and Emergency Medicine

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Department of Accident and Emergency Medicine

**UG SEMESTER 2,4,6**

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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 aide
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

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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<td>Airway Management ECG &amp; Emergency Drugs</td>
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</table>

**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 – Padsma 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
Text Books:

Reference Books:

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<th>Course Number</th>
<th>Course Code</th>
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<td>3</td>
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</table>

Learning objective: This course highlights on 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 personnel
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 personnel
- To have in depth knowledge on the role of vision therapists in handling sports personnel

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](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
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Elective Code</th>
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<tr>
<td>11</td>
<td>AGE011</td>
<td>Functional Foods and Nutraceuticals for Health Promotion</td>
</tr>
<tr>
<td>12</td>
<td>AGE012</td>
<td>Nutrition Support Techniques</td>
</tr>
<tr>
<td>13</td>
<td>AGE014</td>
<td>Occupational Nutrition</td>
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<tr>
<td>14</td>
<td>AGE015</td>
<td>Malnutrition and Public Health</td>
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<tr>
<td>15</td>
<td>AGE016</td>
<td>Basics of Food and Nutrition</td>
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<td>16</td>
<td>AGE017</td>
<td>Food and Nutrition In Emergencies</td>
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**Department of Clinical Nutrition**

**IN/PG SEMESTER 3,5,7**

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<td>AGE 011</td>
<td>Functional foods and nutraceuticals for health promotion</td>
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**Objectives**

3. To impart knowledge about nutraceuticals
4. 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


III- Introduction to functional foods


IV - Functional foods and health

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Generic, Ability & Skills Enhancements Electives 26
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:

3. Comprehend the application of nutraceuticals for the benefit of human beings.
4. 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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<table>
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</table>
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

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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
5. To understand the compromised nutritional status with regards to the occupation to the individual and family.
6. 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

Department of Clinical Nutrition
UG Semester 2,4,6

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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 lifestyle 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.nutritionssociety.org/publications/nutrition...journals/public-health](http://www.nutritionssociety.org/publications/nutrition...journals/public-health)
3. [www.nutritionssociety.org](http://www.nutritionssociety.org)
4. [www.internationalmedicalcorps.org/](http://www.internationalmedicalcorps.org/)
5. [www.internationalmedicalcorps.org/](http://www.internationalmedicalcorps.org/)
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 – Macronutrients
Macro Nutrients: carbohydrates, lipids and protein-their occurrence in the body –composition, classification; functions, dietary sources and daily recommended allowances.

IV - Vitamins

V - Minerals

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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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

**Website References:**

1. [www.learnwarecorp.com](http://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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### Generic Elective/ Ability Enhancement Courses Offered – Faculty of Allied Health Sciences

<table>
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<tr>
<th>S. No.</th>
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<td>AGE 022</td>
<td>Exercise Psychology</td>
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<td>Even</td>
<td>AHS</td>
<td>Arthroscopy and Sports Medicine</td>
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</table>
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:
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:
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 IV:
Cardiopulmonary exercise testing- indications, types and interpretation.

Recommended/Suggested Textbooks:
- Katch and Katch Exercise Physiology
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

Department of Arthroscopy And Sports Medicine
PG SEMESTER 3,5, 7

<table>
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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:
### Department of Allied Health Sciences

Course Transactor: P.Vijayalakshmi Anbu

<table>
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<td>Pranayama Exercises</td>
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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)
PRANAYAYAMA

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 Techninques- Surya Bhedha, Chandra Bhedana, Ujjayi, Sitali, Sitkari, Bhastrika, Nadi Suddhi, Kapalabhati, Sectional Breathing

REFERENCE BOOKS
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)
5. B.Natarajan: Thirumantiram (Atamil Scriptural Classic) (Sri Ramakrishna Math, Madras.)
OBJECTIVES
On completion of course, students will be able to
- Explain the streams, paths of yoga
- Practice and understand the benefits of asanas, pranayama, and dhayana
- Know about general guidelines for practicing yoga

UNIT –I
Important definitions of yoga, aims and objectives of yoga, Streams of yoga-karma yoga, bhakthi yoga, jana yoga, raja yoga, hatha yoga, yoga aphorism of patanjali and thirumoolar.

UNIT-II
Definition-Asanas, objectives of asanas, physiological benefits of asanas, Definition pranayama, Physiological changes in pranayama, difference between yogasanas and physical exercises, basic rules of practice-the Do’s and the Don’ts, Classification on the basis of starting position. Dhyana(Meaning &Concept of Meditation)

UNIT-III (practical)
I. Simplified physical exercises(Dynamic Breathing Exercise)
II. Suriyanamaskar,
III. Asanas,
IV. Pranayama
   a. ujjayi,
   b. sitthali,
   c. nadi shuththi,
V. Dhyana (Meaning &Concept of Meditation)

UNIT-IV (practical)
Dynamic breathing exercises, suriya namashar and asanas.

Standing Asanas:
1. ardhakatichakrasana,
2. padahastasana,
3. ardhachakrasana,
4. uttkatasana,
5. Ekapada asana.

Sitting Asanas:
1. padmasana,
2. paschimotanasanas,
3. ushtrasana
4. gomukasana,
5. ardhamatsyendrasana

Prone:
1. Makrasana
2. Bhujangasana
3. Ardha salabhasana
4. salabhasana
5. dhanurasana

Supine:
1. navasana
2. uttanapadasana,
3. sarvangasana,
4. matsyasana
5. chakrasana
6. shavasana

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: Dr. P. VIJAYALAKSHMI, SENIOR LECTURER IN PSYCHOLOGY < vijayalakshmianbu@gmail.com>

OBJECTIVES
- Understand the respiratory system
- Explain the types of breathing
- Understand and practice the practical aspects of pranayama
➢ To know the special pranayama techniques

UNIT –I
Respiratory system, Types of breathing, 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 (Practical)
Difference between pranayama and breathing exercises, Breathing practices: Hands in and out, Hands stretch, Ankle stretch, Rabbit, Dog, Tiger, Straight leg raising breathing; Breath Awareness: Shwas-prashwas samyama; Abdomen, Thoracic & Clavicular Breathing, Abdomen + Thoracic Breathing, Abdomen + Thoracic + Clavicular Breathing; Yogic Breathing: Pause Breathing (Viloma Pranayama), Spinal Passage Breathing (Sushumna Breathing); Practice of Puraka, Rechaka & Kumbhaka (Antar & Bahya Kumbhaka)

UNIT-IV (Practical)
Specific Pranayama Techniques- Surya Bhedha, Chandra Bhedana, Ujjayi, Sitali, Sitkari, Bhastrrika, Nadi Suddhi, Kapalabhati, Sectional Breathing

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

Department of Speech, Language and Hearing Sciences

<table>
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<tr>
<th>S. No</th>
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<td>Noise exposure and its effects</td>
<td>Speech Language &amp; Hearing Science</td>
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<tr>
<td>23</td>
<td>AGE029</td>
<td>Basic concepts in Voice and its efficient use</td>
<td>Speech Language &amp; Hearing Science</td>
<td>3,5,7</td>
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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.

22. 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:


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.

23. 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/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
3. www.udemy.com/enhance-your-speaking-voice/
24. Fundamentals of Occupational Health

**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)
   - Role of environmental and occupational health professionals
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:

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25. Biomedical Waste Management

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:


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<td>2</td>
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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 sin cell division, cell to cell communication.

29. 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

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**


<table>
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<tr>
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**Department of Human Genetics**

**PG SEMESTER 2,4,6**

**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.

**31 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 cyto genetic 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
cardiovascular biology and wound healing.

32. 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

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

<table>
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Course Transactor: Dr. Jamuna R. Subramaniam, Associate Professor, CPTMR, CRF, SRU

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

33. 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 – antagonists; Genes and their effects

III – Selection of the model systems

Reductionist approach – Choice of the model organism- Aplysia- 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

<table>
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<th>SL. NO.</th>
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<td>3,5,7</td>
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Department of Biomedical Sciences
UG SEMESTER 1

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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

34. 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
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

UNIT I Modern Lifestyle 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.dailydiet.in
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 pharamaceutical 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

The table below represents the course information for the Department of Biomedical Sciences.

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<tr>
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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.

<table>
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<tr>
<th>Course Number</th>
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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

38. 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

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**Department of Biomedical Sciences**
**UG SEMESTER 2, 4, 6**

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**Learning objective:**
➢ To enable the students to have a clear understanding of dietary management in health and disease condition.

**39. Nutrition in Health & Disease**

**UNIT I** Definition for Nutrition, balanced diet-carbohydrate, lipids, proteins, vitamins, minerals. PCM - Kwarshiorkar 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
2. Nutritional Biochemistry - Swaminathan

Reference books
1. Human Nutrition – Catherine Geissler and Hilary Powers
3. Lipid disorders-John Reckless and Jonathan Morell
4. Diet management –Rekha Sharma

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Basic Radiation Biology

Learning Objectives:
- To gain fundamental knowledge regarding the interactions of radiation with the biological systems at molecular, cellular and systemic levels leading to death, cancer and mutation
- To understand mechanisms underlying biological responses of humans (and other living beings) to ionizing and non-ionizing radiation
- To gain insight into the various applications of radiation in biomedicine as well as approaches for protecting the biological systems from harmful effects of radiation

Unit I: Fundamentals of radiation physics and radiation chemistry (6 h)

- a. Electromagnetic radiation and radioactivity
- b. Radiation sources and radionuclides
- c. Measurement units of exposed and absorbed radiation
- d. Interaction of radiation with matter, excitation and ionization
- e. Radiochemical events relevant to radiation biology
- f. Interaction of radiation with biomolecules: Nucleic acids, proteins, lipids and carbohydrates
### Unit II: Cellular effects of radiation (12 h)
- a. Effects of ionizing and non-ionizing radiation on cells, DNA, chromosomes and membrane
- b. Clonogenic cell survival; Concept of RBE and OER
- c. Recovery from sub-lethal and potentially lethal damage
  - d. Repair of radiation-induced DNA damage; various DNA repair pathways
  - e. Division delay and cell cycle check points
- f. Radiation-induced cell death; apoptosis, necrosis and autophagy
- g. Radiation-induced mutation
- h. Low dose hypersensitivity
- i. Bystander effects
- j. Radiation-induced alterations in signal transduction

### Unit III: 1. Radiation-induced cytogenetic damage and biological dosimetry (9 h)
- a. Radiation-induced cytogenetic damage; Chromosome aberrations (CA) and micronuclei formation (MN)
- b. Dosimetry using CA, MN and mutation assays
- c. Biomarkers of radiation exposure
2. Systemic effects of radiation (6 h)
- a. Acute, delayed and late effects of radiation (with particular reference to nervous system, gastrointestinal and hematopoietic syndrome).
- b. Radiation-induced carcinogenesis

### Unit IV: 1. Modification of cellular and systemic responses to radiation (6 h)
- a. Protection, mitigation and therapy of radiation damage
- b. Biological basis of ICRP recommendations
  - c. Radiosensitization of tumors
- d. Tumor Physiology and Radiation Response
- e. Immune modulation and radiation response of tumors
2. Applications in Radiation Medicine (6 h)
- a. Radiation Therapy: External beam therapy, Brachy therapy and radiosurgery
- b. Therapeutic nuclear medicine
- c. Sterilization of medical products

**LEARNING OUTCOMES:**

At the end of the course, students will learn about the biological effects of radiation with good understanding of the benefits and risks of using radiation in a variety of applications

**REFERENCES**

**Text books:**

1. *Introduction to Radiation Biology*
P. Uma Devi, A. Nagarathnam and B. S. Satish Rao
   Bi Publications Pvt Ltd; 2000
   ISBN: 9788170421641

2. *Radiobiology for the Radiologist*
   Eric J Hall & Amato J Giaccia
   Lippincott Williams and Wilkins; Wolters Kluwer

**Reference books:**

1. *An Introduction to Radiobiology*
   A.H.W. Nias
2. Basic Clinical Radiobiology
G. Gorden Steel
Hodder Arnold Publication; 3rd Edition; 2002
Oxford University Press

3. Biological Radiation Effects
J Kiefer
Springer-Verlag; 1990
ISBN: 10-0387510893; 13- 97800387510897

4. Cellular Radiobiology
T. Alper
Cambridge University Press : 1979
ISBN 0-521 22411 X (Hard); ISBN 0-521 99479 7(Soft)

5. Introduction to Radiobiology
Maurice Tubiana, J. Dutreix, A. Wambersie
Taylor & Francis

6. Essentials of Radiation Biology and Protection
Steven Forshier
Thomson Delmar Learning
ISBN: 0766813304

7. Mechanisms in Radiobiology
M. Errera & A. Forssberg
Academic Press Inc., U.S.

Online Resources:


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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

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

### Department of Bioinformatics

**UG SEMESTERS**: 2, 4, 6; 3, 5, 7

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### 41. Introductory 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/ OPENEPI / 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

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42. 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

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<th>PG/IN Semesters 2, 4, 6</th>
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43 - BIOINFORMATICS

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

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
3. BLAST. The Definitive Guide. Basic Local Alignment Search Tool – Korf, Yandell, Bedell
4. Introduction to Bioinformatics - Attwood, Smith, Parry-Smith
44. 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 IV - Data Analytics - Data Mining - Artificial intelligence - Big Data issues- Mobile Computing - Health Care Information System Planning.


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

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**45 - 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 Cheminformatics by Muthukumarasamy Karthikeyan, Renu Vyas, Springer India, 2014
3. Cheminformatics by Frederic P Miller, Agnes F Vandome, John Mc Brewster, alphascript publishing, 2010

Generic Elective (GE) Courses Offered – Faculty of BMST & R

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## Department of Biotechnology – Generic Elective (GE)

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**Objectives**

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.

### 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; ProteinNanoarrays - 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 field detection (Point-of-Care Diagnostics), Colorimetric detection of NA using NPs,

UNIT 5  **Nanobarcodes and imaging:** Nanobarcodes Technology - Nanobarcode Particle Technology for SNP Genotyping - Qdot Nanobarcodes for Multiplexed Gene Expression Profiling - BiobarcodeAssay for Proteins; Single-Molecule Barcoding System for DNA Analysis; Mammalian (Myosin family) Nanobiosensors: Science of Self-assembly - From Natural to Artificial Structures Nanoparticles in Biological Labeling and Cellular Imaging.

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

**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/
Course Number | Course Code | Course Title             | L | T | P | C | Total Hours |
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47 | BGE 027 | Health care Biotechnology | 3 | 3 |  |  | 45 |

**Objectives**

- 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

**Learning outcomes**

**UNIT 1**

**Health care Biotechnology**

**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 4**

**Organ Specific therapeutics & Chemotherapeutic Agents:** Basic concepts and novel advances, Brain-specific drug targeting strategies. Pulmonary drug delivery.

**UNIT 5**

**Cell specific drug delivery.** Synthesis of antibacterial agents - serine protease, antifungal, antiprotozoal, Antihelminthic agents, Antiamoebic agents, Antiviral agents Radiological Agents: Radiosensitzers and Radioprotective agents

**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)
Department of Biotechnology  
UG Semester 2, 4, 6

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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

UNIT 4-6

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

### Department of Biotechnology
**UG Semester 2,4,6**

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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

**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 Practical:

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.microbiolab-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.
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 nanomaterials and their applications

Learning outcomes

On successful completion of the course, the student will be able to understand the applications of nanoparticles
Nanotechnology
Theory cum demonstration

UNIT 1
Introduction: History of Nanoscience; nanomaterials, nanosized effects surface to volume ratio, nanoscale molecular and atomic size, quantum effects.

UNIT 2
Nanomaterials: Synthesis of nanoparticles and nanofabrication – bottom up and top up approaches; chemical methods (sol-gel, sonochemical, solvothermal); physical methods (mechanical milling), colloidal routes and biological methods (microbes, green chemistry); Types of nanomaterials (Gold, Silver, Carbon, Ferro magnetic); Quantum dots; Graphene and Fullerenes.

UNIT - 3
Characterization of Nanoparticles: Structure and Size characterization of nanoparticles: XRD, TEM, SEM, AFM, Light scattering, UV-Vis spectroscopy, Surface Plasmon resonance, EDAX, ICP-MS; Properties of nanoparticles – rods, spheres, nanotubes (Gold, Silver, Carbon, Ferro magnetic)

UNIT - 4
Principles of Bionanotechnology: Energetics; Chemical transformation; Biomolecular Motors; Biomaterials; Traffic across membranes; Biomolecular sensing; self-replication

UNIT - 5
Nanosensors: Optical based detectors; Mechanical detectors; Lateral Flow; Electrochemical detectors; magentic sensors; applications of the various sensors in science.

UNIT - 6
Nanomedicine: Targeted delivery - drug, nucleic acid, Theranostics, Nanobodies, Antimicrobial activity of NPs. Toxicity of nanoparticles and their management, Bioethics and societal implications of nanotechnology

Text Books
2. Chemistry of Nanomaterials: Synthesis, properties and applications by CNR Rao et al.,

Reference Books
3. Biomolecule-Based Nanomaterials and Nanostructures Itamar Willner* and Bilha Willner DOI: 10.1021/nl102083j | Nano Lett. 2010, 10, 3805–3815

Online Resources:
NPTEL.nic.in
http://nanohub.org/groups/biomed
Department of Biotechnology
PG Semester 2, 4, 6

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Objectives

To impart knowledge on
1. Various Toxicity Tests
2. *In vitro* and *In vivo* bioassays

Learning outcomes

On successful completion of the course, the student will be able to:
- Determine the LD$_{50}$ value of the drug
- Determination of Minimum Inhibitory Concentration of the Antibiotic
- Bioactivity of the drug

Alternative models for Experimental Toxicology

Unit 1 Introduction to pharmacology & toxicology, history, classification of drugs and toxicants, Routes of exposure of toxicants.

Unit 2 Preclinical Toxicology: Acute toxicity, chronic toxicity, local tolerance study, immunotoxicity studies, genotoxicity, carcinogenicity studies, reproductive toxicity studies.

Unit 3 *In vivo* assay systems for drug targets and action: Alternative to animal models (fish, brine shrimp, and bacteria, onion root tip, potato disc assay using *Agrobacterium*) used for drug targets and action.

Unit 4 *In vitro* assay systems for drug targets and action: enzyme based, organ based, tissue based, and growth inhibition assays

Unit 5 Regulatory Toxicology: Drug Discovery and Development: Drug Laws, FDA, OECD, ICH guidelines. Schedule Y of the Drugs and Cosmetics Act for requirements of preclinical and clinical trial studies.

Unit 6 Practical demonstrations:

Antibiotic Sensitivity Assay, Minimum Inhibitory Concentration, Bioautography

Cytotoxicity Assay using Brine Shrimp Lethality Test, Genotoxicity Test using Onion Root Tip Assay, Determination of LD$_{50}$ value of drug using Brine Shrimp and Zebra fish Model Organism

Text Books:


Reference Books:

1. Pharmaceutical Biotechnology by Gary Walsh
2. Pharmacological Assays 3rd Edition by Hans Vogel
3. Antimicrobial Agents, 2012 Varaprasad Bobbarala
4. Quality control in Herbal drugs- An approach to evaluation of botanicals. P K Mukherjee, Business Horizons

Online Resources:


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Faculty of Management Sciences

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 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

2. Team-Work and Group Dynamics – Stewart G.L., Sims H. P., Manz C. C.

Reference Books


Web Resources


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<th>Course Number</th>
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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 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
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)

Web Resources

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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
- E-Book : http://www.bizlibrary.com/resources/ebooks/

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<th>Course Number</th>
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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/

<table>
<thead>
<tr>
<th>Faculty of Management</th>
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<td>UG Semester 2,4,6</td>
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Course Transactor: DR. BHOOMA DEVI, ASSISTANT PROFESSOR < bhooma.ganesh@gmail.com>

LEARNING OBJECTIVES:
- To understand the fit between you and your entrepreneurial ambitions
- To find a problem worth solving
- To identify your customers
- To develop a solution for your customers' problems and problem solution
- To build and demonstrate an MVP
- To structure a business model around the problem, customer, and solution and present your Business Model Canvas

UNIT – I
ORIENTATION (3 hours)
What is entrepreneurship – myths about entrepreneurship – impact of an entrepreneur and social entrepreneur – wealth building and making an impact

IDEA/PROBLEM (6 hours)

What is a business opportunity and how to identify it - Methods for finding and understanding problems - (Observation, Questioning, DT, Jobs to be done (JTBD) - Introduction to Design Thinking - Process and Examples - Generate ideas that are potential solutions to the problem identified

UNIT - II
CUSTOMER (5 hours)
The difference between a consumer and a customer (decision maker); Market Types, Segmentation and Targeting, Defining the personas; Understanding Early Adopters and Customer Adoption Patterns - Identify the innovators and early adopters for start-up - Basics of Lean Approach and Canvas; Types of Business Models (b2b; b2c)

UNIT – III
BUSINESS MODEL AND VALIDATION (12 hours)
Introduction to Risks; Identify and document your assumptions (Hypotheses); Identify the riskiest parts of Plan - Develop the Solution Demo - Sizing the Opportunity - Building an MVP (Minimum Viable Product)

UNIT – IV
MONEY AND TEAM (10 hours)
Revenue Streams: Basics of how companies make money - Understand income, costs, gross and net margins - Identify primary and secondary revenue streams - Pricing and Costs - Financing Your New Venture - Team Building: Role of a good team in a venture’s success; What to look for in a team; How do you ensure there is a good fit? Defining clear roles and responsibilities

UNIT – V
MARKETING AND SALES (9 hours)
Positioning – channels and strategy – sales planning – Importance of project management to launch and track progress - Understanding time management, workflow, and delegation of tasks– Business regulation: Basics of business regulations of starting and operating a business - Importance of being compliant and keeping proper documentation
LEARNING OUTCOMES

- This course will give the students the foundational experience of the entire cycle of entrepreneurship, through a combination of theory and practice.
- Students will learn what it takes to be an entrepreneur, recognizing business opportunities and the basics to create launch and manage new businesses.
- The participating students will create a ‘campus venture’ or a "real" venture of their own to practice the concepts taught during the program. The course is built in a modular fashion such that colleges can tailor their offerings to cover either the entire offering (idea to an MVP) or limit to building a business model.

<table>
<thead>
<tr>
<th>Course</th>
<th>Category</th>
<th>Course title</th>
<th>Credits/week</th>
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</table>

REFERENCES

- Read Forbes article and do Group Discussion
  https://www.forbes.com/sites/chrismyers/2015/12/16/find-your-flow-and-success-will-follow/
- https://strategyn.com/turn-customer-input-into-innovation/  CASE STUDIES in ODI: 
  https://jobs-to-be-done.com/tagged/case-study
  https://www.youtube.com/watch?v=sBhtb6Hb_O4&t=255s&list=PL2W81BDFL4yu193zyhEfpfW66PSQZ8&index=73

LEARNING OBJECTIVES:

- To understand the importance of growth and to be able to chart a path towards growth
- To revisit your business model
- To give a growth orientation your customer acquisition, operations, revenue and sales strategy
- To list and comply with the requirements relating to regulatory compliance
- To be able to effectively pitch your venture to potential stakeholders

UNIT – I
ORIENTATION TO GROWTH
10 hours
Why growth stage is different compared to startup phase - Why Product-Market fit is not enough
CUSTOMERS
Identify additional customer segments that your solution can address - Evaluate business models for the new customer segments - Relook at the Problem Statement (can you expand the scope and scalability of your business by repositioning your problem statement?) - Explore additional ways to monetize

UNIT – II
TRACTION
6 hours
How to gain traction beyond early customers? - Defining traction (in quantifiable terms) and identifying the most important metrics to measure traction. - Calculate cost of new customer acquisition - Estimate your customer lifetime value (LTV) - Identifying waste in your operations and focusing your team on what is important for traction - The Bullseye framework - Identify Channels using Bulls Eye Framework - Measuring the effectiveness of selected channels - Budgeting and planning

UNIT – III
MONEY
15 hours
Stabilizing key revenue streams - Developing additional revenue streams (licensing, franchising) - Exploring new channels and partnerships - Understanding why customers buy and how buying decisions are made; Listening skills - Sales planning, setting targets – Unique Sales Proposition (USP) - Sales planning, setting targets - Testing price elasticity - Optimizing costs and operational expenses - Advanced concepts of unit costing - Financial modeling of your venture's growth - Various sources of funds available for a business - What the investors and lenders expect from you - The benefits of using a specific type of finance

UNIT – IV
TEAM AND SUPPORT
6 hours
Building the team beyond the founders - Basic concepts of compensation and incentives - Basics of stock options - Essential HR needs of a growing business

UNIT – V
SUPPORT
8 hours
**Technology Planning**  
Identify technology needs - Estimate costs of using technology to build and grow your business - Technology as a differentiator and a competitive weapon  

**Legal**  
Overview of legal issues and their impact on entrepreneurs - Importance of getting professional help (legal and accounting) - Importance of being compliant and keeping proper documentation - Patents and Intellectual property - Trademarks  

**Mentors, Advisors, and Experts**  
The importance of a Mentor and how to find one - Role of business advisors and experts for specific targets in your growth plan  

**LEARNING OUTCOMES**  
- The advanced course will build upon the concepts covered in the Basic program and help students understand the processes required to grow a business beyond the early adoption by initial customers.  
- It helps them iterate several versions of the business models, identify new revenue channels and build their sales teams.  
- They will learn to work on their financial model and develop a pitch deck to share with external stakeholders.  
- In the process, they will build their Sales, Ops, Hiring, and Technology Plans.  
- They will also understand the basics of incorporating a new business and the related regulations and compliances.  
- Students can either apply the techniques learned in the course to growing the ‘campus’ venture at a minimum or build and grow a “real” venture.  

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| Theory: a+(b+2) = 100 | 50 | 100 |
| Theory: a + c = 100 | 80 | 50 |

**REFERENCES**  
- [https://www.mindtools.com/pages/article/newTMC_90.htm](https://www.mindtools.com/pages/article/newTMC_90.htm) Reinventing Your Business Model by Mark W. Johnson, Clayton M. Christensen, and Henning Kagermann, HBR  
- Case: 1366 Technologies: Scaling the Venture by Joseph B. Lassiter; Ramana Nanda; David Kiron; Evan Richardson
https://www.mindtools.com/pages/article/newTMC_90.htm  Reinventing Your Business Model by Mark W. Johnson, Clayton M. Christensen, and Henning Kagermann, HBR
Case: 1366 Technologies: Scaling the Venture by Joseph B. Lassiter; Ramana Nanda; David Kiron; Evan Richardson

https://hbr.org/2003/12/growth-outside-the-core"
Traction: A Startup Guide to Getting Customers by Gabriel Weinberg and Justin Mares
Strategize, Test, Measure: The Bullseye Framework by Brian Balfour of Elevate-Growth and User Acquisition. The 50% Rule for Traction by Ash Maurya

Six Keys to Release Ideas for Profitable Growth: Corporate Entrepreneurship by Hakan Ener, HBR, December 2014

Case: Creating Revenue Streams for VOSS by Mona Anita K. Olsen; Katie Chan; Johnny VanCora
https://www.boardofinnovation.com/business-revenue-model-examples/

https://hbswk.hbs.edu/item/the-strategic-way-to-hire-a-sales-team
https://fi.co/insight/how-to-create-a-basic-financial-model-an-entrepreneur-s-guide
https://www.eloquens.com/category/startups/financial-models

https://get.workable.com/startup-hiring-guide/
https://www.esop.org/
http://www.mca.gov.in/MinistryV2/registrarofcompanies.html
https://cleartax.in/s/annual-compliance-checklist-startups

**SRMC & RI**

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**Department of Physiology, SRMC & RI**

**Generic Elective Offered to UG Programmes**

**UG Semester – 2,4,6 Category:** Generic Elective (GE) Course - UG

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Course Transactor: Dr. Bagavad Geetha; Bagavad Geetha bgeethasru@gmail.com; Padmavathi Ramaswamy <padmavathi.dr@gmail.com>

**Objectives**

**Learning outcomes**
UNIT –I  Stress and Health (10hrs) (Lectures & Tutorials)

- Acute Care Model of Medicine and its limitations
- Salutogenesis
- Biopsychosocial model of health
- Introduction and definitions, Pathophysiology of stress
- Investigative methods.

UNIT-II  Heartfulness Meditation (8hrs) (Lectures & Tutorials)

Introduction to meditation and understanding the Crux of self development

- Mind Over Matter
- Mind versus Brain
- Regulation of the Mind
- Decluttering the mind
- The Science of Meditation
- From thinking to feeling
- Purity of Heart
- From periphery to Center
- Making Wise Choices
- Creating Time
- Stress Management
- Designing destiny

UNIT-III  Role of Mind-Body Interventions in various aspects of health (7hrs) (Lectures & Tutorials)

- Introduction of mind body interventions
- Relaxation response
- Psychoneuroimmunology
- Gut-Brain Axis and Health

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

- Understand and have a fundamental knowledge of stress, patho-physiology and immune response.
- Describe the role of mind-body interventions in various aspects of health.
- To understand the Heartfulness Meditation and procure the skill of Heartfulness Meditation.

Understand and have a fundamental knowledge of stress, patho-physiology and immune response.
- Describe the role of mind-body interventions in various aspects of health.
- To understand the Heartfulness Meditation and procure the skill of Heartfulness Meditation.

- Explain the pathophysiology and immune response of stress.
- Describe the relationship between mind-body in various aspects of health.
- Discuss the importance of Heartfulness Meditation as life skill.
- Enumerate the various mind-body intervention techniques.
- Become experienced in the art of meditation.
- Inspired and self motivated to pursue a balanced life.
- Confidence and courage to face the demands of life and the ability to draw inspiration from within oneself.
- Explain the role of resilience and positive attitude in coping.
- Recognize the symptoms of burnout and describe the various methods of preventing burn out.
- Explain the principles of Placebo response to improve clinical outcomes.
- Describe the health benefits of social relationships.
Placebo response.
Burnout-The healthcare and perspective
Exercise and mood disorders

UNIT IV  Role of Mind- Body Interventions in various aspects of health (5hrs) (Lectures & Tutorials)
- Sleep
- Resilience
- Attitudes and health
- Social relationships and health
- Spirituality and health

UNIT-V  Practical (15hrs)
- Mind – Body Intervention techniques
- Heartfulness relaxation and meditation exercise programs

Text Books:
2. e books available for Heartfulness Meditation (www.heartfulness.org)

Reference books:

Online Resources:
1. www.heartfulness.org

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Course Transactor: DR. G. SOWMYA, PROFESSOR, <sowmya_js@yahoo.com>

Learning Objectives:
- A structured learning course on woman’s wellness to understand the basics and key concepts of
  Unit 1- healthy woman and phases of a woman’s life
  Unit 2- Emotional and mental health
  Unit 3- diseases in women
  Unit 4- Social, cultural and financial health
## Unit 1 - healthy woman and phases of a woman’s life

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<tr>
<td>1.A</td>
<td>Anatomy &amp; Physiology-Menstral Cycle &amp; Gynaecological Health</td>
<td>[1.5 hours]</td>
<td>Prof. Sheila Pillai - Dept. Of OG</td>
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<tr>
<td>1.B</td>
<td>ADOLESCENCE [1.5 hours]</td>
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<td>Prof. Latha Ravichandran - Dept. Of Pediatrics</td>
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<tr>
<td>1.D</td>
<td>NUTRITION AND HEALTH- [1.5 hours]</td>
<td>Dept. Of Clinical Nutrition</td>
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<tr>
<td>1.E</td>
<td>FITNESS AND HEALTH- [1.5 hours]</td>
<td>Dept. Of Sports Medicine</td>
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### Menstruation
Menstruation, or period, is normal vaginal bleeding that occurs as part of a woman’s monthly cycle.

**Objectives:**
- Physical and emotional changes
- Physiology and menstrual cycles
- Ovulation
- Premenstrual symptoms
- Self hygiene

### ADOLESCENCE [1.5 hours]

**Objectives:**
- Physical growth
- Emotional, growing up pangs
- Peer influences

### MOTHERHOOD – [3 hours]

**Objectives:**
1. Pre pregnancy evaluation
2. Pregnancy and childbirth
3. Artificial conception, adoption
4. Single parenthood

### NUTRITION AND HEALTH- [1.5 hours]

A balanced diet is the cornerstone to good health.

**Objectives:**
1. General approach to nutrition
2. Diet during pregnancy and lactation
3. Adolescence & menopause
4. Requirements in specific diseases

### FITNESS AND HEALTH- [1.5 hours]

Regular exercise is necessary for physical fitness and good health.

**Objectives:**
1. Importance of exercise in maintaining good health
2. Types of exercise
3. Duration of regular exercise
4. Exercise in special situations such as osteoporosis, arthritis, weight loss, etc.
Unit 2 - Emotional and mental health

2.A MENTAL HEALTH-[2hours] [Dr.Sathyanathen] (Dept. Of Psychiatry)
Emotional health is "a positive state of wellbeing which enables an individual to be able to function in society and meet the demands of everyday life.”

Objectives:
Definition of emotional health

1) Link between emotion and disease
2) Women and special emotional needs- menarche, pregnancy and postpartum period, menopause, premenstrual symptoms
3) Psychological and mental diseases common in women
4) Eating disorders in women
5) Steps to maintain emotional health and treatment of psychiatric disorders

VIOLENCE AGAINST WOMEN-[1.5 hours] [Dr.Shuba Kumar] [Social Scientist External]

Objectives:
1) Eve teasing
2) Rape and physical abuse
3) Dowry, mental harassment
4) Domestic violence
5) Legal and other forms of support available

2.B GENDER SENSITISATION- [3 hours]-Dr. Lokeswari
1) Role play?
2) Differences in approach between sexes
3) Basic courtesy and respect

MIND BODY MEDICINE-[1.5 hours][Dr. Venkat Srinivasan-USA]
Stress Management-Social relationship & Health

Unit 3 - diseases in women

3.A Medical disorders in women
PREVENTIVE HEALTH- [3 hours] (Dept. Of General Medicine)
1) Screening for illness
2) Immunisation
3) Self breast exam

CHRONIC MEDICAL DISEASES-3 hours (Dept. Of General Medicine)
DM, Hypertension, CAD, Respiratory problems, Osteoporosis, Infections

Connective Tissue Disorders

CANCERS IN WOMEN-1.5 hours - [Dept. of General Surgery and OG]
Oral cancer, Cancer Breast, Cancer ovary, Cancer Cervix etc
Website- blog.peerform.com/focussing on women’s

UNIT 4 Social, cultural and financial health

3 A CULTURAL ATTITUDES TO WOMEN-1.5 hours [Dr. Roopa Nagarajan]
India remains a patriarchal country with preset attitudes to women.
<table>
<thead>
<tr>
<th>4 B</th>
<th>Objectives</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1) Role of women in society</td>
</tr>
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<td>2) Traditional roles</td>
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<td>3) Breaking barriers</td>
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**WOMEN ROLE MODELS, LEADERSHIP SKILLS, CAPACITY BUILDING - 1.5 hours [Dr. Usha Vishwanath]**

Objectives:

1) Why do we need role models?
2) Case studies of inspiring women in 5 different fields

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<th>MULTITASKING, NETWORKING - 2 hours (Dept. Of management)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Human multitasking is an ability to perform more than one task, or activity simultaneously.</td>
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Objectives:

1) Principles of networking, advantages
2) Multitasking, setting priorities

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<th>4 D</th>
<th>FINANCIAL WELLBEING - 2 hours (Dept of Management)</th>
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<tr>
<td></td>
<td>Financial independence can empower a woman</td>
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Objectives:

1) Role of finances in a woman’s health
2) Challenges faced by women in working - marriage, childbirth, caregiver of elderly and ailing
3) Part time and work from home options
4) Methods of saving

Website - blog.peerform.com/focussing on women’s financial health

Reference:


2. Vishaka guidelines
Sri Ramachandra Medical College and Research Institute (DU)

Faculty of Pharmacy

<table>
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<tr>
<th>S. No.</th>
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Faculty of Pharmacy

UG SEMESTER 1

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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 Arishtha.
7. Isolation, Detection and Standardization of Volatile oil from Fennel.
8. HPTLC study of herbal extracts.

REFERENCES:
Compulsory reading:
2. Clark’ 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:
2.
3. file:///C:/Documents%20and%20Settings/Tisculture/My%20Documents/Downloads/Certificati on_Scheme_AYUSH-who.pdf
http://www.ccras.nic.in/pharmacopoeialwork/links/compfom/ayurvedicfarmocopia.pdf

Faculty of Pharmacy
UG SEMESTER 3, 5, 7

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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  (30 Hours) Credits - 2

Unit 1  9 hours
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  7 hours
Solvents:
Supercritical solvents - Super critical carbon dioxide 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  7 hours
- 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:  7 hours
Background, theory, super heating effect, solvents and mechanism
- Microwave assisted chemical reaction
- Grinding Technique.

PRACTICALS: (30 HOURS) Credit - 1

1  Introduction  3
2  Acetylation Of Primary Amine- Preparation of acetanilide  3
3  Diels-Alder reaction between furan and maleic acid  3
4  BenzilBenzilic 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 Chemistry Francesca M. Kerton Published by the Royal Society of Chemistry

Suggested reading:
1. Eric LichtfouseJan SchwarzauerDidier Robert Environmental Chemistry Springer Berlin Heidelberg New York
2. Monograph on Green Chemistry Laboratory Experiments Green Chemistry Task Force Committee, DST
4. A Grinding-induced Catalyst- and Solvent-freeSynthesis of Highly Functionalized 1,4-Dihydropyridines viaa Domino Multicomponent Reaction Supplementary Material (ESI) for Green Chemistry This journal is © The Royal Society of Chemistry 2011

Online reading:
1. www.rsc.org

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<th>Course Number</th>
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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
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
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-cpcsea

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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)
Concept, Theories, Types of Intellectual Property Rights - An Overview,
Role of International Institutions: World Intellectual Property Organisation (WIPO), WTO.

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 gowing 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.
Sri Ramachandra Medical College and Research Institute (DU)

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:
5. Jaya Bir Karmacharya, Good Manufacturing Practices (GMP) for Medicinal Products, Omnic Laboratories Private Limited, Nepal.

Online Reading:

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Generic, Ability & Skills Enhancements Electives 108
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 (45 Hours)

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

Unit I
Introduction to Pharmacovigilance (10 hours)
Introduction, Definition, History of Pharmacovigilance, Standard terms and terminologies in Pharmacovigilance, Objectives and scope of Pharmacovigilance, Indian scenario, Agencies concerned with Pharmacovigilance and methods involved in Pharmacovigilance

Unit II
Medical Evaluation of Adverse Events in Pharmacovigilance (10 hours)
Adverse drug reactions – Classification, mechanism, predisposing factors and causality assessment. Drug induced diseases. Adverse events reporting system and form, Diagnosis and management of ADRs.

UNIT III
Spontaneous reporting (5 hours)
Organization, setting and running a Pharmacovigilance centre, patient reporting, managing individual case report forms.

Unit IV
Epidemiological methods (5 hours)
Drug utilization studies, case reports, case series, cohort studies, case control studies, longitudinal database of patient records

Unit V
Pharmacovigilance reporting database, Signal detection, Management, Risk Assessments & Evaluation (5 hours)
Pharmacovigilance Database, Signal detection, Risk Assessments and management, safety specification, Signal analysis and follow up.

Unit VI
Pharmacovigilance laws and Guidelines (10 hours)
Regulatory guidelines and laws in Pharmacovigilance, SOPS in Pharmacovigilance, Pharmacovigilance Auditing and Inspection, Regulatory aspects in Pharmacovigilance

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/

### Faculty of Pharmacy
PG SEMESTER 3, 5, 7

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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**

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<thead>
<tr>
<th>Unit I</th>
<th>UV SPECTROSCOPY</th>
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<td>Introduction, Fundamental law of photometry, Deviations of BEER’S Law, Instrumentation, Terminology, Electronic transitions, application</td>
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<td>Introduction, Principle, Instrumentation and its applications</td>
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<tr>
<th>UNIT V</th>
<th>HIGH PERFORMANCE LIQUID CHROMATOGRAPHY</th>
<th>5 hours</th>
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<td>Introduction, Principle, Instrumentation and its applications</td>
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<tr>
<th>UNIT VI</th>
<th>GAS CHROMATOGRAPHY</th>
<th>5 hours</th>
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</thead>
<tbody>
<tr>
<td>Introduction, Principle, Instrumentation and its applications</td>
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</table>

**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
<table>
<thead>
<tr>
<th>S. No.</th>
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<th>Semester</th>
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<tr>
<td>68</td>
<td>TGE002</td>
<td>Exercise Prescription in Women’s Health</td>
<td>Physiotherapy</td>
<td>2,4,6</td>
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<tr>
<td>69</td>
<td>TGE003</td>
<td>Physical Health</td>
<td>Physiotherapy</td>
<td>3,5,7</td>
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**Faculty of Physiotherapy**

**UG SEMESTER 2, 4, 6**

<table>
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<th>P</th>
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<td>Exercise Prescription in Women’s Health</td>
<td>3</td>
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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, practical’s the student will be able to plan appropriate fitness counseling 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 Kettles

**JOURNALS**

- The Association of chartered physiotherapists in Women’s Health Journal
- American Physical Therapy Association -continence and Women’s Health Journal
LEARNING OBJECTIVES:
- To understand the importance of physical health, its components and assessment
- To understand the importance of various factors influencing physical health and methods to improve physical health

PHYSICAL HEALTH

Unit –I - Introduction
Physical Health-Technical Terms-Overview of fundamental anatomy and physiology of Musculoskeletal system, Cardio respiratory System and Neurological System

Unit –II - Physical Health components
Body Mass Index, Skin fold measurements, waist circumference, Body fat analysis, Physical activity-Muscle strength, endurance and flexibility-Assessment and significance

Unit –III - Effect exercises on Body systems
Physiological Changes and therapeutic benefits of physical activity/ exercises on various systems of the body (Includes-Musculoskeletal system, Cardio respiratory System and Neurological System)

Unit –IV- Effect of aging on physical health
Aging-Definition, theories and effects on different systems of the body (Includes-Musculoskeletal system, Cardio respiratory System and Neurological System)

Unit –V - Factors of physical health and it’s promotion
Factors: Pain-Physiology - Posture-Nutrition- Psycho social aspects- Impact of various factors on Physical health, Physical health promotion strategies

LEARNING OUTCOMES:
- By the end of the course the students will be able to
- Appreciate the importance of physical health factors and measures to maintain physical health
- Understand the methods to assess the components and ascertain the possible risks due to physical inactivity
- Understand the methods to improve and maintain Physical Health

References:
2. William D. McArdle, Frank I. Katch, Victor L. Katch, Essentials of Exercise Physiology, Lippincott Williams & Wilkins, 2006
### B. LIST OF ABILITY ENHANCEMENT COURSES OFFERED BY SRU DEPARTMENTS [Credits = 2]

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Elective Code</th>
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<tr>
<td>1</td>
<td>AAE 001</td>
<td>English</td>
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<td>2</td>
<td>AAE 002</td>
<td>English for Clinical Communication</td>
<td>English</td>
<td>2,4</td>
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<tr>
<td>3</td>
<td>AAE 003</td>
<td>Communication and Soft Skill</td>
<td>English</td>
<td>1,3,5</td>
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<tr>
<td>4</td>
<td>AAE 004</td>
<td>Environmental Science</td>
<td>Environmental Health Engineering</td>
<td>1,2,3</td>
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<td>5</td>
<td>AAE 005</td>
<td>Trauma Life Support</td>
<td>Accident &amp; Emergency</td>
<td>1,3,5</td>
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<tr>
<td>6</td>
<td>AAE 006</td>
<td>Cardiac Life Support</td>
<td>Accident &amp; Emergency</td>
<td>1,3,5</td>
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<td>7</td>
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<td>Community Medicine</td>
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<td>1,3</td>
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<td>8</td>
<td>AAE 010</td>
<td>Medical Ethics &amp; Law</td>
<td>General Medicine</td>
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#### Faculty of Biomedical Sciences & Technology

<table>
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<th>Department</th>
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<td>BAE 005</td>
<td>Basics of Biodiversity</td>
<td>Biomedical Sciences</td>
<td>1,3,5,7</td>
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**LEARNING 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**
1. Remedial Grammar: Parts of speech, Types of sentences, question tags
2. Modal verbs
3. Tenses

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**Faculty of Allied Health Sciences**
4. Concordance

UNIT : II VOCABULARY
1. Word formation – prefixes and suffixes
2. Medical terminology
3. Words often misused or confused
4. Idioms and phrases

UNIT : III WRITING SKILLS
1. Letter writing - permission, leave and other official letters
2. Note making methods
3. Jumbled sentences - cohesion
4. Paragraph Writing

UNIT : IV SPOKEN COMMUNICATION
1. Pronunciation of commonly mispronounced words
2. Day to day conversation
3. Telephonic conversations
4. Group Discussions

UNIT : V LISTENING AND READING SKILLS
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, Lakshminarayan.K.R
Practical Communication By Abraham Benjamin Samuel

Online sources:
http://www.letterwritingguide.com/
http://www.englishchick.com/grammar/

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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Offered to: B.Sc., (E.T.C.T), B.Sc., (AHS; MRIT), B.Sc., (Sports & Exercise Science); B. Sc., (Clinical Nutrition)

LEARNING 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.

| AAE 002 | English for Clinical Communication |

**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                                     (8Hrs)**
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:                          (3Hrs)**
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/
LEARNING OBJECTIVE:
This course is designed to equip the students with essential soft skills needed for workplace and improve personality.

LEARNING OUTCOME:
This course is designed to help the students to
- Foster healthy attitude.
- Develop effective inter and intra personal skills to be an effective team worker.
- Communicate effectively in both academic and professional setup

UNIT: I ASPECTS OF COMMUNICATION (4 hrs)
1. Importance of communication, Process, Barriers
2. Non verbal Communication

UNIT: II SPEAKING (8 hrs)
1. Opening and Closing conversations
2. Introductions and Address Systems
3. Expressing Courtesy
4. Giving Compliments and replying to Compliments
5. Presentation Skills
6. Telephonic conversation and telephone etiquette

UNIT – III PRESCRIBED READING (4 hrs)
1. White washing the Fence – Episode from Tom Sawyer by Mark Twain
2. Bacon’s Essays: - Of Goodness and goodness of nature

UNIT – IV WRITING (7 hrs)
1. Letter writing - Letter of Complaints, Inviting and Declining an invitation
2. Memos and Email

UNIT – V SOFT SKILLS (7hrs.)
1. Active Listening Skills
2. Assertive Skills
3. Negotiation and Persuasive Skills
4. Interview Skills


Reference Books:
2. English and soft skills by S.P. Dhanavel, Orient Black Swan

Online sources:
http://www.letterwritingguide.com/
http://www.englishchick.com/grammar/

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<th>UG Semester – I, 2 or 3</th>
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<tr>
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<tr>
<td>Course Code</td>
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<td>AAE 004</td>
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Offered to:
B.Sc., (Bio med.), B.Sc., (Opto.), BPT, B.Sc., (E.T.C.T), B.Sc., (AHS; MRIT), B.Sc., (Sports & Exercise Science); B. Sc., (Clinical Nutrition); BBA (GUHS)

Course description

This course has been designed on the study of the natural world and how it is influenced by people. It will emphasize the need of increasing awareness of the consequences of environmental degradation and human population growth, together with the need to conserve biodiversity. This course is to train students in a multidisciplinary environmental concepts drawing from various basic and applied disciplines.

Learning objectives

This course will enable students -

- to anticipate, identify, assess, and manage green environment and its probable ways occupational settings.

- to integrate and apply knowledge from the appropriate areas of basic science, economics, and policy to address problems caused by ecosystem degradation and from physical alteration of the environment and chemical contaminants from industrial activities, agriculture, food production, and inadequate resource management.

- to participate in outreach activities including environmental applications and problem solving in off-campus community settings.

Learning Outcomes
Upon completion of the program, students will be able to:

- Identify the implications of environmental policies and standards on compliance with regulatory, standard setting organizations and International policies.
- Apply management practices to environmental and occupational health issues.
- Understand and describe the processes and mechanisms by which hazards are produced, released, transported, and modified in the environment and affect health.

Syllabus

Unit 1: Multidisciplinary nature of environmental studies and Ecosystem
Scope of environmental science, Physical, Chemical and Biological factors in the environment, Concept of an ecosystem- Types, Structure and function, Structure and composition of atmosphere, Meteorology, Energy flow in the ecosystem, Food chains, food webs and Ecological pyramids, Current issues in India, Environmental education and awareness

Unit 2: Natural Resources, Biodiversity and its conservation:
Natural resources- Use and benefits, over utilization, degradation, Exploitations and Associated problems: Forest; Water, Mineral, Food, Land and Ocean resources, Energy resources and needs, Alternate energy sources, Conservation of natural resources, Biodiversity at global, National and local levels- Biogeographical classification of India, Threats to biodiversity and Hot-spots, Endangered and endemic species of India, Conservation of biodiversity

Unit 3: Environmental Pollution and Social issues

Unit 4: Human Population and the Environment

Unit 5: Field work
Visit to a local area to document environmental assets river/ forest/grassland/hill/mountain, Visit to a local polluted site-Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, etc.

Text Books
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad –380 013, India, Email:mapin@icenet.net (R)

Reference Books
1. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
5. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)

Online resources
1. http://snre.umich.edu/degrees/masters/environmental_policy/overview?gclid=CPjQ_IziicUCFQRjgodVmEAkg
2. http://www.prospects.ac.uk/options_environmental_science.htm

<table>
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<tr>
<th>UG Semester – 1,3</th>
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<tr>
<td>Offered by Department of Community Medicine, Faculty of Allied Health Sciences</td>
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<tr>
<td>Course Code</td>
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<td>AAE 007</td>
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</table>

Offered to: B.Sc., (AHS; MRIT), B.Sc., (TCM), B.Sc., (Sports & Exercise Science); BPT

Objectives
Facilitate the students to
• Acquire excellent knowledge in the principles of Community Medicine
• Acquire excellent skills in the practice of Community Medicine.

<table>
<thead>
<tr>
<th>Unit –I:</th>
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<tbody>
<tr>
<td>Importance of Community Medicine- Natural History of disease- Epidemiologic concept of Interactions of Agents, Host and Environment- Agent factors- Environmental factors – Risk groups</td>
</tr>
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</table>

| 7  | AAE 007 | Community Medicine |
• Dynamics of Disease Transmission - Sources and Reservoir- Modes of transmission- Susceptible Host.
• Principles of prevention and control – Controlling the reservoir- Interruption of transmission- Levels of Prevention - Modes of Intervention -Vaccine preventable diseases -Importance of Immunization- Immunization schedule
• Disinfection-Definition, Types and Principles of Disinfection- Disinfectants, Recommended disinfection procedures for faeces and urine, sputum and room- Factors affecting the efficacy of sterilization

UNIT – II:
• Hospital Acquired infection – Source, Routes of spread, Recipients – Principles of infection control – preventive measures-Standard Precautions
• Hospital Waste Management – Definition of health care waste – Health hazards - Route of transmission of infection from health care waste - Segregation and safe storage – Choice of bins – Handling and Treating of health care waste and Disposal.
• Non Communicable diseases -CHD & Obesity, Diabetes and Hypertension, Cancer – Risk factors and Prevention

Unit –III:
• Mental health - Alcoholism and Tobacco use –Adverse health effects and Prevention
• Maternal and Child Health – Antenatal, Intranatal, & Postnatal care & Reproductive and Child Health programme in brief
• Family planning – Definition- Health aspects of family planning- Condom,IUD,Oral Contraceptive Pills – Mode of action, Advantages and Disadvantages.
• Environmental sanitation - Prevention of environmental pollution – Waterborne diseases- Household purification of water-Disposal of wastes-Public health importance-Open air defecation-Sanitation barrier
• Nutritional problems in public health- Low birth weight-Protein energy malnutrition-Vit A deficiency- Nutritional anemia- Iodine deficiency disorders- Balanced diet
• Health education-Contents-Principles and Practice of health education
• Epidemiological Study designs –Descriptive and analytical study designs-Uses of epidemiology

Reference Book
1. Park’s Textbook of Preventive and Social Medicine -23rd Edition

Recommended Books
1. Textbook of Public health and Community Medicine I Edition–published by Department of Community Medicine, Armed forces Medical college, Pune

Online Reference
1. World Health Organization web site - www.who.int/topics/en/
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); Virioids 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

### C. LIST OF SKILLS ENHANCEMENT COURSES OFFERED BY SRU DEPARTMENTS [Credits = 2]

**SE-** indicates Theory Courses; **SL-** indicates Practical Courses

<table>
<thead>
<tr>
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<th>Title</th>
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<tr>
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<td>Clinical Nutrition</td>
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<td>Speech Language and Hearing Science</td>
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<td>Language Department</td>
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<td>Basic quantitative research tools for clinical and public health research</td>
<td>Environmental Health Engineering</td>
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<td>6</td>
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<td>Occupational Health Services</td>
<td>Environmental Health Engineering</td>
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<td>7</td>
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<td>Professional skills Development</td>
<td>Environmental Health Engineering</td>
<td>1,3</td>
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<td>8</td>
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<td>Health Science Data Analysis using R-Statistical Software</td>
<td>Environmental Health Engineering</td>
<td>1,3</td>
<td>PG</td>
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<td>ASL 014 *</td>
<td>National service scheme and Nation Building</td>
<td>NSS office</td>
<td>2,4,6</td>
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<tr>
<td>10</td>
<td>ASL 015 *</td>
<td>Culinary Skills for optimal nutrition</td>
<td>Clinical Nutrition</td>
<td>1,3,5,7</td>
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<td>ASL 016 *</td>
<td>Basic Life Support</td>
<td>Accident &amp; Emergency</td>
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<td>12</td>
<td>ASL 017 *</td>
<td>Library Science and E-Resources</td>
<td>Central Library</td>
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<td>13</td>
<td>BSE 001</td>
<td>Good Laboratory Practices</td>
<td>Biomedical Sciences</td>
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<td>Human Rights and Value Education</td>
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<td>Fundamentals in Analytical Laboratory Skills</td>
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<td>Medical Transcription</td>
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<td>18</td>
<td>BSL 016 *</td>
<td>Basics of Electronics</td>
<td>BMS</td>
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<td>19</td>
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<td>Tooth Wisdom</td>
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<td>Introduction to the principles and practice of infection prevention and control</td>
<td>Microbiology</td>
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<td>21</td>
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<td>Management</td>
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OBJECTIVES
After complete ting the course the student can able to

- To identify the emerging specialties
- To understand the behaviour and mental processes
- How the theories and principles of psychology may be applied to individual, societal and global issue
- Explain the application of psychology in Allied Health Sciences

Unit I: Introduction
Introduction to applied Psychology, Scientific methods in Psychology, Application of Psychology: Psychology in Industry, community, family, education, health, self development, Human relations. Scope of psychology with special relevance to Allied Health Sciences.

Unit II: various cognitive process and their application
Factors affecting learning, Importance of studying Psychology of learning in relation to Allied Health Sciences

Memory and forgetting, Kinds of remembering, the nature of forgetting, Improving memory, relevance to Allied Health Sciences

Intelligence, Normal distribution of intelligence levels, Intelligence Testing, Intelligence tests, Uses and abuses of intelligence tests, relevance of intelligence and aptitude for Allied Health Sciences

Unit-III: Life style, Health, Stress and Coping Behaviour
Cultural evolution, Life style choices and consequences, Healthy and Unhealthy life styles. Nutrition, Physical fitness, Smoking and Drinking, Stress and Health, The biological basis of stress, Stress and Physical functioning, Coping with stress, Adjustment a lifelong process. Cognitive appraisal and
Stress, Stressful life styles, Coping with everyday stress, Sources of stress, Coping styles and Strategies, Stress inoculation training.

Unit IV: Psychology of Vulnerable Individuals
Psychology of the challenged, types of disability, effects of disability, psychology of women, women and health, dealing with alcoholics and their families, post-traumatic stress disorder, psychology of the sick and ill, how patients react to chronic illness, effects of illness and hospitalization

REFERENCE BOOKS
7. Psychological testing and Assessment - Aiken, L R - IX edition 1997

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<tr>
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Offered to: UG Programs

Learning Objectives

✓ To impart knowledge pertaining to the science of baking.
✓ To acquire basic skills of bakery and confectionery

Bakery and Confectionery

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

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<tr>
<th>Course Code</th>
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<td>Introduction To Communication Disorders And Rehabilitation</td>
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Offered by Department of Speech, Language and Hearing Sciences

Offered to: UG Programs

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/
FUNCTIONAL LANGUAGE SKILLS

Learning 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 (9 HRS)
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:
1. Communication Skills for Engineers and Scientists by Sangeeta Sharma and Binod Mishra, PHI
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
4. Technical Communication – Principles and Practice, by Meenakshi Raman and Sangeetha
   a. New Delhi.

Online reference:
http://www.studygs.net/reading_essays.htm

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Offered to: UG Programs

**Course description**

This course will build students the basis to organize and conduct research by providing practical experience to design questionnaire, conduct a systematic literature review, design study instruments, collect and process data using simple and widely available software tools. The course also covers the elements required for data analysis and methods of data presentation.

**Learning objectives:**

- To develop practical skills in designing questionnaires for clinical and epidemiological research studies
- To develop skills to conduct a systematic literature search using online recourses
To develop capacities in designing and maintaining databases using Microsoft Excel and cleaning the data to a stage that is ready for analysis

**Learning Outcome:**

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

- Develop skills to conduct a systematic literature search using PubMed
- Demonstrate their basic skills in developing questionnaires and collection of data
- Develop capacities developing database using Microsoft Excel, cleaning the entered data and organizing for data analysis

**Syllabus:**

1. **Introduction to quantitative research**
   - Research question, Hypothesis & Objectives
   - Brief introduction to research methodology

2. **Searching for the evidence**
   - Overview of literature search
   - Online literature databases – PubMed & Science direct
   - Basic search strategy in PubMed
   - Advanced search strategy in PubMed using MeSH

3. **Introduction to questionnaire design**
   - Types of questionnaire
   - Pilot testing
     - Reliability
     - Validity

4. **Data preparation, data entry using Microsoft Excel**
   - Data coding
   - Types of variables
   - Naming variables
   - Use of Excel for data entry
     - Effective usage of features in Excel

5. **Data quality and fundamentals of epidemiological data analysis**
   - Data editing
   - Elements of data analysis
   - Data description & summarization

**Text Books:**


**Reference book:**


**Online resources:**

1. Questionnaire design: [http://www.fao.org/docrep/w3241e/w3241e05.htm](http://www.fao.org/docrep/w3241e/w3241e05.htm)
Course Description:
This course provides an overview on the types of services that needs to be rendered at occupational health centers of an industry. This course is intended to build the capacity of the medical and nursing professionals on legal requirement for managing the health center functions within the industry premises following code of practice to maintain the health record and handle the employees during emergencies.

Learning Objectives:
- To understand the requirements of occupational health services in relation to regulatory requirements
- To understand the range of clinical and health promotion packages used in routine occupational surveillance
- To develop skills in organization and archival of occupational health data
- The student would learn the function and specific requirements of nursing personnel in factories and work place.
- How to manage the of cases reporting to emergency medical Centre
- Understand the hazards and risks in industries and their importance in managing affected patients.
- Learn the concept of wellness among the working population.

Learning outcomes:
At the end of the course the student will be able to
- Understand the functions of the Occupational Health Centre and the statutory requirements in an industry
- Scope the provision of occupational health services for specific industries
- Understand the functions of the Occupational Health Centre and the statutory requirements in an industry
- Ability to evacuate a patient from workplace in case of emergency
- Maintain the first aid boxes and first aid post in work areas
- Successfully motivate the employees to complete their periodical medical examination
- Maintain safe custody and retrieve the medical records if required.

Syllabus
1. Introduction and Code of ethics
1. Role of Nurse in Industries
   - Indian Factories Act and Tamil Nadu Rules
   - Code of practice and conduct
   - Corporate responsibility

2. **Employee health screening**
   - Diagnosis of Occupational Diseases
   - Management of OD
   - Importance of Medical surveillance

3. **Diagnostic tools for ODs:**
   - Spirometry
   - Audiometry
   - Checklists

4. **Setting up an Occupational Health Clinic**
   - Requirements
   - Issues and constraints

5. **Compensation in ODs**
   - Laws governing compensation including ESI Act
   - Visit to an Occupational Health Clinic

6. **Disaster Management**
   - Evacuation of patients
   - Triage

7. **Medical Records Management**
   - Storage of records
   - Electronic data management
   - Periodical returns to authorities
   - Planning PME schedule and follow up
   - Field Visit to ESIC ODC Ward

**Text Books:**

1. Occupational and Environmental Medicine, Joseph LaDou, 3rd Edition 2002

**Reference Books:**


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<tr>
<th>Course Code</th>
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**Course Description:**

Students develop their professional skills in order to make a difference in organizations. In this course, student will understand and practice the professional skills needed to make a difference in organizations, such as effective team work, peer-coaching and self-presentation with well-founded self-confidence. Training will be provided through multiple presentation and interaction exercises within class.
Learning objectives:

- Advance the students' intellectual curiosity, competency and skills in preparation for employment
- Develop critical thinking, creativity and effective communication

Learning Outcomes:

At the completion of the course, the students will:

- Develop good written and oral communication abilities
- Develop an understanding of team building and leadership skills
- Develop knowledge regarding capacities needed to work independently within diverse work environments

Syllabus:

1. **Communication Skills**
   - Importance of Communication skills in Public health; Communication process; Methods of communication; Types of communication: Verbal and Non-verbal; Impediments to effective communication; Feedback

2. **Oral Presentation Skills:**
   - Preparation and planning; Structure; Audio-visual aids; Creating interest and establishing a relationship with the audience; Body language; Voice and pronunciation; Review

3. **Writing skills:**
   - Writing a scientific paper; Writing a proposal; Structure of an article; References and literature review; Peer-review process; Publication bias; International guidelines for publication in journals; Professional Ethics

4. **Leadership in Public health:**
   - Leadership styles and trait; Motivation skills; Interpersonal communication skills; Problem solving skills; Decision making skills; Management skills; Communication Skills

5. **Manuscript writing**
   - Writing introduction, objectives, methodologies, major finding, discussion, conclusion and recommendation

6. **Seminar presentations**
   - Use of computers present data and information on recent topics

Text Books:

Reference Books:

2. Communication and Health: Systems and Applications (Communication Textbook Series, Applied Communication) by Eileen Berlin Ray, Lewis Donohew

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Offered by Dept. of EHE, Faculty of Allied Health Sciences

Course Description:
This course is designed to provide hands on training in applying epidemiological and statistical principles in performing quantitative analysis using modern tools, problem solving exercise from previously conducted research studies, case studies from existing online sources, and peer reviewed publications. A special feature will include hands on training in the SPSS and free statistical ‘R’ software.

Learning Objectives:
- Provide Hands on training on data analysis using statistical software ‘R’. software
- Provide foundation to computational and analytical skill in health science data analysis using case studies.

Learning Outcomes:
Upon completion of this course, the student will
- Demonstrate their basic skills in developing questionnaires and collection of data
- Demonstrate skills in developing database using Microsoft Excel and cleaning the data
- Be able to identify appropriate statistical tool, analysis data and interpret the results

Syllabus:
1. Quantitative methods and concepts for Epidemiological data analysis
   - Basic concept of vector and matrix, Summarization of data, Probability and Probability distribution
   - Sampling and Sampling distribution
   - Statistical inference, Measure of association, Non-parametric inference,
   - Measuring health and disease,
   - Type of study design,
   - Causation in Epidemiology.
2. Data and Database
   - Concept of data type
   - Database building,
   - Data entry, Data cleaning and Data management.
3. Introduction to ‘R’-a free Statistical Software
   - Download and installation of R
   - Concept of array and data frame, Import and export of data, Data coding, Few primary functions and their uses
   - Graphic tools, Loops and functions.

4. Descriptive Analysis using R
   - Basic concepts of descriptive analysis
   - Case studies: Health assessment
   - Exposure assessment,
   - Estimation of prevalence,

5. Time Series Analysis using R
   - Definition of time series,
   - Components of time series
   - Extraction of trend and seasonality
   - Auto correlation and auto regression.

6. Data Analysis for Correlation Study using R
   - Case studies: Case control study,
   - Cohort study
   - Clinical trial
   - ROC curve analysis.

7. Survival data analysis using R
   - Measure of disease incidence
   - Hazard function, Survival function
   - Kaplan-Meier product limit estimator
   - Cox proportional hazard model.

Text book

1. Biostatics- Basic Concept and Methodology for the Health Sciences by Wayne W. Daniel, John Wiley and Sons
3. Basic Epidemiology by R. Beaglehole, R.Bonita, TKjellstrom, Orint Longman in association with WHO

Online Resource

2. www.r-project.org

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Course Description: This course is designed to enable our student youth to understand about NSS and its role in building youth and our Nation and developing skills thereof.
Learning Objectives:

- To provide an understanding about the aims, structure and programmes and activities of National Service scheme in terms of Nation Building
- To develop certain basic skills for personality development through community development.

Units

National Service Scheme and Nation Building

Unit 1 Structure and Functions of NSS
Aims and Objectives of National Service Scheme, Organizational Structure, Roles of various NSS functionaries; Concept of Regular Activities and Special Camping activities. Adoption of Villages and Slums Methodology of conducting Survey.

Unit 2 Understanding Youth
Definition and Profiles of youth categories, Youth Issues, Challenges and Opportunities for Youth, Youth as agent of social change & Community Mobilization. Role of Youth in Nation Building. National Youth Policy.

Unit 3 Personality and Community Development skills.
Importance of youth Leadership, Traits of Good Leadership and Personality Development. Role of youth in creating awareness through NSS Programmes on Health & Hygiene; Environmental Conservation and Enrichment for Sustainable Development; Sanitation and Swachh Bharat.

Unit 4 Practical / Field Activity: (15 Hours)

Text Books:

Reference Books:
2. Youth in Perspective

On line resources:
1. Official Web site of National Service Scheme. www.nss.nic.in

Scheme of Curriculum and Evaluation

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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 develop the skills healthy dishes using the food groups

**Culinary Skills for Optimal Nutrition**

**UNIT 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. Food adulteration, common adulterants used and methods of identification, nutrition labeling, food standards.

**UNIT II- Methods of Cooking, Preservation and Sensory Evaluation**
Principles and techniques of sensory evaluation, interpretation tools
Cooking methods – moist heat, dry heat, advantages and disadvantages, changes during cooking, nutrient preservation while cooking
Preservation techniques, advantages and disadvantages

**UNIT III- Nutritional Requirements and Meal Planning**
Basic nutritional requirements through different stages of life cycle, basic principles of meal planning, revisiting concept of balanced diets

**Practicals (30 hrs)**

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

✓ Appreciate the concept of balanced diet
✓ 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

Text Books


Reference Text

2. Parker R O. Introduction to Food Science, Thomson Delmar Learning, 200

Web References

1. www.eatright.org

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ASL015 : Culinary Skills for Optimal Nutrition
Skills Enhancement Course for UG programmes

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Course Transactor: Ms. Shanthi A; Clinical Instructor and Technologist < srmceducators@gmail.com>
Course Description:
This course is designed to provide hands on training in Basic life support. It helps one to understand the importance of immediate recognition of cardiac arrest and early initiation of Cardio Pulmonary Resuscitation.

Learning Objectives:
- Provide Hands on training on Cardio Pulmonary Resuscitation (CPR)
- Use of Automated External Defibrillator (AED)
- Key differences in Adult and Pediatric Resuscitation
- How to respond and to relieve choking

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<th>Units</th>
<th>Basic life Support</th>
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<tr>
<td>Unit 1</td>
<td>➢ Introduction and Importance of Basic Life Support</td>
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<td>➢ Chain Of Survival and Critical concepts of CPR</td>
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<td></td>
<td>➢ One RescuerAdult CPR</td>
</tr>
<tr>
<td></td>
<td>➢ Two Rescuer Adult CPR</td>
</tr>
<tr>
<td></td>
<td>➢ Automated External Defibrillator</td>
</tr>
<tr>
<td>Unit 2</td>
<td>➢ Management of Respiratory Arrest</td>
</tr>
<tr>
<td></td>
<td>➢ Child CPR</td>
</tr>
<tr>
<td></td>
<td>➢ Infant CPR</td>
</tr>
<tr>
<td></td>
<td>➢ Adult Choking</td>
</tr>
<tr>
<td></td>
<td>➢ Child Choking</td>
</tr>
<tr>
<td></td>
<td>➢ Infant Choking</td>
</tr>
<tr>
<td>Unit 3</td>
<td>➢ CPR modifications in Pregnant patients</td>
</tr>
<tr>
<td></td>
<td>➢ BLS in Intoxicated patients</td>
</tr>
<tr>
<td></td>
<td>➢ AED Special situations</td>
</tr>
<tr>
<td></td>
<td>➢ Difference between Infant, Pediatric and Adult CPR</td>
</tr>
<tr>
<td>Unit 4</td>
<td>➢ PRACTICAL: (20 hours)</td>
</tr>
</tbody>
</table>

Learning Outcomes:
Upon completion of this course, the student will
- Demonstrate their basic skills in CPR
- Demonstrate skills in AED
- Be able to identify choking and its management

References Books:
1) AHA – Basic Life Support Manual – 2015 guidelines
2) Nancy caroline – Emergency care in the streets – seventh edition

Online Resources:
1) www.aha.org
2) www, emedicine.org
## Scheme of Curriculum and Evaluation:

### ASL016 Basic Life Support
**Skills Enhancement Course for UG programme**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Category</th>
<th>Course Title</th>
<th>Credits / Week</th>
<th>Hours/semester</th>
<th>Attendance (%)</th>
<th>CIA - Theory / Practical (a) MARKS</th>
<th>End Semester Assessment</th>
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<tr>
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<td>Basic Life Support</td>
<td>1</td>
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### CENTRAL LIBRARY
**UG SEMESTER 1,3,5,7**

<table>
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<th>L</th>
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<th>P</th>
<th>C</th>
<th>Total Hours</th>
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<tbody>
<tr>
<td>ASL017</td>
<td>LIBRARY SCIENCE AND E-RESOURCES</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>2</td>
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</table>

Course Transactor: DR. P SANKAR, LIBRARIAN, <librarian@sramachandra.edu.in>

### Course Description:
This course is designed to provide hands on training in medical coding and transcription. It helps one to know and understand the uses of …

### Learning Objectives:
- To train students in Library Managements and equip them with the latest development in libraries and information centers
- To make the students aware of various sources of E information and Providing information to the different user groups.

### Units

#### Unit 1
**LIBRARY SCIENCE AND E-RESOURCES**
- Meaning of Library – Types of Library — Library layout - Functions of Library – need for Library
- Meaning of ISBN and ISSN – Collection management - Library Classification system - Five laws of Library Science – Inter Library Loan (ILL), Communication theories and models. Barriers to communication. Levels of communications – Intrapersonal, interpersonal and mass communication. Information services – literature search Methods of Dissemination of information
- Current Awareness Service (CAS), Selective Dissemination of Information (SDI), Document delivery service, Alert services, and Internet services.

#### Unit 2
**INFORMATION SOURCES**
- Documentory Sources of Information, Print, and Non-print including Electronic, Human and Institutional sources: Nature, types, characteristics and utility. Internet as a source of Information.

Unit 3  
**LIBRARY AUTOMATION**

Unit 4  
**Electronic Information Sources**

Unit 5  
**Digital Libraries**

**PRACTICAL:** (10 hours)
Collection of information through different sources
Library Automation
Remote Access
Preservation of Documents (Digitization)

**Learning Outcomes:**
Upon completion of this course, the student will
- Students can analyze and understand the query™
- Identify the sources of information
- Finding out the information

**TEXTBOOKS**

**REFERENCE BOOKS**
1. Pooja and Jain *Introduction to Computer*, Vikas Publication 2011
Scheme of Curriculum and Evaluation:

ASL017 LIBRARY SCIENCE AND E-RESOURCES
Skills Enhancement Course for UG programmes

<table>
<thead>
<tr>
<th>Course code</th>
<th>Category</th>
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<th>Hours / semester</th>
<th>Attendance (%)</th>
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<td>ASL 017</td>
<td>S E</td>
<td>LIBRARY SCIENCE AND E-RESOURCES</td>
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<td>Tutorial (T)/Clinical Training (CT) 1</td>
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<td>Theory (b)</td>
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<td>Theory: a+(b+c) = 100</td>
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UG Semester – I, 3, 5, & 7

Offered by Department of Biomedical Sciences

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>T</th>
<th>P</th>
<th>C</th>
<th>Total Hours</th>
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<tr>
<td>BSE 001</td>
<td>Good Laboratory Practices</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>2</td>
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</table>

Offered to: UG Programs

Learning Objective:

- To understand the relevance, importance and basic concepts of good laboratory practices
- To apply the knowledge to become familiar with the basic laboratory skills

UNIT I: INTRODUCTION


UNIT II: GOOD LABORATORY PRACTICE PRINCIPLE

UNIT III: STANDARDIZED OPERATING PROCEDURES
Definition, Initiation of SOP, Preparation of SOP, Administration, Distribution and Implementation.Maintenance of laboratory records.Formating SOP, Reagent/materials certification, Certification of analysts,Certification of laboratory facilities, Documentation and maintenance of record.

UNIT IV: DATE REPORTING AND STORAGE
Performance of study, Study plan, Conduct of study, Reporting of results. Archival storage of records and reports.

Learning Outcome:
- To understand the implications of good laboratory practices

Text Books:

References:

<table>
<thead>
<tr>
<th>UG Semester – 2,4,6</th>
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<tbody>
<tr>
<td>Offered by Dept. of Biomedical Sciences</td>
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<th>T</th>
<th>P</th>
<th>C</th>
<th>Total Hours</th>
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<td>BSE 002</td>
<td>Human Rights and Value Education</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>

Offered to: UG Programs

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

<table>
<thead>
<tr>
<th>UG Semester – I, 3,5,&amp; 7</th>
<th>Offered by Department of Biomedical Sciences</th>
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</thead>
<tbody>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>BSE 003</td>
<td>Fundamentals in Analytical Laboratory Skills</td>
</tr>
</tbody>
</table>

Offered to: UG Programs

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

<table>
<thead>
<tr>
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<th>Offered by Dept. of Biomedical Sciences</th>
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<tbody>
<tr>
<td>Course Code</td>
<td>Course Title</td>
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<tr>
<td>BSE 004</td>
<td>Public Health and Hygiene</td>
</tr>
</tbody>
</table>

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

http://www.phfi.org/
http://health.nih.gov/

Course Description:
This course is designed to provide hands on training in medical transcription. It helps one to know and understand the uses of Vocabulary, listening comprehension and Medical document preparation.

Learning Objectives:
- Provide Hands on training on English Language and listening comprehension
- Provide foundation to learn medical terminology (Anatomy, Physiology)
- Provide foundation to learn laboratory reports (Hematology, Biochemical reports, & Pathology)

DEPARTMENT OF HUMAN GENETICS
UG SEMESTER 1,3,5,7

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
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<td>2</td>
<td>45</td>
</tr>
</tbody>
</table>

Course Transactor: Dr. J. Vijayalakshmi, Associate Professor < karthivi@yahoo.com>

Units | Medical Transcription
---|--------------------------------------------------
Unit 1 | The Medical Transcriptionist’s career including Ethical& Legal Responsibilities
       | Introduction to Medical transcription, Job Opportunities, Transcription Skills, Medical records, Certification for Medical Transcriptionists, Ethical and Legal responsibilities
Unit 2 | Equipments in Transcription
       | Equipment, Computer Systems, Ergonomics, Dictation Equipments, Hand and Foot control Dictation, Transcription Preparation
Unit 3 | Transcription Guidelines
       | Punctuations, Proof reading notations, Formats and styles, SOAP for Chart notes; Discharge Summary
Unit 4 | PRACTICAL: (20 hours)
       | Equipments for Medical Transcription
       | Typing for the beginners
       | Vocabulary
Learning Outcomes:
Upon completion of this course, the student will

- Demonstrate their basic skills in the knowledge of Vocabulary, Medical terminology, and preparation of chart notes.
- Demonstrate skills in listening comprehension
- Be able to identify accurate format for medical document preparation

References Books:
2. The AAMT Book of Style for Medical Transcription, Claudia J. Tessier
3. CD’s available for:
   a. Stedman’s Electronic Medical Dictionary 4.0
   b. American Drug Index 2003

Text Books:
2. The AAMT Book of Style for Medical Transcription, Claudia J. Tessier

Online Resources:
1) www.medicaltranscriptiontraining.in
2) www.rbsten-tel.com/pdf/QualityMT.pdf

Scheme of Curriculum and Evaluation:

<table>
<thead>
<tr>
<th>Course code</th>
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<th>Hours / semester</th>
<th>Attendance (%)</th>
<th>CIA - Theory / Practical (a)</th>
<th>End Semester Assessment</th>
<th>Grand Total</th>
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<tr>
<td>BSL 015</td>
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<td>Medical Transcription</td>
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<td>80</td>
<td>50</td>
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</tbody>
</table>

Total hours: Theory: a+(b÷2) = 100  Practical: a + c = 100
Course Description:
In today’s world the basic knowledge of electronic gadgets is highly essential. Everyday Electronics represents a hands-on lecture and lab course through which students will learn the basic electronics principles, to read schematics and interpretation of circuits. This course sensitizes the students about the intricate components and working principle of the common appliances they use.

Learning Objectives:
- To provide hands on training in understanding intricate of circuits and their working.
- To enable the comprehension of the day to day electronic gadgets.
- To help student identify and troubleshoot errors in electronic circuits

<table>
<thead>
<tr>
<th>Units</th>
<th>BASIC OFELECTRONICS</th>
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<tbody>
<tr>
<td>Unit 1</td>
<td>INTRODUCTION</td>
</tr>
<tr>
<td></td>
<td>Basic concepts – static and current electricity – Ammeter – Voltmeter – Multimeter—</td>
</tr>
<tr>
<td>Unit 2</td>
<td>ELECTRONIC GADGETS</td>
</tr>
<tr>
<td>Unit 3</td>
<td>SENSORS</td>
</tr>
<tr>
<td>Unit 4</td>
<td>PRACTICAL: (20 hours)</td>
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<tr>
<td></td>
<td>Understanding of Basic circuit connections and continuity in circuits</td>
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<tr>
<td></td>
<td>Construction of light dark sensor</td>
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<tr>
<td></td>
<td>Demonstration of sound level meter</td>
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<tr>
<td></td>
<td>Construction of electronic alarm and buglar alarm</td>
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<tr>
<td></td>
<td>Construction of FM receiver</td>
</tr>
<tr>
<td></td>
<td>Demonstration of the working of thermostat and water heater</td>
</tr>
<tr>
<td></td>
<td>Demonstration of minor day to day gadgets.</td>
</tr>
</tbody>
</table>

Learning Outcomes:
On completion of this course the student will be able to
- Understand basic electrical and electronic terminology.
- Construct simple circuits.
- Students acquire skills in using materials and instruments that are used to monitor, design and build basic electronic equipment.
- Familiarity with electronic devices, gadgets and basic testing equipment

Text Books:
1. V.K. Mehta ‘Principle of Electronics, S Chand publishers.
2. Biomedical instrumentation by Arumugam, Anuradha publishers

Sri Ramachandra Medical College and Research Institute (DU)

Generic, Ability & Skills Enhancements Electives 152
Reference Books:
2. Basic Electronics by Debashis De, Pearson publishers.

Online Resources:
1. www.electronics-lab.com

Scheme of Curriculum and Evaluation:

<table>
<thead>
<tr>
<th>Course code</th>
<th>Category</th>
<th>Course Title</th>
<th>Credits / Week</th>
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<th>Attendance (%)</th>
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<td>1</td>
<td>1</td>
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<td>15</td>
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</table>

LEARNING OBJECTIVES:
At the end of this course, the students should have knowledge in:
1. The two most common diseases of the oral cavity and its prevention
2. The myths and facts of Dentistry
3. How the oral health plays an important role in general health
4. The importance of the role of teeth in personality enhancement

LEARNING OUTCOME:
At the end of the course the students should be able to have a broad overview of Dentistry and knowledge about common diseases affecting the teeth and its supporting structures including identification, etiology and prevention.

UNIT – I
OVERVIEW OF DENTISTRY: [4 hours]
1. Tooth dynamics
2. Gumpad, types of dentition & its chronology
3. Pedodontics clinical observation and infant oral health
4. Assessment

UNIT - II
NO CAVITY IN ORAL CAVITY: [8 Hours]
1. Dental caries – etiology and precipitating factors
2. PRECIPITATING FACTORS [Activity based learning]
i) Diet & Microbes
ii) Saliva & Substrate with Activities
3. Assessment
4. PREVENTION OF DENTAL CARIES:
i) Remineralizing agents
ii) Fluorides in dentistry
5. Clinical observation Hour –
6. a)Conservative Dentistry & Endodontics
   b) Public Health Dentistry

UNIT – III
DANCING TOOTH: (8 Hours)
1. Gum dynamics
2. Plaque & Gum disease - 1 hours
3. Identifying & prevention of gum disease
   a) Oral Hygiene Instructions & activity
   b) Toothpaste & Tooth brush & Auxiliary aids
   c) Tooth brushing techniques (Activity based learning and assessment)
4. Malocclusion
5. Cleft lip & Palate assessment

UNIT- IV
Hidden Links (5 Hours)
1. Oral health – A gateway to health
2. Hormonal influences on Oral diseases
3. Dental imaging - Observation/ Activity/ assessment
4. Beauty at 60
5. Museum visit

UNIT –V
CUT TO SAVE: (4 Hours)
1. Wisdom about wisdom tooth
2. Oro-facial trauma & tumours
3. Assessment
4. Oral Pathology & Museum visit

UNIT –VI: IN A NUT SHELL: (1 Hour)

REFERENCES:
Text Books:
• Conservative dentistry - Sturdevant 6th ed,
• Textbook of Oral Medicine – Burket’s 12th ed.,
• Essential of Public Health dentistry – Soben Peter 5th ed
• Pediatric Dentistry –Principles and practice : MS.Muthu,N.Sivakumar, 2nd ed
• Textbook of Orthodontics – William.R. Proffit
Web Resources: From SRU Library Portal

Preferred period for beginning of the semester (UG): Month of November
Evaluation will be continuous periodic assessment in the form of MCQ’s/ Activity based/ Pedagogy

### DSL001: Tooth Wisdom

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Category</th>
<th>Course Title</th>
<th>Credits / Week</th>
<th>Hours/ semester</th>
<th>Attendance (%)</th>
<th>CIA - Theory / Practical (a)</th>
<th>End Semester Assessment (b)</th>
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<tr>
<td>DSL 001</td>
<td>S</td>
<td>Tooth Wisdom</td>
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### DEPARTMENT OF MICROBIOLOGY

**PG SEMESTER 2**

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<tbody>
<tr>
<td>MSL001</td>
<td>Introduction to the principles and practice of Infection prevention and Control</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>2</td>
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</tbody>
</table>

Course Transactor:

**Aim:** The program aims to impart the student’s knowledge about the various practices in prevention of infection both within the Hospital and Community. The students will understand the principles of the underlying the practices and how to implement them effectively.

**Learning Objectives:**

At the end of the Course the student should be knowledgeable about
1. How to prevent and control infections in hospitalized patients to ensure patient safety
2. How to prevent infections in employees thus assuring employee safety within the organization
3. How to prevent and control infections in the environment within the hospital and homes thus ensuring environmental safety
4. How to plan and implement an infection prevention program.

**Unit 1:** Overview of infectious diseases with special reference to communicable pathogens. Hand hygiene principles, practice and audit. Handling of patients with communicable diseases and the principles of isolation policies. Reporting of communicable diseases to the governmental agencies. Biomedical waste management and the current regulations.

**Unit 2:** Infection prevention in Operating rooms, Casualty, Dialysis, transplant units, Burns unit. Occupational exposure to infection and management, environmental surveillance protocols.
Unit 3 : Infection control in Central Sterilization Services department, Laundry, Diet kitchen. Infection control in Intensive Care Units including prevention of Device Associated Infections.

Unit 4 : Monitoring of Antimicrobial use and audit.

Learning Outcome : At the end of the course the student shall understand the various principles and practices of an Infection Control Program and be able to identify potential health care related infections in order to implement prevention and control measures.

Evaluation and Assessment :  
1. OSPE  
2. Multiple Choice Questions  
3. Viva Voce  

Test Books :  
1. Handbook Of Hospital Infection Control – Sanjay Singhal  
2. Basics of Infection Control for Health Care Providers 2nd edition: Mike kennamarr  
3. APIC Text of Infection Control and Epidemiology, 4th ed.  

Web Resources:  
www.cdc.gov/hai/prevent/prevention  
www.cdc.gov/hai/prevent/prevent_pubs.

| MSL001 Introduction to the principles and practice of Infection prevention and Control Skills Enhancement Course for UG programmes |
|--------------------------------------------------|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Course code | Category | Course Title | Credits / Week | Hours/ semester | End Semester Assessment |
|--------------|-----------|---------------|----------------|-----------------|-----------------|-----------------|
| MS L0 01 | Introduction to the principles and practice of Infection prevention and Control | Lecture (L) | Tutorial (T)/ Clinical Training (CT) | Practical (P)/Research Project | Credits (C) | Lecture/Tutorial | Practical | Total hours | Attendance (%) | CIA - Theory / Practical (a) MARKS |
| | | | | | | | | | | Theory (b) |
| | | | | | | | | | | Practica /Viva (c) |
| | | | | | | | | | | Theory: a+(b÷2) = 100 |
| | | | | | | | | | | Practical: a + c = 100 |

MSL001 Introduction to the principles and practice of Infection prevention and Control Skills Enhancement Course for UG programmes

| Course code | Category | Course Title | Credits / Week | Hours/ semester | End Semester Assessment |
|--------------|-----------|---------------|----------------|-----------------|-----------------|-----------------|
| MS L0 01 | Introduction to the principles and practice of Infection prevention and Control | Lecture (L) | Tutorial (T)/ Clinical Training (CT) | Practical (P)/Research Project | Credits (C) | Lecture/Tutorial | Practical | Total hours | Attendance (%) | CIA - Theory / Practical (a) MARKS |
| | | | | | | | | | | Theory (b) |
| | | | | | | | | | | Practica /Viva (c) |
| | | | | | | | | | | Theory: a+(b÷2) = 100 |
| | | | | | | | | | | Practical: a + c = 100 |

Generic, Ability & Skills Enhancemen Electives 156
**DEPARTMENT OF COLLEGE OF MANAGEMENT**

**UG SEMESTER 2, 4, 6**

<table>
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<th>Course Code</th>
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<td>2</td>
<td>-</td>
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</tbody>
</table>

Course Transactor: Dr. A. Bhoomadevi, Assistant Professor <bhooma.ganesh@gmail.com>

### Objectives

1. To make them understand the outpatient and inpatient registration process.
2. To educate them on the importance of patient education.
3. To give insight on patient satisfaction and patient records.
4. To make them understand the importance of coordination among various departments in hospitals.

### Unit I

Hospital front office management – introductory aspects of front managerial effectiveness – internal and external clients of the hospital – customer service excellence and satisfaction - role of medical secretaries in hospital - communication skills with emphasis on verbal and non-verbal communication – personal and business etiquette.

### Unit II

Outpatient section – Registration of new cases – registration of repeat cases – patient record guide – Laboratory, X-Ray reports and reports filing – Alpha index typing and Filing. OP Records – Coding (Disease & indexing) – retrieval – OP statistics.

### Unit III


### Unit IV

Discharge analysis – Incomplete record control – completed record control – Medico legal procedures & issue of Medical certification – Record retention & destruction of OP and IP records.

### Text Book

1. Medical Office Management – Christine Malone
2. Medical Office Management – Alice Anne Andress

### Reference Books

1. The physician as Manager – John J. Aluise
2. Contemporary Medical Office Procedures – Doris D. Humphrey

### Web Resources

Scheme of Curriculum and Evaluation:

Skills Enhancement Course for UG programmes offered by College of Management

<table>
<thead>
<tr>
<th>Course code</th>
<th>Category</th>
<th>Course Title</th>
<th>Credits / Week</th>
<th>Hours/ semester</th>
<th>End Semester Assessment</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Physician Office Management</td>
<td>2</td>
<td>30</td>
<td>80 50 - 50 100</td>
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</table>

Learning Objectives:
1. To make the students understand the importance of self development.
2. To support the students in building Interpersonal Skills.
3. To impart knowledge about leadership and Time management.

Unit I: Self-Assessment - Self-Awareness - SWOT Analysis – Attitudes – Values - Goal setting – Stress Management

Unit II: Communication process- Types – Barriers – Tips for Effective Communication - Speaking Skills - Listening Skills

Unit III: Group Discussion – Resume Writing- Importance of Professional behavior at workplace – Ethics and Integrity at workplace - Grooming - Email and telephone etiquette

Unit IV: Team Work – Conflict Management – Motivating Others – Good Leadership Behaviors – Time Management

Learning Outcome:
Students will understand the significance of interpersonal skills and teamwork in the working environment.

**Text Books:**
1. Personality development and soft Skills, Barun K Mitra, Oxford Higher Education
2. Organizational Behaviour, Fred Luthans, McGraw Hill

**Reference Books:**
1. 7 Habits of Highly effective people, Stephen Covey, Free press
2. You can win, Shiv Khera, Macmillan

**Web References:**

**Scheme of Curriculum and Evaluation:**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Category</th>
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**Course Description:**
This course is designed to provide knowledge and develop skill in diabetic foot care.

**Learning Objectives:**
- Brief the anatomy and physiology of pancreas, skin, nail and foot
• Brief diabetes mellitus and its risk factors, pathophysiology, clinical features, diagnostic investigations, management and complications
• Explain the pathophysiology of diabetic foot ulcer
• Perform diabetic foot examination
• List the complications of diabetic foot
• Explain the diabetic foot care practices for prevention of complications
• Conduct health education

<table>
<thead>
<tr>
<th>Unit</th>
<th>Diabetic foot care</th>
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<tbody>
<tr>
<td>I</td>
<td>Introduction of the course</td>
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<tr>
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<td>- Diabetes mellitus</td>
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<tr>
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<td>- Diabetic foot problems</td>
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<tr>
<td></td>
<td>- Anatomy and Physiology of the pancreas, skin (callus), nail and foot</td>
</tr>
<tr>
<td>II</td>
<td>Management of patients with diabetes mellitus</td>
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<tr>
<td></td>
<td>- Definitions</td>
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<td>- Risk factors</td>
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<td>- Pathophysiology of diabetes mellitus</td>
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<td>- Clinical features</td>
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<td>Assessment of diabetic foot</td>
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<tr>
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<td>- Foot examination</td>
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<tr>
<td></td>
<td>- Neurovascular assessment</td>
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<td>- Nerve conduction studies</td>
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<tr>
<td></td>
<td>- Doppler study</td>
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<td>- Screening the diabetic foot</td>
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<td>- Foot hygiene</td>
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<td>-Trimming nails</td>
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<td></td>
<td>- Cutting callus</td>
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<td>- Foot wear inspection and advice</td>
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<td>- Lifestyle modification</td>
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<td>- Monitoring blood sugar level</td>
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<td>- Follow-up care</td>
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<td>- Health education</td>
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<td>V</td>
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<td>- Foot examination</td>
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<td>- Neurovascular assessment</td>
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<td>- Foot hygiene</td>
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<td>- Foot wear inspection and advice</td>
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<tr>
<td></td>
<td>- Health education on</td>
</tr>
<tr>
<td></td>
<td>- Lifestyle modification, foot care, monitoring blood sugar level &amp; follow-up care</td>
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</tbody>
</table>

**Learning Outcome:**

On completion of this course, the student will
• Educate on prevention of diabetic foot complications
• Demonstrate basic skills in diabetic foot care
• Identify the foot complications in its early stage

References

Text Books:

Reference Books:

Online Resource:
1. www.diabeticfootcare.com
2. www.diabetesresearchconnection.org

Scheme of Curriculum and Evaluation:

<table>
<thead>
<tr>
<th>Course code</th>
<th>Category</th>
<th>Course Title</th>
<th>Credits / Week</th>
<th>Hours/semester</th>
<th>End Semester Assessment</th>
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<td>Lecture (L)</td>
<td>Tutorial (T)/Clinical Training (CT)</td>
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</table>
**Course Description**
This course equips the student with concepts of ergonomics, posture and physical activity in health perspective. It provides knowledge on basics of movement mechanics and energy expenditure, posture-effects, need for physical activity, assessment of associated health risks and strategies for Health promotion.

**Learning Objective**
The objective of this course is after 45 hours of lectures/demonstration the student should
i) Have basic knowledge on ergonomics and lifestyle diseases.
ii) Show his/her proficiency in basic skills to evaluate and apply the concepts of posture, physical capacity and health risk factors towards health promotion.

**Course Content**

**I. Anatomy and Physiology of Movement**
1. Principles of construction of human joints
2. Classification of joints
3. Physiology of Muscle contraction, posture and movement

**II. Metabolism and Bioenergetics**
1. Food energetics – Source of energy
2. Basal Metabolism
3. Anaerobic metabolism – Oxygen transportation steps
4. Aerobic metabolism
5. Influence of exercises on metabolism
6. Methods of energy expenditure evaluation

**III. Ergonomics**
1. Fundamentals of ergonomics
2. Body mechanics, posture and anthropometry
3. Application of ergonomic principle and related evaluation
4. Common work related musculoskeletal disorders, Cumulative Trauma Disorders and Repetitive motion disorders
5. Ergonomic Risk Factors and Modification
6. Application for daily life

**IV. Fitness and Health Promotion**
1. Components of physical fitness and evaluation
2. Functional capacity and evaluation (6-MWT)
3. Exercise capacity and evaluation
4. Indicators of physical health and their assessment (includes PR,BP,BMI)
5. Principles of fitness training
6. Methods of fitness training
7. Physical inactivity & health effects
8. Life style diseases and their modification

<table>
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<tr>
<th>Course Code</th>
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</table>

Course Transactor: Mr. T. Senthil Kumar, Assistant professor < tsktill@yahoo.com>
LEARNING OUTCOME:
The learner will be able understand the influence of ergonomics on life style diseases and be able to evaluate and apply the concepts of posture, physical capacity and health risk factors towards health promotion.

EVALUATION:
Unit tests, assignments and seminars are given to evaluate the student.

References:
5. Kinesiology of Musculoskeletal system, Donald. A Neuman.
6. Anatomy and Human Movement, Nigel Palastanga.

<table>
<thead>
<tr>
<th>Course code</th>
<th>Category</th>
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<th>Credits / Week</th>
<th>Hours/ semester</th>
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- Theory: a+(b+c)/2 = 100
- Practical: a+c = 100
# PROGRAM REGISTRATION CARD

**REGISTRATION CARD FOR COURSE – ACADEMIC YEAR 2015-16**

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<td>Year &amp; Batch</td>
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| Total Credit |                                                    |

**Signature:**

**Name:**

**Designation:**

**Time of Submission**

*To be filled and sent to CBCS office within one week of joining a programme*

**Seal of Department**

*NOTE: This online elective registration process is indicative of the electives chosen by the student. ELIGIBILITY FOR ADMISSION TO EXAMINATIONS OR ADVANCING TO THE NEXT SEMESTER IS GOVERNED BY THE REGULATIONS FOR A PROGRAM.*
### Type A5 for ALL GE/AE/SE Courses from April 2017 onwards

<table>
<thead>
<tr>
<th>UG And PG programs</th>
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**THEORY QUESTION PAPER PATTERN FOR UNIVERSITY EXAMINATIONS UNDER CBCS**

*(End of Semester Examination (ESE) Theory Assessment Pattern)*

*for GE/ AE/SE courses - single evaluation*

**TYPE A5**

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<tr>
<th>Objective type: (Answer ALL) [Define/give reasons/classify/List any two (differences; advantages; functions; applications;....)]</th>
<th>5 x 3 marks</th>
<th>15 marks</th>
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<tr>
<td>Long essay (1 out of 2)</td>
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**TOTAL** | **50 marks** |

**FORMAT:**

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**B Sc Hons. (AHS); B P T; B Sc Hons. Sports & Exercise Science; B OPTOM ....DEGREE EXAMINATION, June 2017**

**FIRST SEMESTER**

**Health Care Biotechnology**

**Time:** 2 hours  
**Maximum marks:** 50

**Instructions to the candidates:**

- Draw diagrams wherever needed

**Answer ALL the following:**

*(5x3 marks)*

[Define/give reasons/classify/List any two (differences; advantages; functions; applications;....)]

1
2
3
Answer any **FOUR** of the following:  

(4x5 marks)

Answer any **ONE** of the following:  

(1x15)