SRI RAMACHANDRA UNIVERSITY

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

Accredited by NAAC with 'A' Grade
Porur, Chennai 600 116

HAND BOOK OF CHOICE BASED CREDIT SYSTEM (CBCS)

FOR UG AND PG DEGREE PROGRAMS

2015-16

CHOICES AND SYLLABUS

FOR

GENERIC ELECTIVE, ABILITY ENHANCEMENT COMPULSORY & SKILLS ENHANCEMENT COURSES

SRU – CBCS CODING SYSTEM FOR GENERIC ELECTIVE/ ABILITY ENHANCEMENT COURSES – 2015-16			
Elective and Foundation College Code			
S. No.	**College/Faculty**	**One Letter Code**	**Three Letter Code**
1	Medical	M	MED
2	Dental	D	DEN
3	Nursing	N	NUR
4	Pharmacy	P	PHY
5	Allied Health Science	A	AHS
6	Physiotherapy	T	PST
7	Biomedical Science	B	BMS
8	Management	G	MGT

Revised and Updated upto June 2017

Elective Courses Offered Under the CBCS, 2015 updated upto June 2017

A. LIST OF GENERIC ELECTIVE COURSES OFFERED BY SRU DEPARTMENTS [Credits = 3]					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG / IN**
Faculty of Allied Health Sciences					
1	AGE001	Personality Development and Stress Management	Clinical Psychology	2,4,6	UG
2	AGE002	Health Psychology	Clinical Psychology	2,4,6	PG
3	AGE003	Organizational Behavior	Clinical Psychology	2,4,6	UG
4	AGE004	Counseling and Guidance	Clinical Psychology	2,4,6	PG
5	AGE005	First Aid Management & Splinting Techniques	Accident and Emergency Medicine	2,4,6	UG
6	AGE006	Airway Management ECG & Emergency Drugs	Accident and Emergency Medicine	1	PG
7	AGE007	Clinical Examination of Visual System	Optometry	1	UG
8	AGE008	Sports Vision	Optometry	3,5,7	UG
9	AGE009	Eye Banking	Optometry	2,4,6	UG
10	AGE010	Visual diagnostic for children with special needs	Optometry	2,4,6	UG
11	AGE011	Functional Foods and Nutraceuticals for Health Promotion	Clinical Nutrition	3,5,7	PG
12	AGE012	Nutrition Support Techniques	Clinical Nutrition	3,5,7	PG
13	AGE014	Occupational Nutrition	Clinical Nutrition	3,5,7	UG
14	AGE015	Malnutrition and Public Health	Clinical Nutrition	2,4,6	UG
15	AGE016	Basics of Food and Nutrition	Clinical Nutrition	1	UG
16	AGE017	Food and Nutrition In Emergencies	Clinical Nutrition	2,4,6	PG
17	AGE018	Exercise Physiology	Arthroscopy and Sports Medicine	2,4,6	UG
18	AGE020	Advanced Exercise Physiology	Arthroscopy and Sports Medicine	1	PG
19	AGE022	Exercise Psychology	Arthroscopy and Sports Medicine	3,5,7	PG
20	AGE023	Basics of Yoga & practice	AHS	1	UG
21	AGE024	Pranayama	AHS	3,5,7	UG
22	AGE028	Noise exposure and its effects	Speech Language & Hearing Science	1	UG
23	AGE029	Basic concepts in Voice and its efficient use	Speech Language & Hearing Science	3,5,7	UG
24	AGE030	Fundamentals of Occupational Health	Environmental Health Engineering	1	UG
25	AGE031	Biomedical Waste Management	Environmental Health Engineering	2,4,6	UG
26	AGE032	Health Behaviour	Clinical Psychology	2,4,6	UG
27	AGE033	Basic Psychology	Clinical Psychology	3,5,7	UG
28	AGE034	Psychology of Addiction	Clinical Psychology	1	UG
Faculty of Biomedical Sciences & Technology					
29	BGE001	Introduction to Human Genetics	Human Genetics	1	UG
30	BGE002	Principles of Genetics	Human Genetics	1	PG

31	BGE011	Clinical Genetics - Principles and applications	Human Genetics	2,4,6	PG
32	BGE012	Trends in Tissue Engineering and Regenerative Medicine	Centre for Regenerative Medicine & Stem Cell Research	3,5,7	UG
33	BGE013	Translational Biology	Centre for Regenerative Medicine & Stem Cell Research	3,5,7	PG
34	BGE014	Medical Entomology	Biomedical Sciences	1	UG
35	BGE015	Lifestyle Disorders	Biomedical Sciences	2,4,6	UG
36	BGE016	Applied Biotechnology	Biomedical Sciences	1	UG
37	BGE017	Food Microbiology	Biomedical Sciences	2,4,6	UG
38	BGE018	In vitro Bioassays of Natural Products	Biomedical Sciences	3,5,7	UG
39	BGE019	Nutrition in Health & Diseases	Biomedical Sciences	2,4,6	UG
40	BGE020	Basic Computing	Bioinformatics	3,5,7	UG
41	BGE021*	Introductory Biostatistics	Bioinformatics	2,4,6 ; 3,5,7	UG
42	BGE022	Intermediate Mathematics	Bioinformatics	3,5,7	UG
43	BGE023*	Bioinformatics	Bioinformatics	2,4,6	PG
44	BGE024	Hospital Information Management Systems	Bioinformatics	2,4,6	PG
45	BGE025	Chemi-informatics	Bioinformatics	2,4,6	PG
46	BGE026	Nano-diagnostics	Biotechnology	2,4,6	PG
47	BGE027	Health care Biotechnology	Biotechnology	2,4,6	UG
48	BGE029	Plant Tissue Culture Technology	Biotechnology	2,4,6	UG
49	BGE030	Marine Biotechnology	Biotechnology	2,4,6	UG
50	BGE031	Antimicrobial Agents	Biotechnology	3,5,7	PG
51	BGE032	Algal Biotechnology	Biotechnology	3,5,7	UG
52	BGE036	Nanotechnology	Biotechnology	3,5,7	UG
53	BGE037	Alternative Models for Experimental Toxicology	Biotechnology	2,4,6	PG
54	BGE038	Basic Radiation Biology	BMS-CRF	3,5,7	UG
Faculty of Management Sciences					
55	GGE002	Team Building & Leadership	Management	1	UG
56	GGE009	Hospital Operations Management	Management	2,4,6	UG
57	GGE015	Training & Development	Management	1	PG
58	GGE018	Basics of Hospital Management	Management	3,5,7	PG
SRMC & RI					
59	MGE001	Mind Body Medicine	Physiology	2,4,6	UG
Faculty of Pharmacy					
60	PGE001	Herbal Drug Technology	Pharmacy	1	UG
61	PGE002	Green Chemistry	Pharmacy	3,5,7	UG
62	PGE003	In vitro Screening Methods	Pharmacy	3,5,7	UG
63	PGE004	Intellectual Property Rights	Pharmacy	3,5,7	UG
64	PGE005	Good Manufacturing Practice (GMP)	Pharmacy	3,5,7	UG
65	PGE006	Good Clinical Practice	Pharmacy	3,5,7	PG

66	PGE007	Pharmacovigilance	Pharmacy	2,4,6	PG
67	PGE008	Analytical Instrumentation Techniques	Pharmacy	3,5,7	PG
Faculty of Physiotherapy					
68	TGE002	Exercise Prescription in Women's Health	Physiotherapy	2,4,6	UG
69	TGE003	Physical Health	Physiotherapy	3,5,7	UG

**** Courses included from 2017 0nwards as theory or practicals.***

B. LIST OF ABILITY ENHANCEMENT COURSES OFFERED BY SRU DEPARTMENTS [Credits = 2]					
Faculty of Allied Health Sciences					
S. No.	Elective Code	**Course Name**	**Department**	**Semester**	**Level UG/ PG**
1	AAE 001	English	English	1,2,3	UG
2	AAE 002	English for Clinical Communication	English	2,4	UG
3	AAE 003	Communication and Soft Skill	English	1,3,5	UG
4	AAE 004	Environmental Science	Environmental Health Engineering	1,2,3	UG
5	AAE 005	Trauma Life Support *	Accident & Emergency	1,3,5	UG
6	AAE 006	Cardiac Life Support *	Accident & Emergency	1,3,5	UG
7	AAE 007	Community Medicine	Community Medicine	1,3	UG
8	AAE 010	Medical Ethics & Law *	General Medicine	3,5,7	UG
Faculty of Biomedical Sciences & Technology					
9	BAE 005	Basics of Biodiversity	Biomedical Sciences	1,3,5,7	UG

* 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					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG**
Faculty of Allied Health Sciences					
1	ASE 002	Applied Psychology	Allied Health Sciences	1,3,5,7	UG
2	ASE 006	Bakery and Confectioneries	Clinical Nutrition	1,3,5,7	UG
3	ASE 008	Introduction To Communication Disorders And Rehabilitation	Speech Language and Hearing Science	2,4,6	UG
4	ASE 009	Functional Language Skills	Language Department	1,3,5,7	UG
5	ASE 010	Basic quantitative research tools for clinical and public health research	Environmental Health Engineering	2,4,6	UG
6	ASE 012	Occupational Health Services	Environmental Health Engineering	2	PG
7	ASE013	Professional skills Development	Environmental Health Engineering	1,3	PG
8	ASL011	Health Science Data Analysis using R-Statistical Software	Environmental Health Engineering	1,3	PG
9	ASL014 ¥	National service scheme and Nation Building	NSS office	2,4,6	UG
10	ASL015 ¥	Culinary Skills for optimal nutrition	Clinical Nutrition	1,3,5,7	UG
11	ASL016 ¥	Basic Life Support	Accident & Emergency	2,4,6	UG
12	ASL017 ¥	Library Science and E-Resources	Central Library	1,3,5,7	UG
Faculty of Biomedical Sciences & Technology					
13	BSE 001	Good Laboratory Practices	Biomedical Sciences	1,3,5,7	UG
14	BSE 002	Human Rights and Value Education	Biomedical Sciences	2,4,6	UG
15	BSE 003	Fundamentals in Analytical Laboratory Skills	Biomedical Sciences	1,3,5,7	UG
16	BSE 004	Public Health and Hygiene	Biomedical Sciences	2,4,6	UG
17	BSL015 ¥	Medical Transcription	BMS	1,3,5,7	UG
18	BSL016 ¥	Basics of Electronics	BMS	1,3,5,7	UG
SRDC &H					
19	DSL001 ¥	Tooth Wisdom	Dental	2,4,6	UG
SRMC & RI					
20	MSL001 ¥	Introduction to the principles and practice of infection prevention and control	Microbiology	2	PG
Faculty of Management Sciences					

21	GSL001 ¥	Physician Office Management	Management	2,4,6	UG
22	GSL002 ¥	Interpersonal Skills	Management	1,3,5,7	UG
Faculty of Nursing					
23	NSL001 ¥	Diabetic foot care	Community Nursing	2,4,6	UG
Faculty of Physiotherapy					
24	TSL001 ¥	Ergonomics and Health promotion	Physiotherapy	2,4,6	UG

¥- Courses introduced in January 2017 onwards

Generic Elective and Skilled Enhancement Course

GENERIC ELECTIVE AND SKILLED ENHANCEMENT COURSE
TYPICAL WEEK TIME TABLE FOR ODD AND EVEN SEMESTERS

Day/Time	**8.00**	**9.00**	**10.00**	**10.15**	**11.15**	**12.15**	**1.00**	**2.00**	**3.00**
	9.00	**10.00**	**10.15**	**11.15**	**12.15**	**1.00**	**2.00**	**3.00**	**4.00**
Monday			Break			Lunch			
Tuesday									
Wednesday									
Thursday	GE 1	GE 1		GE 2	SE 1		GE 1	GE 2	GE 2
Friday									
Saturday								SE 1	SE 1

- 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					
Course Number	**Elective Code**	**Course Title**	**DEPARTMENT**	**SEMESTER**	**UG/PG/IN**
1	AGE001	Personality Development and Stress Management	Clinical Psychology	2,4,6	UG
2	AGE002	Health Psychology	Clinical Psychology	2,4,6	PG
3	AGE003	Organizational Behaviour	Clinical Psychology	2,4,6	UG
4	AGE004	Counseling and Guidance	Clinical Psychology	2,4,6	PG
26	AGE032	Health Behaviour	Clinical Psychology	2,4,6	UG
27	AGE033	Basic Psychology	Clinical Psychology	3,5,7	UG
28	AGE034	Psychology of Addiction	Clinical Psychology	1	UG

Department of Clinical Psychology UG SEMESTER 2,4,6							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
1	AGE 001	Personality Development and Stress Management	3	-	-	**3**	45

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:

1. Hurlock (1976). Personality development. Tata McGraw Hill.
2. Baron R A, Psychology 5th edition, Pearsons publication.
3. Abraham A, General Psychology, Tata Mc Graw hill Education private limited.

Reference Books:

1. Lazarus J Stress Relief and Relaxation Techniques, Viva Book Private limited.
2. Shelly E. Taylor, Health psychology, 7th edition, TATA McGrawHil, New Delhi.

Online Resources:

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

2. Soft skill module, Effective communication, listening, speaking, writing, interpretation http://profitt.gatech.edu/drupal/sites/default/files/curriculum/Soft%20Skills%20Track/Soft%20Skills%20Module%2005%20Communication/Soft%20Skills%20Module%205%20Communication.pdf

3. Personality development http://abesit.in/wp-content/uploads/2014/05/article-personality-development.pdf

Department of Clinical Psychology PG SEMESTER 2,4,6							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
2	AGE 002	Health Psychology	3	-	-	**3**	45

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:

1. Health psychology, 7th edition, Shelly E. Taylor, TATA McGrawHil, New Delhi, 2012
2. Behavioural medicine – A guide for clinical practice, 3rd edition, Mitchell D. Feldman &John F. Christensen, McGraw Hill, NY, 2008

References Books:

1. An introduction to health psychology, 2nd edition, Robert J. Gatchel, Andrew Baum and David S. Krantz, McGraw Hill, NY, 1989
2. Health psychology- theory, research and practice, 2nd edition, David F. Marks, Michael Murray, Brain Evans, Carla Willig, Cailine Woodall and Catherine Sykes, Sage south Asia Edition, 2008

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)

2. Health news http://www.health-e.org.za/health-categories/

DEPARTMENT OF Clinical Psychology UG SEMESTER 2,4,6						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
3. AGE003	Organizational Behaviour	3	-	-	**3**	**45**
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
Definition, Causes of Conflict, Types of Conflict, Conflict Process, Conflict Resolution Model. Stress-Symptoms, General Adaptation Syndrome, Sources of Jobs Stress, Group stressors, Individual Stressors, Stress and Behaviour, Burnout - Causes of Burnout, Prevention of Burnout, Management of stress Individual vs. Organizational level strategies.

LEARNING 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:

1. Organizational Behavior, 1st ed, Koldalkar, New Age International (P) Limited, Publishers, New Delhi, 2007.
2. Fundamentals of Organizational Behavior, Key Concepts, Skills and Best Practices, 2nd ed. Kreitner, Kinicki and Cole, McGraw-Hill Ryerson, 2007.

Reference books:

1. Introduction to Psychology (International Student Edition) Morgan, C.T., King, R.A., Weisz, J.R., & Schopler, J: McGraw Hill Book Co., 1986.
2. Theories of Personality (4th ed.) Hall S C., Lindzey G, Campbell B J, John Willey and Sons, Inc. New York. 1998)

Online Resources:

1. http://www.scimagojr.com/journalrank.php?category=1407
2. http://www.lib.unb.ca/guides/view/index.php/489

Department of Clinical Psychology IN/ PG Semester 2,4,6							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
4	AGE 004	Counseling and Guidance	3	-	-	3	45

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.).
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- 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:

1. Corey, G. (2004). *Theory and Practice of Counseling and Psychotherapy* (7th ed.). Wadsworth Publishing.
2. Gladding, S.T. (2003). *Counseling: A Comprehensive Profession* (5th edition.). Prentice-Hall Career & Technology.

Reference books:

1. Narayana Rao, S. (2002). Counselling and Guidance (Rev. Second Edition). Tata McGraw-Hill, New Delhi.
2. Thomas, R. Murray. (1990). Counselling and Life Span Development. Sage Publications, New Delhi.

Online Resources:

1. http://www.basic-counseling-skills.com/
2. http://www.counsellingtutor.com/basic-counselling-skills/

DEPARTMENT OF ClinicalPsychology UG SEMESTER 2,4,6						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
26. AGE032	**Health Behaviour**	3	-	-	**3**	**45**
Course Transactor: Ms. Divya Merciline A, Lecturer < divyaclipsian@gmail.com>						

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

Concepts of health –definition of health –determinants of health– health psychology as a field – mind and body relationship – bio-medical model versus bio-psychosocial model

Unit II – Links between stress, personality and illness

Stress and coping: Stress and stressors – types of stress – stages of stress – Psychoneuroimmunology – health outcomes of stress – coping – coping styles

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:

1. Taylor S. E. (2012), Health psychology (7th edition), TATA McGrawHil, New Delhi.
2. Marks D. F., Murray M., Evans B, Willig C, Woodall C. & Sykes C. (2008), Health psychology-theory, research and practice (2nd edition), Sage south Asia Edition.

References Books:

1. Gatchel R. J., Baum A., & Krantz D. S. (1989). An introduction to health psychology (2nd edition), McGraw Hill, NY.
2. Feldman M. D. & Christensen J. F. (2008). Behavioural medicine – A guide for clinical practice (3rd edition), McGraw Hill, NY.

Online Resources:

- ✓ Global Health (EBSCO) (//www.google.co.in/search?q=Global+Health+(EBSCO)&rlz=1C1SAVU_enIN566IN566&oq=Global+Heal th+(EBSCO)&aqs=chrome..69i57.18704j0j8&sourceid=chrome&es_sm=93&ie=UTF-8)
- ✓ Health news http://www.health-e.org.za/health-categories/

Department of Clinical Psychology **UG SEMESTER 3,5,7**						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
27. AGE033	Basic Psychology	3	-	-	**3**	**45**
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

Language and Thoughts_ -Properties of language- pattern of language development- Mental imagery-Relationship between language and intelligence – Thought process – Concepts –types, processes in concept formation; Problem solving -mental sets , Functional fixedness, Creativity- Nature of Creative thinking.

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:

1.Clifford.T,Morgan,RichardA.King,John R.Weise, John Schopler(2003)Introduction to Psychology,7th Edition , Tata Mc Graw Hill

2. Ernest R.Hilgard, Rital Atkinson, Richard C.Atkinson, Introduction to Psychology, Harcourt, Brace, Jovanovich, Inc.

Reference books:

1. James W.Kalat (1996), Introduction to Psychology, 4th edition, Brooks/cole.

2. Robert S Feldman, 2011 Understanding psychology 10th Edition, Mc. Graw Hill publishing company pvt. ltd

Online Resources:

1. Psychology Basics: http://psychology.about.com/od/psychology101/u/psychology-basics.htm

2. Introduction to psychology: http://psych.wisc.edu/braun/281/Outlines.html

DEPARTMENT OF PSYCHOLOGY UG SEMESTER 1						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
28	Psychology of Addiction	2	1	-	**3**	**45**
Course Transactor: Dr. P. N. Thomas						

LEARNING OBJECTIVES:

- To create awareness about addiction and it's 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 it's 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:

1. Sadock, B. J., Sadock, V. A., & Ruiz, P. (2015). *Kaplan & Sadock's synopsis of psychiatry: Behavioral sciences/clinical psychiatry* (Eleventh edition.). Philadelphia: Wolters Kluwer.

2. Cowen, P., Harrison, P. & Burns, T. (2012). *Shorter Oxford Textbook of Psychiatry* (Sixth edition). Oxford, UK: Oxford University Press.

3. Coleman, J. C. & Butcher, J. N. (2001). *Abnormal Psychology and Modern Life* (Eighth edition). Illinois: Scott, Foresman and Company.

Reference books:

1. WHO, (1992). *The ICD-10 Classification of Mental and Behavioural Disorders: Clinical Description and Diagnostic Guidelines* (Tenth edition). Geneva: World Health Organization.

2. American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Association.

Faculty Allied Health Sciences - Department of Accident and Emergency Medicine								
S. No.	**Code Number**	**Course Name**	**Elective Open**	**Credit**	**Semester Odd/Even**	**Faculty**	**Department**	**Level UG/PG/I/D/Ph.D**
7.	AGE 005	First Aid Management & Splinting Techniques	Elective Open	3	Even	AHS	TCM	UG
8.	AGE 006	Airway Management ECG & Emergency Drugs	Elective Open	3	odd	AHS	TCM	PG/ IN

Department of Accident and Emergency Medicine **UG SEMESTER 2,4,6**							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
7	AGE 005	First Aid Management & Splinting Techniques	3	-	-	**3**	45

<u>FIRST AID MANAGEMENT AND SPLINTING TECHNIQUES</u>

<u>Objectives:</u>

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

Unit-I BACKGROUND INFORMATION

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

Unit-II ACTION AT AN EMERGENCY

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

Unit –III BLEEDING AND WOUNDS

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

Unit-IV BONE, JOINT AND MUSCLE INJURIES

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

UNIT-V RESCUING AND MOVING INJURIES

- Water rescue
- Ice rescue
- Electrical Emergency Rescue
- Hazardous materials incidents
- Motor Vehicle crashes
- Fires
- Confined spaces
- Triage – what to do with multiple victims
- Moving victims

Recommended books:

1.First Aid CPR and AED standard (sixth edition)

2.First aid book-St Johns Ambulance services

3. Text book of Orthopaedics – Natarajan

4. Text book of Orthopaedics – John Ebenezer

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

Department of Accident and Emergency Medicine **PG semester 1**							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
8	AGE 006	Airway Management ECG & Emergency Drugs	3	-	-	**3**	**45**

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 – 1

- 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 – PadmajaUdaykumar

4. ECG made easy – John R. Hampton

Reference Books:

1. Titinallis Textbook of Emergency Medicine 7 th edition
2. American Heart Association Advanced Cardiac Life support Provider Manual

Online References:

1. www.trauma.org

2. Airway management academy.com

S. No.	Elective Code	Title	Department	Semester	UG/PG
7	AGE007	Clinical Examination of Visual System	Optometry	1	UG
8	AGE008	Sports Vision	Optometry	3,5,7	UG
9	AGE009	Eye Banking	Optometry	2,4,6	UG
10	AGE010	Visual diagnostic for children with special needs	Optometry	2,4,6	UG

Department of Optometry UG SEMESTER 1							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
7	AGE 007	Clinical Examination of the Visual system	3	-	-	3	45

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:

1. Comprehensive Ophthalmology – A K Khurana, 5th edition, New Age International Publishers, 2012.
2. Clinical Ophthalmology – Jack J Kanski, 7th edition, Butterworths, 2012

Reference Books:

1. Borish's Clinical Refraction - William J. Benjamin, Irvin M. Borish, Butterworth-Heinemann, 2006

Department of Optometry **UG SEMESTER 3,5,7**							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
8	AGE 008	Sports Vision	3	-	-	**3**	**45**

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 personnels

Definition, Classification in to 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

Dynamic visual acuity, Visual Concentration, Eye tracking: Fixation, Saccades, Pursuits, Vestibular and Optokinetic movements, Eye - Hand - Body coordination, Visual Memory, Visualization, Peripheral Vision Awareness, Accommodation, Vergence facility, Visual reaction time, Depth Perception, Glare recovery

V- Preservation and Protection of Vision

Hazards: Physical and Radiation, Preventive measures, Managing Sports eye injuries

Learning Outcome:

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

Text books:

1. Elite Sports & Vision by Ajay K. Bhootra, 1 ed, Jaypee Brothers Medical Pub; 2008
2. Sports Vision, Edited by Alan W. Reichow, OD & Michael M. Stoner, OD, Optometric Extension Program, 1993

Reference Books:

1. Sports Vision By Graham Erickson, Butterworth Heinmann,2007

Online references:

1. visiontherapystories.org

Department of Optometry UG SEMESTER 2,4,6							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
09	AGE 009	Eye Banking	3	-	-	3	45

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:

1. Essentials of Eye Banking, A. Panda, 1st ed, CBS Publishers & Distributors; 2005
2. Introduction to Eye Banking: A Handbook and Atlas: a Guide to Eye Bank Techniques, Corneal Evaluation, and Grading, George O. D. Rosenwasser, William J. Nicholson, Pennsylvania State University, 2003

Reference Books:

3. Eye Banking : T. Bredehorn, Gernot Duncker, W. John Armitage, 1st ed, S Karger, 2009
4. Postgraduate Ophthalmology, Volume 1 Zia Chaudhuri, Murugesan Vanathi

Online References: http://npcb.nic.in/writereaddata/mainlinkfile/file176.pdf

Department of Optometry UG SEMESTER 2,4,6							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
10	AGE 010	Visual diagnosis for children with special needs	3	-	-	3	45

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:

1. Borish clinical refraction; William J. Benjamin, 2 ed, Butterworth-Heinemann; 2006
2. Clinical procedures in primary eye care; David B. Elliot, 4 ed, Saunders Ltd.; 2013

S. No.	Elective Code	Title	Department	Semester	UG/PG / IN
11	AGE011	Functional Foods and Nutraceuticals for Health Promotion	Clinical Nutrition	3,5,7	PG
12	AGE012	Nutrition Support Techniques	Clinical Nutrition	3,5,7	PG
13	AGE014	Occupational Nutrition	Clinical Nutrition	3,5,7	UG
14	AGE015	Malnutrition and Public Health	Clinical Nutrition	2,4,6	UG
15	AGE016	Basics of Food and Nutrition	Clinical Nutrition	1	UG
16	AGE017	Food and Nutrition In Emergencies	Clinical Nutrition	2,4,6	PG

Department of Clinical Nutrition **IN/PG SEMESTER 3,5,7**							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
11	**AGE 011**	Functional foods and nutraceuticals for health promotion	**3**	**-**	**-**	**3**	**45**

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

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

III- Introduction to functional foods

Functional Foods – definition. Development of functional foods. Functional meat products, functional soy products, functional seafood products, Dietary fibre functional products.

IV - Functional foods and health

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

V - Probiotics and Prebiotics

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

VI- Synbiotics

Synbiotics: Definition. Potential traditional and novel food interventions.

Learning Outcomes:

The student will be able to:

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

- ✓ Handbook of Nutraceuticals and Functional Foods, Wildman, R.E.C. 2nd edition. CRC Press, 2007.
- ✓ Functional Foods - Concept to Product, Gibson GR & William CM, 2000.
- ✓ Functional Foods- Concept to Product, Maria Saarela, Woodhead Publishing, 2011.

Reference books

1.Functional Food Product Development, Jim Smith, Edward Charter,Wiley-Blackwell, 2010.

2.Phytochemicals of Nutraceutical Importance Dhan Prakash, Girish Sharma 2014.

Journal references:

1.Nutrition Journal

2.Current Topics in Nutraceutical Research

Websites:

http://www.nutraingredients.com/

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

Department of Clinical Nutrition **IN/PG SEMESTER 3,5,7**							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
12	AGE 012	Nutrition support techniques	2	-	1	**3**	**60**

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

1. Michele Grodner EdD CHES and Sara Long Roth PhD RD LD Nutritional Foundations and Clinical Applications of Nutrition – A Nursing Approach, 4th Ed., 2007

2. Srivastava, R.K., Tiwari, B.K., Agarwal, Y, Cuurent Nutritional Therapy Guidelines in Clinical Practices, 2008. Directorate General of Health Services, Ministry of Family Welfare, Govt. of India.

Reference Texts

1. Gottschlich,M., Materesse EL., The Science and Practice of Nutrition Support, A case based core curiculum, 1st Ed., 2000

2. Laura E Mataresse – Contemporary Nutrition Practice, 2nd Ed., Saunders, 2003

Practicals

Learning Objectives

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

Practicals

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

At the end of the module the learner will be able to

1. Be an integral part of the health care team in monitoring nutrition support
2. Developed skill of planning nutrition support schedule

Department of Clinical Nutrition **UG SEMESTER 3,5,7**							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
13	AGE 014	Occupational Nutrition	3	-	-	**3**	45

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

1. Global Inequalities at Work : Work's Impact on the Health of Individuals, Families, and Societies, Jody Heymann , PublisherOxford University Press, 2003

2. Ecology, Ethnology, and Nutrition: A Study of Kondh Tribals and Tibetan Refugees, Srisha Patel, Mittal Publications, 1985

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**							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
14	AGE 015	Malnutrition and Public Health	3	-	-	3	45

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, sever acute malnutrition and micronutrient deficiencies of public health significance.

V-Public health aspects of life style related disorders

Public health implications and preventive strategies for obesity, hypertension, coronary heart disease, diabetes, osteoporosis, cancer and dental carrier

VI-Nutrition education in community

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

Learning outcome

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

Text books:

1. Nutrition in promoting the public health strategies, principles and practices, Kaufman M., Jones and Barlett Publishers, 2007.
2. Basic Epidemiology, Bonita R, Beaglehole R, Kjellstrom, 2nd Edition. WHO, 2006.
3. Community Nutrition-Applying epidemiology to contemporary practice,Frank G.C., 2nd Edition. Jones and Bartlett Publishers, 2008.

Reference books

1. Public Health Nutrition, Gibney M.J., Margetts, B.M., Kearney, J. M. Arab, I., (Eds), NS Blackwell Publishing, 2004.
2. National Consensus Workshop on Management of SAM children through Medical Nutrition Therapy (2009)-Compendium of Scientific Publications Volume I and II. Jointly organized by AIIMS, Sitaram Bhartia Institute of Science and Research, IAP (Subspeciality chapter on Nutrition), New Delhi. Sponsored by DBT.
3. Park's Textbook of Preventive and Social Medicine, .Park, K, 20th edition. Jabalpur M/s. Banarsidas, 2009.

Journal reference

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

Web reference

1.www.nutritionsociety.org/publications/nutrition...journals/public-health
2.www.nestlenutrition-institute.org/
3.www.nutritionsociety.org
4.www.internationalmedicalcorps.org/
5.www.internationalmedicalcorps.org/

Department of Clinical Nutrition UG SEMESTER 1							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
15	AGE 016	Basics of Food and Nutrition	3	-	-	3	45

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

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

V - Minerals

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

VI - Water and Interrelationship between Nutrients

Importance of water and water balance & Interrelationship between nutrients.

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

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

Text Books:

7. **Foods- Nutrition & Health, Vijaya Khader, 1st Edition, Kalyani Publishers / Lyall Bk Depot, 2003.**
8. **A Textbook on Human Nutrition, Bamji MS, PrahladRao N and Reddy V, 3rd Edition, Oxford and IBH Publishing Co., New Delhi, 2010.**

Reference Books:

- ✓ Handbook of Nutrition and Food, Carolyn D. Berdanier, Johanna T. Dwyer, David Heber, 3rd Edition, CRC Press, 2013.
- ✓ Food, Nutrition and Health, Linda Tapsell, Oxford University,2013.
- ✓ Food Science, B.Srilakshmi, 5th Edition, New Age International (P) Limited, 2010.
- ✓ A Handbook of Foods and Nutrition, F.C. Blank, Reena, Agrobios (India), 2009.

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

Department of Clinical Nutrition **PG SEMESTER 2,4,6**							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
16	AGE 017	Food and Nutrition In Emergencies	3	-	-	3	45

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 Availablity, 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, Faciltating 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:-

1. Tolley's Handbook of Disaster and Emergency Management Principles and Practice, Tony Moore & Raj Lakha, 2006.
2. International Public Health: Diseases, Programs, Systems, and Policies. Michael H. Merson, Robert E. Black, Anne Mills,Jones & Bartlett, 2005.
3. The Management of Nutritional Emergencies in large populations, Goyet, Fish V, Seaman, J. and Geijaer, WHO, Geneva, 1978
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
5. UNHCR Hand Books of emergencies, UNHCR, 2nd edition, Geneva, UNHCR, 1999
6. Public Health Guide for Emergencies,Saade Abdallah, Gilbert Burnham, 1st Edition, Johns Hopkins School of Hygiene and Public Health & International Federation of Red Cross and Red Crescent Societies
7.

Reference Book:-

The Management of Nutrition in Major Emergencies, WHO, 2000

Website References:-

1. www.learnwarecorp.com
2. http://whqlibdoc.who.int/publications/2000/9241545208.pdf
3. http://whqlibdoc .who.int /hq/2004/9241546069.pdf

Journal References:-

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

Generic Elective/ Ability Enhancement Courses Offered – Faculty of Allied Health Sciences Dept Of Arthroscopy and Sports Medicine								
S. No.	**Code Number**	**Course Name**	**Generic Elective / Ability Enhancement Courses**	**Credit**	**Semester Odd / Even**	**Faculty**	**Department**	**Level UG/PG/I /D/Ph.D.**
Elective								
17	**AGE 018**	Exercise Physiology	Generic Elective	3	Even	AHS	Arthroscopy and Sports Medicine	UG
18	**AGE 020**	Advanced Exercise Physiology	Generic Elective	3	ODD	AHS	Arthroscopy and Sports Medicine	PG
19	**AGE 022**	Exercise Psychology	Generic Elective	3	Even	AHS	Arthroscopy and Sports Medicine	PG

Department of Arthroscopy And Sports Medicine UG SEMESTER 2,4,6							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
17	**AGE 018**	Exercise Physiology	2	-	2	**3**	**60**

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:

- George Brooks, Thomas Fahey, Kenneth Baldwin. Exercise Physiology: Human Bioenergetics and Its Applications. (4th Edition).
- Jack H. Wilmore, David L. Costill. Physiology of Sport and Exercise. (3rd Edition).
- Katch and Katch Exercise Physiology

Department of Arthroscopy And Sports Medicine PG SEMESTER 1							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
19	AGE 020	Advanced Exercise Physiology	2	-	2	3	60

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:

- George Brooks, Thomas Fahey, Kenneth Baldwin. Exercise Physiology: Human Bioenergetics and Its Applications. (4th Edition).
- Jack H. Wilmore, David L. Costill. Physiology of Sport and Exercise. (3rd Edition).
- Katch and Katch Exercise Physiology

Department of Arthroscopy And Sports Medicine PG SEMESTER 3,5, 7							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
19	**AGE 022**	**Exercise Psychology**	2	-	2	**3**	**90**

Learning Objective:

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

- Understand how sport and exercise influence psychological health and well-being

Learning Outcomes:

At the completion of this module the students must be able to;

a) Summarise the psychological theories and models from the area of sport and exercise psychology
b) Demonstrate knowledge of personality and motivation and aggression in relation to sport and exercise
c) Know the impact of arousal, stress and anxiety on sport performance
Demonstrate knowledge of what competitive state anxiety is, and the factors that contribute to this state

UNIT I: **Review of psychology concepts**

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

UNIT II: **Personality and sport**

a. Understanding personality structure
b. Measuring personality
c. Examining cognitive strategies and success

UNIT III: **Motivation**

a. Approaches to motivation
b. Building motivation
c. Developing realistic view

UNIT IV: **Arousal stress and anxiety**

1. Measuring arousal
2. Anxiety
3. Sources of stress & anxiety
4. Stress process
5. Aggression in sport

UNIT V: **Psychological factors that affect people in exercise environments**

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

Recommended/Suggested Textbooks:

- Robert S. Weinberg, Daniel Gould. Foundations of Sport and Exercise Psychology. (5th Edition).

Department of Allied Health Sciences Course Transactor: P.Vijayalakshmi Anbu					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG/ IN**
20	AGE023	Basics of Yoga & practice	AHS	1	UG
21	AGE024	Pranayama	AHS	3,5,7	UG

Department of Allied Health Sciences UG SEMESTER 1										
Course Number	**Course Code**	**Course Title**	Faculty Code	**Credits/Week**				**Hours / Semester**		
				Lecture (L)	Tutorial (T)/ Clinical training	Practical (P)/Research Project	**Credits (C)**	Lect. / Tut.	Practical	**Total Hours**
20.	AGE 023	Basics of Yoga & practice	AHS	2	-	1	**3**	30	30	60

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 Satyanada Saraswathi: Asanas, Prnanayama, Mudra, Bhndha, (India: Yoga Publications Trust, Munger, Bihar)
B.Natarajan: Thirumantiram (Atamil Scriptural Classic) (Sri Ramakrishna Math, Madras.)

Department of Allied Health Sciences UG SEMESTER 3,5,7										
Course Number	**Course Code**	**Course Title**	Faculty Code	**Credits/Week**				**Hours / Semester**		
				Lecture (L)	Tutorial (T)/ Clinical training	Practical (P)/Research Project	**Credits (C)**	Lect. / Tut.	Practical	**Total Hours**
21.	AGE 024	Pranayama	AHS	2	-	1	**3**	30	30	60

PRANAYAMA
Learning Objectives:

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

Learning Outcome:

UNIT –I
Concepts of prana and pranayama, definition of pranayama, need, purpose and goal of pranayama, benefits of pranayama, result of wrong practices
UNIT-II
Components of pranayama, prerequisites and preparations for pranayama as per yoga sutras, hathayoga prathipika and other books, food, quality of breath in pranayama, different seated asanas suitable for pranayama.
UNIT-III
Difference between pranayama and breathing exercises, types of pranayama, smarvitti and visamavritti,
Four aspects of pranayam, Antak kumbhaka, bahiranga kumbhaga, rechakham, purakham.

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

REFERENCE BOOKS
1. Desikachar, t.k.v., light on yoga', harper colins publishers, new delhi.
2. B.K.S.Iyenkar- Light on Yoga Sutras of Patanjali(Haper Collins Publications India Pvt. Ltd. New Delhi)
3. Swami Sivananda: Practice of Yoga (The Divine Life Society, Shivananda Nagar, P.O., U.P.Himalayas, India)
4. Swamy Satyanada Saraswathi: Asanas, Prnanayama, Mudra, Bhndha, (India: Yoga Publications Trust, Munger, Bihar)
5. B.Natarajan: Thirumantiram (Atamil Scriptural Classic) (Sri Ramakrishna Math, Madras.)

Department of Speech, Language and Hearing Sciences					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG / IN**
22	AGE028	Noise exposure and its effects	Speech Language & Hearing Science	1	UG
23	AGE029	Basic concepts in Voice and its efficient use	Speech Language & Hearing Science	3,5,7	UG

Department of Speech, Language and Hearing Sciences UG SEMESTER 1							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
22	AGE 028	**Noise exposure and its effects**	3	-	-	**3**	**45**

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

1. Rawool.V.W. (2012). Hearing conservation in occupational, recreational, educational and home settings. New York : Thieme.
2. Dobie.R.A. (2001). Medical legal evaluation of hearing loss. II Ed, Delmar Cengage Learning.

Online Resources:

1. Bredekamp (2014), noise induced hearing loss and its prevention, retrieved from http://www.medicinenet.com/noise_induced_hearing_loss_and_its_prevention/article.htm
2. Alberti (2014). The anatomy and physiology of ear and hearing, retrieved from http://www.who.int/occupational_health/publications/noise2.pdf
3. Noise induced hearing loss, (2012), retrieved from http://american-hearing.org/disorders/noise-induced-hearing-loss/

Department of Speech, Language and Hearing Sciences **UG SEMESTER 3,5,7**							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
23.	AGE 029	Basic concepts in Voice and its efficient use	2	-	1	**3**	**60**

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:

1. Communication skills.Sanjjay Kumar &Pushplata.Oxford University Press. (2011).
2. Be heard the first time. Susan Miller. Voice trainer.com (2006).
3. Vocal Vitality.Susan Miller & Susan Berkely (2010).

4. The vocal athlete: application & technique for the hybrid singer Marci Rosenberg & Wendy D Leborgne. Plural Pub (2013)

Online Resources:

1. Toastmaster international (2011). http://web.mst.edu/~toast/docs/Your%20Spkg%20Voice.pdf
2. www.wikihow.com/develop-a-perfect-speaking-voice
3. www.udemy.com/enhance-your-speaking -voice/

Department of Environmental Health Engineering					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG / IN**
24	AGE030	Fundamentals of Occupational Health	Environmental Health Engineering	1	UG
25	AGE031	Biomedical Waste Management	Environmental Health Engineering	2,4,6	UG

Department of Environmental Health Engineering UG SEMESTER 1						
C. No.	Course Code	Course title	Lecture	Tutorial (T)/ Clinical Training	Practical (P)/ Research Project (RP)	**Total Credits**
24	AGE030	**Fundamentals of Occupational Health**	3	0	0	**3**

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:**
   - Environment Protection Act, The National Environment Tribunal act, The National environment appellate authority act, The Public liability insurance act, US Environment

Protection Act,

- Introduction to Environment Management systems
- ISO 14001, OSHAS 18001,

Text Books:

1. Environmental Health, Dade W Moeller, 3rd edition. 2005
2. Basics of Environmental Health, Annalee Yasi et al, 2001, WHO.

Reference books:

1. Occupational and Environmental Medicine, Joseph LaDou, 3rd Edition 2002
2. Environment and Occupational medicine, William N. Rom 2nd Edition. 1992
3. Occupational Health, Barry S. Levy, David H. Wegman, 4th Edition, 2000.
4. OSH for Development, By Kaj Elgstrand and Nils F. Petersson (editors)

Online Resources:

1. http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?TOXLINE
2. http://toxnet.nlm.nih.gov/
3. http://www.remm.nlm.gov/
4. http://tools.niehs.nih.gov/wetp/
5. http://www.cdc.gov/niosh/topics/industries.html
6. http://www.cdc.gov/niosh/idlh/intridl4.html

Department of Environmental Health Engineering UG SEMESTER 2,4,6							
C. No.	Course Code	Category	Course	Lecture	Tutorial (T)/ Clinical Training	Practical (P)/ Research Project (RP)	**Total Credits**
25	AGE031	Elective Open	**Biomedical Waste Management**	3	0	0	**3**

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:

1. Sustainable Biomedical Waste Management, P. K. Behera, 2nd Edition. 2008
2. Biomedical Waste Management, R. Radhakrishnan, 1st Edition, 2005
3. The Environmental Protection Act, 1986.

Reference Books:

1. Reinhardt, Peter A., and Judith G. Gordon. 1991. Infectious and medical waste management. Chelsea, Mich: Lewis Publishers
2. Bio-medical waste management", Environmental Management and Policy Research Institute, Bangalore, 2004.
3. "Guidelines for management of liquid waste streams in biomedical waste", Sri Ramachandra Medical College & Research Institute, Porur, Chennai, 1999.
4. "Southern regional conference on bio-medical waste management" Tamilnadu Pollution Control Board, Chennai, 1999.
5. "Manual on hospital waste management", Central Pollution Control Board, Delhi, 2000.
6. "Bio-medical waste", Toxics Link – Factsheet, Number, 21, 22, 23, 24, 2004. .
7. "Understanding and Simplifying Bio-Medical Waste Management" - Training Manual

Faculty of Biomedical Sciences								
29	BGE 001	Introduction to Human Genetics	Generic Elective	3	Odd	BMS	Human Genetics	UG
30	BGE 002	Principles of Genetics	Generic Elective	3	Odd	BMS	Human Genetics	PG
31	BGE 011	Clinical Genetics - Principles and applications	Generic Elective	3	Odd	BMS	Human Genetics	PG

Faculty of Biomedical Science, Technology and Research **Department of Human Genetics** **UG SEMESTER 1**							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
29	BGE 001	Introduction to Human Genetics	2	-	1	**3**	**60**

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

Chromosome behavior and inheritance pattern in man - Single gene Mendelian disorders: autosomal dominant, recessive, sex linked dominant and recessive - Polygeneic and mitochondrial inheritance.

III - Origin and detection of genetic disorders

Mutation - Non-disjunction - Chromosomal abnormalities and clinical phenotypes of common genetic syndromes (Down's syndrome, Patua's syndrome, Edward syndrome, Turner syndrome and Klinefelter's syndrome, Cri-du-caht syndrome)- Karyotyping**,** Neural tube defects, Carcinogenesis.

IV–Biochemical basis for the inborn errors of metabolism

General characteristics of inborn errors of metabolism – Incidence - etiology - Folic acid metabolism - triple markers - New born screening, prevention and management. False positive and false negative - Ethical principles of Genetic counseling for prenatal diagnosis - Fetal rights – Regulation and prevention of misuse act 1994.

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

1. A guide to genetic counseling, 2nd edition, D.L. Baker, J.L. Schuette and W.R. Uhlmann, Wiley –Leiss Publications 2002.

2. Emery Elements of Medical Genetics, 9th edition, Robert F. Mueller & Ian D. young, Churchill Livingstone, 1995.
3. Medical Genetics, 3rd edition, Lynn B. Jorde, John C. Carey, Michael J. Bamshad, & Raymond L. White, Mosby, 2003.

Department of Human Genetics **PG SEMESTER 1**							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
30.	BGE 002	Principles of Genetics	3	-	-	**3**	**45**

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

1. Principles of Genetics, D. Peter Snustad and Michael. J. Simmons, 4th edition, John Wiley & Sons, 2006.
2. Genetics – an analysis of genes and genomes, D.L. Hartel and E.W. Jones, 6th edition, Jones and Bartlett publishers inc., 2005.
3. Essential Genetics – A Genomic Perspective. D.L. Hartel and E.W. Jones, 4th edition, Jones and Bartlett publishers inc., 2006.

Department of Human Genetics **PG SEMESTER 2,4,6**							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
31	BGE 011	Clinical Genetics - Principles and applications	1	-	2	**3**	**75**

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 cytogenetic testing- DNA testing.

II - Cytogenetic testing

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

III - Molecular Cytogenetic testing

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

IV - DNA testing

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

V - Practical:

Case studies

Learning outcome:

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

Referencebooks

1. Practical Genetic counseling, Peter S. Harper, 6th edition, Hodder Headline Group 2004.
2. Medical Genetics, 3rd edition, Lynn B. Jorde, John C. Carey, Michael J. Bamshad, & Raymond L. White, Mosby, 2006.
3. Genetics in Medicine, Thompson & Thompson, 6th edition, Elsevier 2004.
4. Practical Genetic counseling, Peter S. Harper, 6th edition, Hodder Headline Group 2004.

BMS-CRF					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG / IN**
32	BGE012	Trends in Tissue Engineering and Regenerative Medicine	Centre for Regenerative Medicine & Stem Cell Research	3,5,7	UG
33	BGE013	Translational Biology	Centre for Regenerative Medicine & Stem Cell Research	3,5,7	PG
54	BGE038	Basic Radiation Biology	BMS-CRF	3,5,7	UG

Department of Biomedical Sciences and Central Research Facility **Centre for Preclinical & Translational Medicinal Research** **UG SEMESTER 3,5,7**							
Course No	**Course Code**	Course Title	L	T	P	C	Total hours
32	BGE 012	Trends in Tissue Engineering and Regenerative Medicine	3				45
Course Transactor: Dr. Alan M Punnoose							

Learning Objectives

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

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

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

UNIT IV-Applications of Tissue engineering - I

Biology of Wound Repair - scar vs. regeneration, Bioengineered Skin tissue constructs. Recent Advances in TE for wound healing.

UNIT V– Applications of Tissue engineering - II

Cardiac Homeostasis and Regeneration. Tissue engineering strategies for Cardiac regeneration and repair. Engineered Heart valves. Vascular tissue engineering.Recent Advances in TE the Cardiovascular System

Learning Outcome:

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

Reference Text Books:

Principles of Tissue Engineering - R Lanza, R Langer and J Vacanti 4th Edition, 2014, Elsevier publishers. ISBN: 978-0-12-398358-9

Principles of Regenerative Medicine - A Atala, R Lanza, J Thomson and R Nerem 1st Edition, 2008, Elsevier publishers. ISBN: 978-0-12-369410-2

Online resources:

Journals :

Tissue Engineering Parts A,B& C

Biomaterials

Journal of Tissue Engineering and Regenerative Medicine

Journal of Regenerative Medicine and Tissue Engineering

Journal of Stem Cell and Regenerative Medicine

Course Transactor: Dr. Alan M Punnoose
Assistant Professor (Research)
Centre for Regenerative Medicine and Stem Cell Research
Central Research Facility; Sri Ramchandra University
Ext: 277; **alanmathp@gmail.com**

Course: PBM-15GE 135,Translational Biology

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

Department of Biomedical Sciences and Central Research Facility **Centre for Preclinical & Translational Medicinal Research** **PG/ IN SEMESTER 3,5,7**							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
33	BGE 013	Translational Biology	3			3	**45**
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- Aplaysia- *C. elegans* – Drosophila—zebrafish - mouse

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

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

V – Translation – bench to bedside
Mouse models, Transgenics, knock outs and drug/biomolecule discovery
Learning outcome:

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

Text books

Reviews/Research articles from journals

Reference Books

1. Molecular Cell Biology – H. Lodish, A. Berk, S.L. Zipursky, P. Matsudaria, D. Baltimore and J Darness, W.H. Freeman & Co, 2000.

2. Text Book of Medical Physiology, Gyton, 10th edition, W.B. Saunders Company, 2000.

Online Resources:

1. Wormbook

2. Purves D et al (eds) (2001) Neuroscience, 2nd ed. Sinauer Associates, Inc (NCBI bookshelf)

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

SL. NO.	Code Number	Course Name	Department	Semester Odd/Even	Level UG/PG/IN
34	**BGE 014**	Medical Entomology	BMS	1	UG
35	**BGE 015**	Lifestyle Disorders	BMS	2,4,6	UG
36	**BGE 016**	Applied Biotechnology	BMS	1	UG
37	**BGE 017**	Food Microbiology	BMS	2,4,6	UG
38	**BGE 018**	Invitro Bioassays of Natural Products	BMS	3,5,7	UG
39	**BGE 019**	Nutrition in Health & Diseases	BMS	2,4,6	UG
54	BGE038	Basic Radiation Biology	BMS-CRF	3,5,7	UG

Department of Biomedical Sciences UG SEMESTER 1							
Course Number	Course Code	Course Title	L	T	**C**	Theory/Tutorial Hours	**Total Hours**
34	BGE 014	Medical Entomology	3	-	**3**	45	**45**

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

<u>Text Books</u>

1. General and Applied Entomology, Second Edition, Dr. B Vasantharaj David, 2nd edition, Tata McGraw Hill publishing Co Ltd
2. A Textbook of Entomology, Herbert H. Ross**,** 2nd edition, Wiley publishers.

<u>Reference Books</u>

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

2. Medical entomology for students, Mike Service, 5th edition, Cambridge university press

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

Department of Biomedical Sciences UG SEMESTER 2,4,6							
Course Number	Course Code	Course Title	L	T	**C**	Theory/Tutorial Hours	**Total Hours**
35	BGE 015	Lifestyle Disorders	3	-	**3**	45	**45**

Learning objectives:

- ✓ To understand the relevance, significance and implications of lifestyle disorders
- ✓ To understand the various types and causes of life style disorders
- ✓ To understand the ways in which lifestyle disorders can be identified, managed and prevented

46. Lifestyle Disorders

UNIT I Modern Life style disorders

Deskbound and sleeping habits, junk food, anxiety. Food poisoning, Acidity.

UNIT II Dietary disorders

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

UNIT III Social health problems

Smoking, alcoholism, drug dependence and Aquired Immuno Deficiency Syndorme (AIDS).

UNIT IV Gastrointestinal disorders

Stomach disorders-Gastritis, Ulcer, Amoebiasis, Constipation, piles
Common ailment- 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

1. Text book of Clinical Biochemistry- Carl. A.Burtis and Edward R. Ashwood
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

Department of Biomedical Sciences UG SEMESTER 1							
Course Number	Course Code	Course Title	L	T	**C**	Theory/Tutorial Hours	**Total Hours**
36	BGE 016	Applied Biotechnology	3	-	**3**	45	**45**

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

1. Industrial and Environmental Biotechnology - Nuzhat Ahmed, Fouad M. Qureshi and Obaid Y. Khan, 2006. Horizon Press.
2. Quality Control for the Food Industry, Krammer, A. and Twigg, B.A. 1970, 3rd Edn. AVI, Westport.

Reference Books

3. Modern Industrial Microbiology & Biotechnology, Nduka Okafor
4. Waste water engineering - treatment, disposal and reuse, Metcalf and Eddy Inc., Tata McGraw Hill, New Delhi.
5. Lows, P. and Ellis H. 1990. Food Processing. Prentice Hall, Reston Virginia, USA

Web Links

www.biospace.com
www.nature.com/nbt

Department of Biomedical Sciences UG SEMESTER 2,4,6							
Course Number	Course Code	Course Title	P	T	**C**	Practical Hours	**Total Hours**
37	BGE 017	Food Microbiology	3	-	**3**	45	**45**

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
2. Essentials of Food Microbiology, Edited by John Garbult. Arnold International Students Edition.
3. Food Microbiology by Frazier, 4th Ed.

Department of Biomedical Sciences UG SEMESTER 3,5,7							
Course Number	Course Code	Course Title	L	T	**C**	Theory/Tutorial Hours	**Total Hours**
38	BGE 018	*In vitro* Bioassays of Natural Products	3	-	**3**	45	**45**

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

Anti-diabetic activity- Alpha amylase assay, Cell membrane damage - LDH assay, Anti-microbial activity- Disc diffusion method.

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

1. Organic Chemistry of Natural Products, Vol. 2, Gurdeep Chatwal, Himalaya Publishing House

Web Links

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

Department of Biomedical Sciences UG SEMESTER 2, 4, 6							
Course Number	Course Code	Course Title	L	T	**C**	Theory/Tutorial Hours	**Total Hours**
39	BGE 019	Nutrition in Health & Disease	3	-	**3**	45	**45**

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 Cholelitheasis, Pancreas – Pancreatitis.

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

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

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

Learning outcomes:

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

Text books

1. William's Basic Nutrition and Diet Therapy – Staci Nix.
2. Nutritional Biochemistry - Swaminathan

Reference books

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

BMS - Central Research Facility UG Semester 3,5,7						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
BGE036	**Basic Radiation Biology**	3	-	-	**3**	**45**
CourseTransactor:**Dr. B. S. Dwarakanath**						

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 hematopoitic 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 radiationin 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
7th Edition: 2012; ISBN-10: 078 1741513; ISBN-13: 977 0781741514

Reference books:

1. **An Introduction to Radiobiology**
   A.H.W. Nias
   Wiley; 2nd Edition: 1998
   ISBN: 10-0471975907; 13-978-0471975908
2. **Basic Clinical Radiobiology**
   G. Gorden Steel
   Hodder Arnold Publication: 3rd Edition; 2002
   Oxford University Press
   ISBN-10: 0340807830; ISBN-13: 978-0340807835
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
   ISBN 0-85066-745-3; ISBN 0-85066-763-1 (Soft)

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.
   ISBN-10: 0122411013 ISBN-13: 978-0122411014

Online Resources:

1.Radiation Biology: A hand book for teachers and students, IAEA Training Course Series 42; ISSN 1018-5518; 2010**.** www-pub.iaea.org/MTCD/publications/PDF/TCS-42_web.pdf

2. Sources and effects of Ionizing radiation. UNSCEAR Publication Vol I: Annexure A & B; 2008. http://www.unscear.org/unscear/publications.html

3. Biological effects of radiation. http://webfiles.ehs.ufl.edu/rssc_stdy_chp_5.pdf

4. Biological effects of ionizing radiation. College Physics. http://philschatz.com/physics-book/contents/m42652.html

1. Biological effects of ionizing radiation. HaydeeDomenech. Springer. 2016. https://link.springer.com/chapter/10.1007%2F978-3-319-42671-6_2

S. No	Code Number	Course Name	Department	Semester Odd/Even	Level UG/PG/I
40	BGE020	Basic Computing	Bioinformatics	3,5,7	UG
41	BGE021*	Introductory Biostatistics	Bioinformatics	2,4,6 ; 3,5,7	UG
42	BGE022	Intermediate Mathematics	Bioinformatics	3,5,7	UG
43	BGE023*	Bioinformatics	Bioinformatics	2,4,6	PG
44	BGE024	Hospital Information Management Systems	Bioinformatics	2,4,6	PG
45	BGE025	Chemi-informatics	Bioinformatics	2,4,6	PG

Department of Bioinformatics **UG SEMESTERS** 3,5,7							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
40	BGE 020	Basic Computing	2		1	**3**	**60**

40 Basic Computing

Learning objectives:

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

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

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

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

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

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

Learning outcome:

- ✓ Be able to identify computer hardware and peripheral devices
- ✓ Be familiar with software applications

- ✓ Understand file management and accomplish creating basic documents, worksheets, presentations and databases
- ✓ Distinguish the advantages and disadvantages of networks
- ✓ Explore the Web and how to conduct research
- ✓ Identify computer risks and safety

Reference Books

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

Department of Bioinformatics **UG SEMESTERS-** 2,4,6 ; 3,5,7							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
41	BGE 021	Introductory Biostatistics	2		1	**3**	**60**

41. Introductory Biostatistics

<u>LEARNING OBJECTIVE:</u>

- ✓ 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**

Measures of Central Tendency- Mean – Median - Mode - Geometric mean- Harmonic mean for raw data -Measures of dispersion - Quartile deviation, Mean Deviation - Standard Deviation - Coefficient of variation- Range

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
- ✓ Tointerpret 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

1. Don. Mc Neil - Epidemiological Research Methods - Oxford University Press, London.
2. Biostatistics –Principle & Practice – McGraw Hill Education.
3. http://www.ats.ucla.edu/stat/
4. Ahttp://www.statsoft.com/textbook/basic-statistics/

Department of Bioinformatics UG SEMESTERS-3,5,7							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
42	BGE 022	INTERMEDIATE MATHEMATICS	3			**3**	**45**

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:

1. Foundations and Fundamental Concepts of Mathematics (3rd Edition) - Howard Eves
2. Concepts of Modern Mathematics - Ian Stewart
3. Introduction to the Foundations of Mathematics: Second Edition - Raymond L. Wilder
4. Essential Calculus with Applications - Richard A. Silverman

Department of Bioinformatics PG/IN Semesters 2,4,6							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
43	BGE 023	BIOINFORMATICS	2		1	**3**	**60**

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 invarious 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 IVMultiple Sequence Alignment & Phylogeny

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

UNIT V Genomics

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

UNIT VIProteomics

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 toGenomics and apply the same in various fields

REFERENCES

1. Introduction to computers & Data processing – Shelly, Gray. B2. Mastering Microsoft office 2007 – Alison Balter's
2. Bioinformatics sequence and Genome analysis – David W. Mount, 2004, 2ed
3. BLAST. The Definitive Guide. Basic Local Alignment Search Tool – Korf, Yandell, Bedell
4. Introduction to Bioinformatics - Attwood, Smith, Parry-Smith

5. Introduction to Genomics, Arthur M. Lesk, 2007, Oxford UniversityPress.
6. Handbook of Comparative Genomics – Principles & Methodology 2003 Saccone & G.Pesole (Publication) Wiley-Liss
7. Microbial Functional Genomics – 2004 Jizhong Zhou, Dorothea K.Thompson, Ying Xu & James.M.Tiedje (Publication) Wiley-Liss

Department of Bioinformatics PG/IN Semesters 2,4,6							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
44	BGE 024	HOSPITAL INFORMATION MANAGEMENT SYSTEMS	2		1	**3**	**60**

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 II - Hardware & Software – Types - Operation Systems - Application software – Office Management, SAP- Storage Management - - HPC - Costing and Cloud system – SaaS – emerging Trends & Medical Computing.

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

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

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

Practical :

1. Hardware ,Software demo 2.Networking 3.DBMS 4.Internet 5.SPSS 6. PMS/EMR

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:

1. Hospital Management: Principle, Theory and Practice by Amit Virmani.
2. Hospital management: An Evaluation – by A.K. MALHOTRA
3. http://www.ats.ucla.edu/stat/
4. Ahttp://www.statsoft.com/textbook/basic-statistics/

Department of Bioinformatics PG/IN Semesters 2,4,6							
Course Number	Course Code	Course Title	L	T	P	**C**	**Total Hours**
45	BGE 025	CHEMI-INFORMATICS	2		1	**3**	**60**

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

Computer Aided Drug Design, Ligand based Drug Designing - Introduction, types. Pharmacophore analysis, Denovo Ligand designing, QSAR and its descriptors, multivariate analysis, pitfalls of QSAR

UNIT V: Molecular Docking

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

UNITVI: 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

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

LEARNING OUTCOMES

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

REFERENCES

1. Computational Approaches in Cheminformatics and Bioinformatics by Rajarshi Guha, Andreas Bender, Wiley, 2012
2. Practical Chemoinformatics by Muthukumarasamy Karthikeyan , Renu Vyas, Springer India, 2014
3. Cheminformatics by Frederic P Miller , Agnes F Vandome , John Mc Brewster, alphascript publishing, 2010
4. Introducing Cheminformatics by David Wild, Open Publishing, 2nd Edition, 2013

Generic Elective (GE) Courses Offered – Faculty of BMST& R **Dept. of Biotechnology**					
S. No.	**Code Number**	**Course Name**	**Department**	Semester	**UG/PG/I**
46	BGE026	Nano-diagnostics	Biotechnology	2,4,6	PG

47	BGE027	Health care Biotechnology	Biotechnology	2,4,6	UG
48	BGE029	Plant Tissue Culture Technology	Biotechnology	2,4,6	UG
49	BGE030	Marine Biotechnology	Biotechnology	2,4,6	UG
50	BGE031	Antimicrobial Agents	Biotechnology	3,5,7	PG
51	BGE032	Algal Biotechnology	Biotechnology	3,5,7	UG
52	BGE036	Nanotechnology	Biotechnology	3,5,7	UG
53	BGE037	Alternative Models for Experimental Toxicology	Biotechnology	2,4,6	PG

Department of Biotechnology – Generic Elective (GE)

Course Number	**Course Code**	**Course Title**	Faculty Code	**Credits/Week**				**Hours / Semester**		
				Lecture (L)	Tutorial (T)/ Clinical training	Practical (P)/Research Project	**Credits (C)**	Lect. / Tut.	Practical	**Total Hours**
46	BGE 026	Nanodiagnostics		3			3	45		45
47	BGE 027	Health care Biotechnology		3			3	45		45
48	BGE 029	Plant Tissue Culture Technology					3	45		45
49	BGE 030	Marine Biotechnology		3			3	45		45
50	BGE 031	Antimicrobial Agents		3			3	45		45
51	BGE 032	Algal Biotechnology		3			3	45		45
52	BGE036	Nanotechnology		3			3	45		45
53	BGE037	Alternative Models for Experimental Toxicology								
54	BGE038	Basic Radiation Biology								

Departmetn of Biotechnology PG Semester 2,4,6							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
46	BGE 026	**Nano - diagnostics**	3			3	45
Objectives		**Learning outcomes**					
To impart knowledge on nanomaterials and their applications		On successful completion of the course, the student will be able to • comprehend the types and features of nanomaterials • Applications of nanoparticles with macromolecules					

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

UNIT 5 **Nanobarcodes and imaging:** Nanobarcodes Technology -Nanobarcode Particle Technology for SNP Genotyping -Qdot Nanobarcode 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
2. Nanotechnology – Basic Science & Emerging Technologies by Chapman & Hall/CRC 2002.
3. Nanotechnology by Gregory Timp (Ed), Spring 1998.

Reference Books:

1. The Handbook of Nanomedicine Kewal K. Jain, Humana Press, (2008).
2. Nanomedicine: A Systems Engineering Approach" 1st Ed., Zhang,. Pan Stanford Publishing, (2005).
3. Nanotechnology – A gentle Introduction to the Next Big Idea by Mark Ratner and Daniel Ratner, Pearson Education, 2005.

Online Resources:

http://www.iinano.org/research

http://www.nanodiainc.com/

Departmetn of Biotechnology UG Semester 2,4,6							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
47	BGE 027	**Health care Biotechnology**	3			3	45
Objectives	**Learning outcomes**						
To impart knowledge on novel strategies for treatment of diseases.	▪ Understand and appreciate the applications of biotechnology ▪ Explain the types of novel therapeutic agents ▪ Understanding novel pharmaceutical agents for drug delivery ▪ Defining new treatment modalities available						

Health care Biotechnology

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

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

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: Radiosensitizers 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:

1. Pharmaceutical Chemistry by Cristine M. Bladon. John Wiley & Sons. Ltd. (2002)
2. Burgerís Medicinal Chemistry and Drug Discovery (5th edition) by Manfred E.Wolf . A Wiley & Sons.Inc. (2000).
3. Drug Targeting Organ- Specific Strategies by Grietje Molema and Dirk K.F.Meijer. Wiley -VCH. (2002)
4. Biotechnology in Personal Care (Cosmetic Science and Technology) by Raj Lad (Editor), CRC Press; 1 edition (March 6, 2006)

Departmetn of Biotechnology UG Semester 2,4,6							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
48	BGE 029	**Plant Tissue Culture Technology** **Lab cum theory**	1	0	4	**3**	75
Objectives		**Learning outcomes**					
To provide training in plant tissue culture techniques		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:

1. Plant Tissue Culture: An Introductory Text by Bhojwani, Sant Saran, Dantu, Prem Kumar, 2013; Springer India; eBook ISBN; 978-81-322-1026-9
2. Plant Cell Culture Protocols, Methods in Molecular Biology, Volume 877 2012 by Editors: Víctor M. Loyola-Vargas, Neftalí Ochoa-Alejo 2012; DOI - 10.1007/978-1-61779-818-4; Print ISBN: 978-1-61779-817-7

Reference Books:

1. Plant Biotechnology. 2000. Hammond J, McGarvey P.& Yusibov V. (Eds): Springer Verlag,.
2. Practical Application of plant molecular biology. 1997. Henry. R.J, Chapman and Hall.

Online Resources:

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

Departmetn of Biotechnology UG Semester 2,4,6							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
49	BGE 030	**Marine Biotechnology**	3	0	0	3	45
Objectives		**Learning outcomes**					
To impart knowledge on concepts of marine biota, marine bioactive products and the use of GE tools to produce commercially important products		On successful completion of the course, the student will be able to understand marine ecosystem and its importance to importance to humans in Biotechnology perspective					

Marine Biotechnology

UNIT 1 **Introduction:**

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

UNIT 2 Biological community structure and associations: Symbiosis, commensalism and

antagonisms among different groups of organisms

UNIT 3 Marine microbiology

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

UNIT 4 Marine Bioprospecting

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

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

UNIT 5 GE Tools and methodologies in marine science

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

UNIT 6 Commercial production of marine products

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

Text Books:

1. Marine Biotechnology: Pharmaceutical and bioactive natural products Vol I: by David H. Attaway, Oskar R. Zaborsky, Plenum Press, New York (ISBN: 0-306-44174-8), 1993

2. Marine Biology- An ecological approach by James Nybakken- 6th Edn, 2005, Pearson Publishers, Benjamin Cummings, ISBN: 10-0805345825, ISBN: 13-9780805345827.

Reference Books:

3. Biotechnology: Environmental Processes I, Volume 11a, Second Edition Editor(s): H.-J. Rehm, G. Reed, 2008, Wiley-VCH-GmbH, ISBN: 9783527283217
4. Fundamentals of Ecology by Eugene. P. Odum and Gay. W. Barrett, Publl: W. B. Saunders 5th edition 2005

Online Resources:

1. http://www.marinebiotech.eu

2. http://www.lsi.umich.edu

Departmetn of Biotechnology PG Semester 3,5,7							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
50	BGE 031	Antimicrobial Agents	1	0	4	3	75
Objectives		**Learning outcomes**					
To impart knowledge on 1. Classification of antibiotics 2. Mechanism of action 3. Mechanism of resistance 4. Combined Antibiotic therapy 5. Plant Products as Antimicrobial Agents		**On successful completion of the course, the student will be able to** • Find the mechanism of action of the antibiotics • Determination of Minimum Inhibitory Concentration of the Antibiotic • Selecting the right choice of antibiotics for the resistant micro-organisms • Use appropriate antibiotics for combination therapy in the case of drug resistance					

Antimicrobial Agents

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

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

UNIT 3 Molecular principles of drug targeting against antibiotic resistant bacteria

UNIT 4 Peptide antibiotics, Phytochemicals as antimicrobial agents.

UNIT 5 Combination therapy - additive, synergistic and antagonistic antibiotic

UNIT 6 **Practicals:**

Growth Inhibition Assays:

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

Text Books:

1. Essentials of Medical Pharmacology, 7th Edition, 2013. KD Tripathi.

2. Phytochemical methods- a guide to modern techniques of plant analysis, 3rd ed. 1998. J B Harborne. Chapman & Hall

Reference Books:

1. Antimicrobial Agents, 2012 Varaprasad Bobbarala

2. Quality control in Herbal drugs- An approach to evaluation of botanicals. 2002. P K Mukherjee, Business Horizons

Online Resources:

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

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

Departmetn of Biotechnology UG Semester 3,5,7							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
51	BGE 032	**Algal Biotechnology**	3	0	0	3	45
Objectives		**Learning outcomes**					
To impart knowledge on concepts of taxonomy, production and phytoremediation using algae		The student will have a thorough understanding on the algal taxonomy, commercially important products and phytoremediation using algae.					

Algal Biotechnology

UNIT 1 **Taxonomic classification of micro and macrolagae**- 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:

1. The Algae. Chapman V J (1962). Macmillan & Co. Ltd.
2. Properties and Products of Algae. Zajic, J. E. 1970. Plenum Press, New York.

3. Handbook of Hydrocolloids, Glyn O. Phillips, Peter A. Williams: Carrageenan, Imeson, A.P. FMC Corporation (UK) Ltd, 5, 88-102

Online Resources:

http://algae.ucsd.edu/research/

http://www.oilgae.com/ref/glos/algal_biotechnology.html

Departmetn of Biotechnology UG Semester 3,5,7							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
52	BGE036	**Nanotechnology**	3			3	45
Objectives		**Learning outcomes**					
To impart knowledge on nanomaterials and their applications		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

1. Nanostructures & Nanomaterials: Synthesis, Properties, and Applications by Guozhong Cao, Imperial College Press, London, 2004.
2. Chemistry of Nanomaterials: Synthesis, properties and applications by CNR Rao *et al.,*
3. Nanobiotechnology: Concepts, Applications and Perspectives. ed. C. M. Niemeyer, C.A. Mirkin. 2006. Wiley –VCH.

Reference Books

1. Bionanotechnology: Lessons from Nature, David S Goodsell, 2004, Wiley publication
2. Biosensors and Biodetection: Volume 503: Optical based Detectors, Avraham Rasooly and Keith E Herold, 2009, Humana Press
3. Biomolecule-Based Nanomaterials and Nanostructures Itamar Willner* and Bilha Willner DOI: 10.1021/nl102083j | Nano Lett. 2010, 10, 3805–3815
4. Gold nanoparticles in the clinical laboratory: principles of preparation and applications. Hassan M.E. Azzazy, Mai M.H. Mansour, Tamer M. Samir and Ricardo Franco. Clin Chem Lab Med 2012;50(2):193–209. doi 10.1515/CCLM.2011.732

Online Resources:

NPTEL.nic.in

http://nanohub.org/groups/biomed

Departmetn of Biotechnology PG Semester 2,4,6							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
53	[BGE 037]	**Alternative models for Experimental Toxicology**	2	1		3	45
Objectives		**Learning outcomes**					
To impart knowledge on 1. Various Toxicity Tests 2. *In vitro* and *In vivo* bioassays		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:

1. Essentials of Medical Pharmacology, 6th Edition, KD Tripathi.

2. Phytochemical methods- a guide to modern techniques of plant analysis, 3rd ed. 1998. J B Harborne. Chapman & Hall

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:

1. http://www.microbiolab-bg.com/CLSI.pdf
2. http://www.gxccl.com/download/upload/CLSIM100.pdf

Faculty of Management Sciences					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG/ IN**
55	GGE002	Team Building & Leadership	Management	1	UG
56	GGE009	Hospital Operations Management	Management	2,4,6	UG
57	GGE015	Training & Development	Management	1	PG
58	GGE018	Basics of Hospital Management	Management	3,5,7	PG

Faculty of Management UG Semester 1							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
55	GGE 002	**Team Building & Leadership**	**3**	**-**	**-**	**3**	**45**

Objectives

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

Unit I : Nature of Team – Team development process – stages of team development –Types of Team - Team composition and diversity.

Unit II : Factors affecting team performance - Group dynamics – complexities of cooperative work – promoting effective team work.

Unit III : Conflict management – Group think – Managing Team – Team member – Team leader – Leadership Grid - Leadership styles –Motivating team members - Essence of motivation.

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

Unit V : Coaching and Mentoring – Working with power and politics – Leadership and diversity- change- - organization.

Learning Outcome

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

Text Books

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

Reference Books

1. Watson M Craig. Dynamics of leadership. Jaico Publishing House. 2001.

2. Daniel Goleman. “Leadership that Gets Results.” Harvard Business Review On Point Enhanced Edition. Boston: Harvard Business School Publishing, 2000.

Web Resources

3. http://notes.tyrocity.com/chapter-8-leadership-qualities-business-studies-xii/
4. https://www.gnb.ca/0000/publications/curric/Leadership%20Through%20Physical%20Education%20and%20Recreation%20-%20Teacher%20Notes.pdf

Faculty of Management UG Semester 2, 4, 6							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
56	GGE 009	**Hospital Operations Management**	**3**	**-**	**-**	**3**	**45**

Objectives

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

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

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

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

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

Unit V : Patient-centered care - The 8 dimensions of healthcare – picker institute: Emergence of patient family centric care – Patients’ Preferences – Emotional Support & Physical comfort – Information & Education – Coordination of Care – Access to care – Continuity & Transition

Learning Outcome

1. Students will learn about the process, functions and structure of clinical, non-clinical & Support services of various hospital

Text Book

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

Reference Books

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

Web Resources

1. http://www.patient-centeredcare.org/inside/abouttheguide.html
2. http://www.mckinsey.com/insights/health_systems_and_services/hospitals_get_serious_about_operations
3. http://libs.daytonaedu.com/~d/H/Hospital-Operations.pdf

Faculty of Management PG Semester 1							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
57	GGE 015	**TRAINING AND DEVELOPMENT**	**3**	**-**	**-**	**3**	**45**

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

1. Gary Dessler, Human Resource Management, 7th edition, Prentice Hall, New Jersey, 1977.
2. Fisher, Schoenfeldt and Shaw, Human Resource Management, 4th edition, Houghton Mifflin Co., New York, 1999.

Reference Books

1. Milkovich, G.T., and F.W. Bourdreau, Human Resource Management, 8th edition, Irwin, 1997
2. Mondy, Wayne R. and Robert M. Noe, Human Resource Management, 6th edition, Prentice Hall, New Jersey, 1996.

Web resources

- E-Book : http://www.bizlibrary.com/resources/ebooks/
- E-Journal: Wiley Online Library – International Journal of Training and Development: http://onlinelibrary.wiley.com/doi/10.1111/ijtd.12046/abstract

Faculty of Management PG Semester 3, 5, 7							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
58	GGE 018	**BASICS OF HOSPITAL MANAGEMENT**	**3**	**-**	**-**	**3**	**45**

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 toClinical 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 – SakthivelMurugan, 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/

SRMC & RI					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG / IN**
59	MGE001	Mind Body Medicine	Physiology	2,4,6	UG

Department of Physiology, SRMC & RI **Generic Elective Offered to UG Programmes**						
UG Semester – 2,4,6 Category: Generic Elective (GE) Course - **UG**						
Course Code	**Course Title**	**L**	**T**	**P/ Field Activity**	**C**	**Total Hours**
MGE001	**Mind-Body Medicine**	**3**			**3**	**45**
Course Transactor: Dr. Bagavad Geetha; **Bagavad Geetha** bgeethasru@gmail.com; Padmavathi Ramaswamy <padmavathi.dr@gmail.com>						

Objectives	**Learning outcomes**
✓ 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	At the end of the course the student will be able to • Explain the pathophysiology and immune response of stress. • Describe the relationship between mind- and 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 resilence and positive attitude in coping

	• Recognize the symptoms of burnout and describe the various methods of preventing of burn out • Explain the principles of Placebo response to improve clinical outcomes • Describe the health benefits of social relationships

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
- 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
- Resilence
- 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:

1. Venkat Srinivasan, Principles of Mind-Body Medicine, First Edition, 2016
2. e books available for Heartfulness Meditation (www.heartfulness.org)

Reference books:

1. A.K.Jain, Textbook of Physiology,6th edition, volume 1,page no: 485 - 498
2. RL Bijlani, Understanding Medical Physiology, A Textbook for Medical Students, Fourth Edition,2011,page no; 745 - 773

Online Resources:

1. www.heartfulness.org

Faculty of Pharmacy					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG / IN**
60	PGE001	Herbal Drug Technology	Pharmacy	1	UG
61	PGE002	Green Chemistry	Pharmacy	3,5,7	UG
62	PGE003	In vitro Screening Methods	Pharmacy	3,5,7	UG
63	PGE004	Intellectual Property Rights	Pharmacy	3,5,7	UG
64	PGE005	Good Manufacturing Practice (GMP)	Pharmacy	3,5,7	UG
65	PGE006	Good Clinical Practice	Pharmacy	3,5,7	PG
66	PGE007	Pharmacovigilance	Pharmacy	2,4,6	PG
67	PGE008	Analytical Instrumentation Techniques	Pharmacy	3,5,7	PG

Faculty of Pharmacy UG SEMESTER 1							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
60	PGE 001	Herbal Drug Technology	**3**	**-**	**-**	**3**	**45**

1. HERBAL DRUG TECHNOLOGY (Theory & Practicals)

Learning Objectives:

To impart knowledge about the various technological aspects of herbal products

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

Learning outcomes:

On completion of the course the candidate shall be able to

- Explore the advanced techniques for the search of new products from natural sources.
- Comprehensive knowledge of various systems of medicine.
- Understand industrial requirements for quality control and quality assurance of herbal drugs.
- Develop skills in Formulation and standardization of herbal products.

SYLLABUS:

THEORY **(30 Hours) Credit- 2**

Unit-1: (4 Hours)

Introduction to herbal drug technology, Basics for herbal drug development, Rationale of the selection of the plant extracts and doses, Preclinical research and discipline, Problems encountered in current drug discovery process.

Unit 2 : (4 Hours)

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

Unit – 3: (7 Hours)

Quality control of Herbal Drugs - Botanical identification of plant material, Sampling, Macroscopic evaluation, Presence of foreign matter, Microscopic evaluation, Determination of moisture content, Determination of volatile oil content, Extractable matter, Ash values, Crude fibre, Determination of hazardous chemical contaminants and residues, Biological contaminants.

Unit – 4: (5 Hours)

Phytochemical standardization **-** application of various chromatographic methods in separation and identification of Phytopharmaceuticals, fingerprint technique and its importance.

- **Unit-5:** (10 Hours)

Polyherbal as Dosage Forms – Methods of preparation and quality control of Tablets, Capsules, Liquid Preparations, syrups, linctus, suspensions, Ointments, Liniments, Gels, Pastes, Lotions, Sprays and Powders.

Herbal Cosmetics - Benefits of using herbs in cosmetics, Importance of Herbals in Hair, Importance of Herbal skin care products.

PRACTICALS: **(30 HOURS)** **Credit- 1**

1. Standardisation of raw materials.
2. Extraction techniques such as maceration, percolation etc.
3. Preliminary phytochemical screening of herbal extracts.
4. Standardisation of Churna.
5. Standardization of Lehya.
6. Standardization of Arishta.
7. Isolation, Detection and Standardization of Volatile oil from Fennel.
8. HPTLC study of herbal extracts.
9. Preparation of Herbal cream for skin care and its evaluation.
10. Preparation of herbal shampoo and its evaluation.

REFERENCES:

Compulsory reading:

1. Pharmacognosy by Varro E. Tylor, Lynn R. Brody, James E. Robberts, K.M. Varghese Co. Mumbai.
2. Clark's Isolation & Identification of Drugs by A.C. Mottal
3. Phytochemical Methods of chemical Analysis By Harborne
4. Quality control methods of Herbal drugs by Pulok V. Mukherjee.

Suggested reading:

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

Online reading:

1. http://whqlibdoc.who.int/publications/1998/9241545100.pdf
2.
3. file:///C:/Documents%20and%20Settings/Tisculture/My%20Documents/Downloads/Certification_Scheme_AYUSH-who.pdf

http://www.ccras.nic.in/pharmacopoeialwork/links/compfom/ayurvedicfarmocopia.pdf

Faculty of Pharmacy UG SEMESTER 3, 5, 7							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
61	PGE 002	Green Chemistry	**3**	**-**	**-**	**3**	**45**

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, safersolvents and auxiliaries, design for energy efficiency, reduce derivatives,renewable feedstock, catalysis, design for degradation, real time analysis forpollution prevention, and inherently safer chemistry for accident prevention.

Unit 2 **7 hours**

Solvents:

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

water the ultimate green solvent:

- Important properties of water
- Chemical process in water
- Fizzy water
- Biochemical oxygen demand
- Water treatment

Unit 3:

Energy **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	Microave assisted knovenegal reaction	3
10	Synthesis of TBAB	3

REFERENCES:

Compulsory reading:

1. Green Chemistry Stanley E Manahan Chemchar research Inc 2005
2. Pielle Lidstorm et.al Microwave assisted organic synthesis- a review Tetrahedron, 57 2001 9225-9283.
3. Alternative Solvents for Green ChemistryFrancesca M. KertonPublished by the Royal Society of Chemistry

Suggested reading:

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

Online reading:

1. www.rsc.org

Faculty of Pharmacy UG SEMESTER 3, 5, 7							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
62	PGE 003	Invitro Screening Methods	**3**	**-**	**-**	**3**	**45**

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

Historical approaches in drug discovery, pharmacological approaches of modern medicine, new approaches in drug discovery, High throughput screening, ultra high throughput screening and high content screening. Enzyme Assays, Cell-based Receptor Functional Assays, Radioligand Binding Assays. Culture of Specific Cell Types,

Unit – II **(6 hours)**

Specialized Cell Culture Techniques

Lymphocyte preparation, autoradiography, time-lapse recording, confocal microscopy, cell synchrony, culture of amniocytes, somatic cell fusion, cell hybridization, production of monoclonal antibodies, DNA transfer.

Unit – III **(6 hours)**

In vitro methods for screening cardiovascular activity

Adenosine receptor binding assay, α & β-adrenoreceptor binding assays, Inhibition of angiotensin converting enzyme, Endothelin receptor antagonism, Calcium uptake inhibiting activity, Positive inotropic activity. Blood coagulation tests, platelet aggregation in whole blood, erythrocyte aggregation, determination of plasma viscosity, euglobulin lysis time, platelet aggregation and deaggregation in platelet rich plasma or washed platelets (BORN method).

Unit – IV (**7 hours)**

In vitro methods for screening central nervous system activity

Tests for anxiolytic activity, anti-epileptic activity, Neuroleptic activity, Antidepressant activity, In vitro inhibition of acetylcholine-esterase. Antioxidant assays.

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

1. Freshney, R. Ian. "Culture of Animal Cells. A Manual of Basic Technique; 4th edn, 486pp." (2000).
2. Vogel, Hans, ed. Drug discovery and evaluation: pharmacological assays. Vol. 1. Springer Science & Business Media, 2007.
3. Han, Chao, Charles B. Davis, and Binghe Wang, eds. Evaluation of drug candidates for preclinical development: pharmacokinetics, metabolism, pharmaceutics, and toxicology. Vol. 12. John Wiley & Sons, 2010.
4. Atta-ur-Rahman, Muhammad Iqbal Choudhary, and William J. Thomsen. Bioassay techniques for drug development. The Netherlands: Harwood academic publishers, 2001.

Suggestive Reading

1. Goldberg, A.M. (Ed.): TheJohns Hopkins Center for Alternatives to Animal Testing.IN: Alternative Methods in Toxicology. Vol. 1. ProductSafety Evaluation. Mary Ann Liebert, Inc., New York,1983.
2. Goldberg, A.M., Van Zutphen,L.F.M., Alternative Methods in Toxicology, Vol. 11 WorldCongress Proceedings. Mary Ann Liebert, Inc., New York,1995.
3. OECD (Organisationfor Economic Cooperation and Development). Final Reportof the OECD Workshop on Harmonisation of Validation andAcceptance Criteria for Alternative Toxicological Test Methods.ENV/MC/CHEM/TG(96)9, OECD Publications Office, Paris, 1996.
4. Toxicity Testing:Strategies to Determine Needs and Priorities, National ResearchCouncil Report. Published by National Academy Press, Washington,D.C., 1984.

Online Reading

1. http://envfor.nic.in/division/committee-purpose-control-and-supervision-experiments-animals-cpcsea
2. https://openinnovation.lilly.com/dd/evaluating-compounds/in-vitro-screening.html
3. http://www.nature.com/npp/journal/v34/n1/full/npp2008160a.html
4. http://www.epa.gov/oppt/exposure/pubs/episuite.htm
5. http://www.click2drug.org/

Faculty of Pharmacy UG SEMESTER 3, 5, 7							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
63	PGE 004	Intellectual Property Rights	**3**	**-**	**-**	**3**	**45**

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)

Introduction to Patent Law, Paris Convention, Patent Cooperation Treaty, WTO- TRIPS, The Patents Act, 1970, Amendments to the Patents Act

Unit 3: Patentability Criteria (9 Hours)

Patentable Subject Matter, ,Procedure for Filing Patent Applications, Patent Granting Procedure , Revocation, Patent Infringement and Remedies , Access and Benefit Sharing Issues

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.
3. The Indian Patent Act 1970.

Suggested Reading:

1. The Gazette of India. The Patent act 1970 and its latest amendments.
2. Mittal, B.M., A Textbook of Forensic Pharmacy.
3. Patent Law Essentials: A Concise Guide **by** Alan L. Durham

Online Reading:

1. http://www.uspto.gov/patent
2. www.wipo.org
3. www.wto.org

Faculty of Pharmacy UG SEMESTER 3, 5, 7							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
97	PGE 005	Good Manufacturing Practice (GMP)	**3**	**-**	**-**	**3**	**45**

Good Manufacturing Practice (GMP) Theory

Learning Objectives:

- To provide the student with an objective of understanding the core principles and practice of Good Manufacturing Practice (GMP) for active pharmaceutical ingredients (APIs) under an appropriate system for managing quality.
- To know the principle and practices of cleaning and sanitations in manufacturing process.

- To know about the rules and regulations required for the manufacture & sale of pharmaceutical products.
- To ensure that APIs meet requirements for quality & purity that they purport to possess.

Learning Outcomes:

- After the completion of course, students would be able to,
- Lead a processing plant in establishing and maintaining Good Manufacturing practices.
- Demonstrate their understanding of concept of Quality Assurance and Quality control in a GMP environment
- Follow proper documentation procedures as outlined in Good laboratory and Good Manufacturing Practices.
- Demonstrate their ability to design a sterile gowning procedure/technique to an industry standard.
- Apply root cause of analysis tools to solve/analyze problems.
- Students will be conversant in all core elements of GMP as practiced in a real world work place setting.

Syllabus

Theory **(45 Hours)** **Credit-3**

UNIT I: 8 Hrs

Introduction to GMP, History of GMP, GMP definitions, Food and drug Law, Core principles of GMP, Ethics, motivating employees in GMP compliance, Good documentation practices, quality assurance and audits.

UNIT: II 10 Hrs

Physics, Chemistry and Biology of sterilization methods, process chemical sanitization and maintenance of sterility.

UNIT: III 10 Hrs

Validation, product complaints, adverse events and device complaints, product and device stability.

UNIT : IV 10 Hrs

Supply chain, Inspection, Labeling and packaging environmental monitoring, Batch record release, Investigations and problem report writing.

UNIT: V 7 Hrs

Root cause analysis, Lean six sigma, statistical process control, ICH Q9, risk management and ISPE Risk Mapp.

REFERENCES:

Compulsory Reading:

1. Good manufacturing practices for pharmaceuticals. A plan for total quality control from manufacture to consumer, Sidney J.willing, Morcol Dekker, 5th Ed., 2000, 723 pp, ISBN 0824704258.
2. Pharmaceutical process Validation, 3rd Edition Edited by Robert Nash and Alfred Wachter, ISBN 0-8247-08385.
3. Good pharmaceutical Manufacturing Practice, Sharp J, CRC Prem, 2005, 19-258.

Suggested Reading:

1. Joseph D. Nally, *Good Manufacturing Practices for Pharmaceuticals*, Sixth Edition, RC Press, 26-Dec-2006.
2. Ludwig Huber, *A primer Good laboratory Practice and Current good manufacturing practice*, Agilent Technologies publishers, Page No 1-132.
3. Mindy J. Allport-Settle, *Good Manufacturing Practice (GMP) Guidelines*: The Rules Governing Medicinal Products in the European Union, EudraLex Volume 4.
4. Phillip A. Carson, Nigel J. Dent, *Good Clinical, Laboratory and Manufacturing Practices: Techniques for the QA professional*, the royal society of chemistry 2007, Page No 1-166.
5. Jaya Bir Karmacharya, *Good Manufacturing Practices (GMP) for Medicinal Products*, Omnica Laboratories Private Limited, Nepal.
6. Sarfaraz K. Niazi, *Handbook of Pharmaceutical Manufacturing Formulations: Over-the Counter products*. Vol-5, 2 nd edition.
7. Andrew A. Signore, Terry Jacobs, *Good Design Practices for GMP Pharmaceutical Facilities.*
8. Leonard Steinborn, *GMP/ISO Quality Audit Manual for Healthcare Manufacturers and their Suppliers*, CRC Press, Vol-2, 6th edition, 2005.
9. Vinay Bhatt, *GMP Compliance, Productivity, and Quality: Achieving Synergy in Healthcare Manufacturing*, CRC Press, 30-Jun-1998, Page no 1-524.

Online Reading:

1. http://en.wikipedia.org/wiki/Good_manufacturing_practice
2. http://www.cdsco.nic.in/writereaddata/ScheduleM%28GMP%296.pdf
3. http://www.abebooks.com/book-search/title/good-manufacturing-practice-gmp-guidelines-the-rules-governing-medicinal-products-in-the-european-union-eudralex-volume-4-concise-reference/
4. http://www.pharmalogika.com/books.html
5. http://cdn.intechopen.com/pdfs-wm/37170.pdf
6. http://www.gmaonline.org/downloads/technical-guidance-and-tools/Industry_Handbook_for_Safe_Processing_of_Nuts_1st_Edition_22Feb10.pdf

Faculty of Pharmacy PG SEMESTER 3, 5, 7							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
65	PGE 006	Good Clinical Practice	**3**	**-**	**-**	**3**	**45**

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**

Origin and Principles of International Conference on Harmonization - Good Clinical Practice (ICH-GCP) guidelines Thalidomide study , Nazis Trials, Tuskegee Syphilis Study, The Belmont Report • The declaration of Helsinki. Overview of ICH GCP Standards (FDA, EU,JAPAN, WHO)

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:

1. Handbook of clinical research. Julia Lloyd and Ann Raven Ed. Churchill Livingstone c.
2. Melmon and Morrells Clinical Pharmacology 4th Edition – S George Carrythers
3. Principles of Clinical Research edited by Giovanna di Ignazio, Di Giovanna and Haynes.
4. Central Drugs Standard Control Organization. Good Clinical Practices-Guidelines for Clinical Trials on Pharmaceutical Products in India. New Delhi: Ministry of Health; 2001.
5. International Conference on Harmonization of Technical requirements for registration of Pharmaceuticals for human use. ICH Harmonized Tripartite Guideline. Guideline for Good Clinical Practice.E6; May 1996.
6. Ethical Guidelines for Biomedical Research on Human Subjects 2000. Indian Council of Medical Research, New Delhi.
7. Textbook of Clinical Trials edited by David Machin, Simon Day and Sylvan Green, March 2005, John Wiley and Sons.
8. Clinical Data Management edited by R K Rondels, S A Varley, C F Webbs. Second Edition, Jan 2000, Wiley Publications.

Suggested Reading:

1. Clinical Pharmacy and Therapeutics Roger walker and Clive Edwards, Churchill Livingstone Edinburgh
2. Davidson's Principle and Practice of Medicine, EDs Christopher, Haslett, Edwin R.Chilvers.
3. Harrison's Principles of Internal medicine- Vol 1 and 2 Braunwald, Eugene & Others.
4. Textbook of Therapeutics Drug Disease Management- Eric T.Herfindal and Dick R.Gourley.
5. Comprehensive Pharmacy Review- Shargel Leon
6. A textbook of Clinical pharmacy practice- Parthasarthi G.

Online Reading:

1. http://gcplearningcenter.niaid.nih.gov
2. http://www.ich.org/fileadmin/Public_Web_Site/ICH_Products/Guidelines/Efficacy/E6_R1/Step4/E6_R1__Guideline.pdf
3. http://inside.niaid.nih.gov/organization/DCR/Documents/NIAIDGCPTrainingPolicy.pdf
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

Faculty of Pharmacy PG SEMESTER 2, 4, 6							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
66	PGE 007	Pharmacovigilance	**3**	**-**	**-**	**3**	**45**

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:

1. Textbook of therapeutics Drug and Disease Management: Eric T Herfindal, Dick R. Gourley, 6th edition.
2. Manual of Drug Safety and Pharmacovigilance – Barton L. Cobert, Jones & Bartlett Publishers, Second edition
3. An Introduction to Pharmacovigilance – Waller, Patrick; John Wiley & Sons
4. Pharmacovigilance (2nd Edition) – Ronald D. Mann & Elizabeth B. Andrews, 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/
2. http://www.who-umc.org/
3. http://www.eu2p.org/
4. http://www.pipaonline.org.uk/

Faculty of Pharmacy PG SEMESTER 3, 5, 7							
Course Number	**Course Code**	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
100	PGE 008	Analytical Instrumentation Techniques	**3**	**-**	**-**	**3**	**45**

3. ANALYTICAL INSTRUMENTATION TECHNIQUE (Theory &Practicals)

Learning Objectives:

- To impart knowledge about analytical instruments and their applications pertaining to Pharmaceutical Industry.
- To design appropriate analytical methods for newer drugs
- To impart hands on training on method development and validation requirements of pharmaceutical dosage forms.

Learning outcomes:

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

- Operate the different sophisticated instruments used in industry for various analytical purposes
- Understand the basic principles of spectroscopy and chromatography and their applications in industry
- Characterize drugs and chemicals by IR spectroscopy

Syllabus

Theory **(30 Hours)** **Credit-2**

Unit I

UV SPECTROSCOPY 4 hours

Introduction, Fundamental law of photometry, Deviations of BEER'S Law, Instrumentation, Terminology, Electronic transitions, application

UMIT II **6 hours**

INFRARED SPECTROSCOPY

Introduction, Principle, Factors Influencing vibrational Frequency, Instrumentation, Sampling Techniques, Applications

UNIT III

CHROMATOGRAPHY 4 hours

Introduction, types, Theoretical principles, Development of chromatogram, Qualitative and quantitative analysis by chromatography.

UNIT IV **6 hours**
HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY
Introduction, Principle, Instrumentation and its applications
UNIT V
HIGH PERFORMANCE LIQUID CHROMATOGRAPHY **5 hours**
Introduction, Principle, Instrumentation and its applications
UNIT VI
GAS CHROMATOGRAPHY **5 hours**
Introduction, Principle, Instrumentation and its applications

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:
1. Principles of Instrumental Analysis by Skoog, holler, Nieman, 5th edition.
2. Instrumental methods of Analysis, H.H. Willard, L.L. Meritt, J.A. Dean and F.A. Settle Wadsworath, New York
3. Pharmaceutical Analysis: Modern methods Part A, Part B, James W. Munson.
Suggested Reading:
1. G. H. Jeffery, J. Basset, J. Mendham, R. C. Denny (Rev. by) Vogel's Text Book of Quantitative Chemical Analysis, Longman, London
2. A Textbook of Pharmaceutical Analysis. Connors K.A.
3. A.H. Beckett and J.B. Stenlake, Practical Pharmaceutical chemistry, part 1&2.
Online Reading:
1. http://www.pharmatext.org/
2. http://www.pharmainfo.net
3. www.chromatography.com

Faculty of Physiotherapy					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG/ IN**
68	TGE002	Exercise Prescription in Women's Health	Physiotherapy	2,4,6	UG
69	TGE003	Physical Health	Physiotherapy	3,5,7	UG

Faculty of Physiotherapy

UG SEMESTER 2, 4, 6

Course Number	Course Code	Course Title	L	T	P	C	Total Hours
65	**TGE 002**	**Exercise Prescription in Womens Health**	3			3	45

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 counselling and create awareness in the community.The student will also demonstrate skill in appreciating the significance and knowledge of women's health to the wider community.

COURSE OUTLINE:

UNIT I-Introductory part

Female anatomy
Female physiology
Exercise physiology and Homeostasis
Fitness –definition, aspects, parameters for testing
Factors enhancing fitness

UNIT II -Women and Exercise

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

UNIT-III-Preventive Pelvic floor Training

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

EVALUATION:

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

REFERENCES

- Women's Health – Sapsford, Publisher Lippincott.
- Exercise physiology ,Mcardle.katch .katch 5th edition
- Women's health and fitness Guide –Michele Kettles

JOURNALS

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

Department of Physiotherapy UG Semester 3, 5, 7						
Course code	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
TGE003	Physical Health	3	-	-	3	45
Course Transactor: Mr.T.Senthil Kumar, Assistant Professor, tsktill@gmail.com						

LEARNING OBJECTIVES:

- To understand the importance of physical health, it's 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:

1. Samson Wright, Cyril Arthur Keele, Eric Neil, Samson Wright's applied physiology, Oxford publication, 15th edition, 2015
2. William D. McArdle, Frank I. Katch, Victor L. Katch, Essentials of Exercise Physiology, Lippincott Williams & Wilkins, 2006
3. Dena Gardiner M. Principles of Exercise Therapy, Fourth Edition, CBS Publication 2000

B. LIST OF ABILITY ENHANCEMENT COURSES OFFERED BY SRU DEPARTMENTS [Credits = 2]					
Faculty of Allied Health Sciences					
S. No.	Elective Code	**Course Name**	**Department**	**Semester**	**Level UG/ PG**
1	AAE 001	English	English	1,2,3	UG
2	AAE 002	English for Clinical Communication	English	2,4	UG
3	AAE 003	Communication and Soft Skill	English	1,3,5	UG
4	AAE 004	Environmental Science	Environmental Health Engineering	1,2,3	UG
5	AAE 005	Trauma Life Support	Accident & Emergency	1,3,5	UG
6	AAE 006	Cardiac Life Support	Accident & Emergency	1,3,5	UG
7	AAE 007	Community Medicine	Community Medicine	1,3	UG
8	AAE 010	Medical Ethics & Law	General Medicine	3,5,7	UG
Faculty of Biomedical Sciences & Technology					
9	BAE 005	Basics of Biodiversity	Biomedical Sciences	1,3,5,7	UG

UG Semester – I, 2 or 3						
Offered by Language Department, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
AAE 001	English	2	-	-	**2**	**30**
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)						

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

AAE 001	**English**

UNIT : I GRAMMAR

1. Remedial Grammar : Parts of speech; Types of sentences, question tags

2. Modal verbs;
3. Tenses
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:

1. Effective English Communication by Krishna Mohan and Meenakshi Raman, Tata Mc Graw – Hill Publishing Company Limited, New Delhi. (Approx. Cost Rs. 200)
2. English for Colleges and Competitive Exams by Dr. R. Dyvadatham, Emerald Publishers. (Approx. Cost Rs. 150)

References:

High School English Grammar and Composition by Wren & Martin.
J. C. Nesfield, English Grammar Composition & Usage, Macmillan India Limited.
Practical English Usage, Michael Swan
Speak in English, Lakshminarayanan.K.R
A handbook of pronunciation of English words, J. Sethi and J.V. Jindal, Eastern Economy Edition.
Practical Communication By Abraham Benjamin Samuel

Online sources:

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

UG Semester – 2, 4						
Offered by Language Department, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
AAE 002	English for Clinical Communication	2	-	-	**2**	**30**
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:

1. Effective English Communication by Krishna Mohan and Meenakshi Raman, Tata Mc Graw – Hill Publishing Company Limited, New Delhi. (Approx. Cost Rs. 200)
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/

UG Semester – 1, 3, 5						
Offered by Language Department, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
AAE 003	**Communication and Soft Skill**	2	-	-	**2**	**30**
Offered to: B.Sc. (Biomedical Sciences)						

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

AAE 003	Communication and Soft Skill

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
3. Editing- Grammar, Spelling & Punctuation, Use of Dictionary & Thesaurus.

UNIT – V SOFT SKILLS (7hrs.)

1. Active Listening Skills
2. Assertive Skills
3. Negotiation and Persuasive Skills
4. Interview Skills

Suggested text Book: Developing Communication Skills by Krishna Mohan and Meera Banerji, II edition, Macmillan.

Reference Books:

1. Communication Skills for Engineers and Scientists by Sangeeta Sharma and Binod Mishra, PHI Learning Private Limited, New Delhi.

2. English and soft skills by S.P. Dhanavel, Orient Black Swan
3. Effective English Communication by Krishna Mohan and Meenakshi Raman, Tata McGraw –Hill Publishing Company Limited.
4. Technical Communication – Principles and Practice, by Meenakshi Raman and Sangeetha Sharma, II edition, Oxford University Press.
5. Developing Communication Skills by Krishna Mohan and Meera Banerji, II edition, Macmillan.
6. The Complete Guide to Functional Writing in English by M. Sarada, Sterling Publishers (P) Ltd., New Delhi.
7. Speaking Naturally: Communication Skills in American English by Bruce Tillitt and Mary Newton Bruder, Cambridge University Press .

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

UG Semester – I, 2 or 3						
Offered by Dept. of EHE, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
AAE 004	**Environmental Sciences**	2	-	-	**2**	**30**
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)						

AAE004	AE	**Environmental Sciences**

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
Source, Cause, effects and control measures of- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Occupational hazards, Hazardous and solid wastes- Municipal wastes, Biomedical wastes, Electronic wastes, Plastic wastes, Industrial chemicals, Disaster management, Urban problems related to energy and Water conservation, Resettlement and Rehabilitation of people, Environment protection related Acts, Issues involved in enforcement of environmental legislation and Public awareness.

Unit 4: Human Population and the Environment
Population growth and explosion variation among nations, Family Welfare Programme, Environment and human health, Women and Child Welfare, Environmental ethics, Human Rights, Value Education, HIV/AIDS, Role of Information Technology in Environment and human health, Case Studies.

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

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.

2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad –380 013, India, Email:mapin@icenet.net (R)
3. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
4. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
5. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

Reference Books

1. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
2. Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
3. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
4. Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
5. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
6. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
7. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
8. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
9. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
10. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
11. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

Online resources

1. http://snre.umich.edu/degrees/masters/environmental_policy/overview?gclid=CPjQ_IziicUCFQURjgodVmEAKg
2. http://www.prospects.ac.uk/options_environmental_science.htm
3. http://study.com/academy/lesson/what-is-environmental-science-definition-and-scope-of-the-field.html

UG Semester – 1,3						
Offered by Department of Community Medicine, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
AAE 007	Community Medicine	2	-	-	**2**	**30**
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.

7	AAE 007	Community Medicine

Unit –I:

- Importance of Community Medicine- Natural History of disease- Epidemiologic concept of Interactions of Agents, Host and Environment- Agent factors- Environmental factors – Risk groups
- 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.
- Important Communicable Diseases – Tuberculosis, ARI & Influenza, Leprosy, HIV / AIDS, Hepatitis B & C, Acute Diarrhoeal Diseases / Food poisoning, Arthropod borne infections, - Risk factors, Prevention – Related health programmes in brief.
- 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/

Semester – I, 3, 5 & 7						
Offered by Department of Biomedical Sciences; Faculty of BMST & R						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
BAE 005	Basics of Biodiversity	2	-	-	**2**	**30**
Offered to: All UG Programs						

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

1. Alexopoulos C.J and MIMS C.V 1988. ***Introductory Mycology***, John Wiley and Sons.
2. Bold, H.C. and Wayne, M.J. 1996 ***Introduction to Algae (2nd Edition***). Prentice Hall, Inc. Englewood Cliffs, New Jersey.
3. Campbell, N.A. and Reece, J. B. (2008) ***Biology 8th edition***, Pearson Benjamin Cummings, San Francisco.
4. Dubey R C and D K Maheswary : ***A Text Book of Microbiology*** : S Chand and Co New Delhi

Reference Books

1. Lee, R.E. 2008. ***Phycology, Fourth Edition***, Cambridge University Press, USA.
2. Pandey and Trivedi - ***A text book of Fungi, Bacteria and Virus*** Vikas Publishing House, New Delhi.
3. Pelczar, M.J. (2001) ***Microbiology, 5th edition,*** Tata Mc Graw-Hill Co, New Delhi.
4. Presscott, L. Harley, J. and Klein, D. (2005) ***Microbiology, 6th edition,*** Tata Mc Graw-Hill Co. New Delhi.
5. Raven, P.H *et al* (2006) ***Biology 7th edition*** Tata McGrawHill Publications, New Delhi

C. LIST OF SKILLS ENHANCEMENT COURSES OFFERED BY SRU DEPARTMENTS [Credits = 2] SE- indicates Theory Courses; SL- indicates Practical Courses					
S. No.	**Elective Code**	**Title**	**Department**	**Semester**	**UG/PG**
Faculty of Allied Health Sciences					
1	ASE 002	Applied Psychology	Allied Health Sciences	1,3,5,7	UG
2	ASE 006	Bakery and Confectioneries	Clinical Nutrition	1,3,5,7	UG
3	ASE 008	Introduction To Communication Disorders And Rehabilitation	Speech Language and Hearing Science	2,4,6	UG
4	ASE 009	Functional Language Skills	Language Department	1,3,5,7	UG
5	ASE 010	Basic quantitative research tools for clinical and public health research	Environmental Health Engineering	2,4,6	UG
6	ASE 012	Occupational Health Services	Environmental Health Engineering	2	PG
7	ASE013	Professional skills Development	Environmental Health Engineering	1,3	PG
8	ASL011	Health Science Data Analysis using R-Statistical Software	Environmental Health Engineering	1,3	PG
9	ASL014 *	National service scheme and Nation Building	NSS office	2,4,6	UG
10	ASL015 *	Culinary Skills for optimal nutrition	Clinical Nutrition	1,3,5,7	UG
11	ASL016 *	Basic Life Support	Accident & Emergency	2,4,6	UG
12	ASL017 *	Library Science and E-Resources	Central Library	1,3,5,7	UG
Faculty of Biomedical Sciences & Technology					
13	BSE 001	Good Laboratory Practices	Biomedical Sciences	1,3,5,7	UG
14	BSE 002	Human Rights and Value Education	Biomedical Sciences	2,4,6	UG
15	BSE 003	Fundamentals in Analytical Laboratory Skills	Biomedical Sciences	1,3,5,7	UG
16	BSE 004	Public Health and Hygiene	Biomedical Sciences	2,4,6	UG
17	BSL015 *	Medical Transcription	BMS	1,3,5,7	UG
18	BSL016 *	Basics of Electronics	BMS	1,3,5,7	UG
SRDC &H					
19	DSL001 *	Tooth Wisdom	Dental	2,4,6	UG
SRMC & RI					
20	MSL001 *	Introduction to the principles and practice of infection prevention and control	Microbiology	2	PG
Faculty of Management Sciences					
21	GSL001 *	Physician Office Management	Management	2,4,6	UG

22	GSL002 *	Interpersonal Skills	Management	1,3,5,7	UG
Faculty of Nursing					
23	NSL001 *	Diabetic foot care	Community Nursing	2,4,6	UG
Faculty of Physiotherapy					
24	TSL001 *	Ergonomics and Health promotion	Physiotherapy	2,4,6	UG

UG Semester – I, 3,5,& 7						
Offered by AHS Department, Faculty of Public Health						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASE 002	Applied Psychology	2	-	-	**2**	**30**
Offered to: UG Programs						

ASE 002	Applied Psychology

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

1. Clifford T. Morgan, Richard a. King, John R. Weis and John Schopler, "Introduction to Psychology" – 7th Edition. Tata McGraw Hill Book Co. New Delhi, 1993.
2. Ernest R. Hillgard, Richard C. Atkinson, Rita L. Atkinson, "Introduction to Psychology" 6th Edition, Oxford IBH publishing Co. Pvt. Ltd., New Delhi,1975.
3. Baron.A. Robert, Psychology, Pearson Education Vth Ed.,2002
4. Psychology –the science of behavior –fifth edition1982-Neil Carson-William Bulkist-Allyn and Bacon.
5. Psychology-Lefton.L-IIIedition 1985-Allyn and Bacan
6. Psychology – The Sciences of Behaviour - Fifth edition 1982 - Neil Carlson - William Bulkist - Allyn and Bacon.
7. Psychological testing and Assessment - Aiken, L R - IX edition 1997
8. Psychological Testing from Easly Childhood Through Adolescence - Editor: Seigal M.S - International Universities press, 1987

UG Semester – I, 3,5,& 7						
Offered by Department of Clinical Nutrition, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASE 006	Bakery and Confectioneries	2	-	-	**2**	**30**
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 - Settiing 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, marshmellows, 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; marshmellow; lemon maringue; fudge; almond paste; glace icing.

5. Toffees: Milk toffee; chocolate; stick jaws; liquor chocolate.

6. Ice Cream: Vanilla, Strawberry, Chocolate, Pineapple, Mango.

7. Pastry: Pineapple pastry, chocolate pastry.

8. Pudding: ginger pudding; cold lemon soufle; chocolate mousse; fruit triffle.

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

1. Baked Products: Science, Technology and Practice, Cauvain S.P. and Young L.S. , Wiley-Blackwell, 2006.

2. Bakery Products: Science and Technology, Hui Y.H. Ed. , Wiley-Blackwell, 2006.

Reference Book

1. Principles of Cereal Science and Technology, Delcour J.A. and Hoseney R.C. , 3rd Edition, 2010.

Web references

1. www.bakersjournal.com
2. www.nchm.nic.in/nchmct_adm/writereaddata/upload/.../1386722436.pdf

UG Semester – 2,4,6						
Offered by Department of Speech, Language and Hearing Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASE 008	Introduction To Communication Disorders And Rehabilitation	2	-	-	**2**	**30**
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:

1. Jalvi R, Nandurkar A,& Bantwal A.(2006), Introduction to hearing impairment, DSE (HI) Manual,RCI. Kanishka Publishers, Delhi.
2. Huddar A, Mose R, Ghate P & Gathoo V.(2006), Language and communication, DSE (HI) Manual,RCI. Kanishka Publishers, Delhi.
3. Anderson N G &Shames, G.H., (2011).Human Communication Disorders: An introduction (8th ed.). Pearson Publication.
4. Van Riper C & Erickson R L (1996). Speech correction, An introduction to speech pathology and audiology, 9th edition. Allyn & Bacon Publishers.
5. Karanth P (2010).Communication DEALL, The Program. The Com DEALL Trust, Bangalore.

Online resources :

http://www.cirrie.**buffalo**.edu/encyclopedia/en/article/272/
http://www.cirrie.**buffalo**.edu/encyclopedia/en/article/50/
http://www.corwin.com/upm-data/8982_CH_1_from_Algozzine10_Rev_Final_Pdf_3.pdf

UG Semester – I, 3,5,& 7						
Offered Language Lab, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASE 009	Functional Language Skills	2	-	-	**2**	**30**
Offered to: UG / PG Programs						

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 (9HRS)
A. METHODS OF READING
1. KWL technique
2. SQ3R technique

B. WRITING
1. Creative writing
2. Sequencing of sentences
3. Paraphrasing skill
4. Art of condensation
5. Interpreting data

UNIT – III PROFESSIONAL SKILL (4 HRS)
1. Elevator pitch
2. Facing an interview
3. Resume writing and cover letter

UNIT – IV GRAMMAR (6 HRS)
1. REMEDIAL GRAMMAR
2. VOCABULARY
   a. Word formation

b. One word substitution
c. Homonyms
d. Phrasal verbs & idioms

UNIT : V SOFT SKILLS (5 HRS)

1. Verbal and non verbal communication & its barriers
2. Team building
3. SOCIAL COMMUNICATION ETIQUETTE
   1. Greeting
   2. Introducing
   3. Complimenting

Suggested Text Book:
Personality Development and soft skills by Barun K. Mitra

Reference Books:

1. Communication Skills for Engineers and Scientists by Sangeeta Sharma and Binod Mishra, PHI
   a. Learning Private Limited, New Delhi.
2. English and soft skills by S.P. Dhanavel, Orient Black Swan
3. Effective English Communication by Krishna Mohan and Meenakshi Raman, Tata McGraw – Hill
   a. Publishing Company Limited.
4. 4. Technical Communication – Principles and Practice, by Meenakshi Raman and Sangeetha
   a. Sharma, II edition, Oxford University Press.
5. 5. Developing Communication Skills by Krishna Mohan and Meera Banerji, II edition, Macmillan.
6. The Complete Guide to Functional Writing in English by M. Sarada, Sterling Publishers (P) Ltd.,
   a. New Delhi.
7. High School English Grammar and Composition by Wren & Martin.

Online reference:

http://www.studygs.net/reading_essays.htm
http://www.edufind.com/english-grammar/english-grammar-guide/

UG Semester – 2,4,6						
Offered by Dept. of EHE, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASE 010	Basic quantitative research tools for clinical and public health research	2	-	-	**2**	**30**
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:

1. Excel Data Analysis for Dummies. Stephen L. Nelson, E.C. Nelson. Wiley India Private Limited; Second edition (23 July 2014) ISBN-10: 812655052X; ISBN-13: 978-8126550524

Reference book:

1. Modern epidemiology Rothman, K.J., Greenland, S., & Lash, T.L. (2008). Modern Epidemiology, 3rd Edition. *Philadelphia, PA: Lippincott, Williams & Wilkins.*

Online resources:

1. Questionnaire design: http://www.fao.org/docrep/w3241e/w3241e05.htm

2. PubMed online training: http://www.nlm.nih.gov/bsd/disted/pubmed.html

PG Semester – 2						
Offered by Dept. of EHE, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASE 012	Occupational Health Services	2	-		**2**	**60**
Offered to: PG Programs						

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**
   - 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:

1. Occupational Diseases, G.Jayaraj, First Edition, 2015

PG Semester – 1,3						
Offered by Dept. of EHE, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASE013	Professional skills Development	2	-		**2**	**60**
Offered to: PG Programs						

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:

1. Professional Writing Skills, A self paced training programme by Janis Fisher Chan and Diane Lutovich. Advanced Communication Designs Inc, 2003. San Anselmo, CA. ISBN 0963745549
2. Speaking Your Mind: Oral Presentation and Seminar Skills By Rebecca Stott, Tory Young, Cordelia Bryan Contributor Rebecca Stott, Tory Young, Cordelia Bryan Published by Longman, 2001 ISBN 0582382432, 9780582382435

3. Public Health Leadership: Putting Principles into Practice Louis Rowitz, PhD. Jones and Bartlett Publishers, 2003. ISBN-13: 9780763725013 ISBN-10: 0763725013

Reference Books:

1. Communication Skills: Stepladders to Success for the Professional by Richard Ellis. Intellect Books 2003. UK. **ISBN** 9781841500874
2. Communication and Health: Systems and Applications (Communication Textbook Series, Applied Communication) by Eileen Berlin Ray, Lewis Donohew
3. Health Promotion: Effectiveness, Efficiency and Equity by Keith Tones, Sylvia Tilford. ISBN 978-0-7487-4527-2

PGSemester – 1,3						
Offered by Dept. of EHE, Faculty of Allied Health Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASL011	Health Science Data Analysis using R-Statistical Software		-	2	**2**	**60**
Offered to: PG Programs						

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
2. Wayne W. Daniel. Biostatistics: Basic Concepts and Methodology for the Health Sciences (Ninth Edition). 2010; John Wiley & Sons, Inc. (Wiley India).
3. Basic Epidemiology by R. Beaglehole, R.Bonita, TKjellstrom, Orint Longman in association with WHO
4. A beginner's Guide to 'R' by Alain F. Zuur, Elena N. Leno, Erik H.W.G. Meesters, Springer

Online Resource

1. http://ccts.osu.edu/education-and-training-programs/resource-room/biostatistics
2. www.r-project.org

Department of National Service Scheme UG SEMESTERS 2,4,6						
Course Code	**Course Title**	**L**	**T**	**P/ Field Activity**	**C**	**Total Hours**
ASL014	**National Service Scheme and Nation Building**	**1**		**2**	**2**	**45**
Course Transactor: Dr. S.V.Roop chandar; Programme Co- ordinator, NSS; <svrchandar@gmail.com>						

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

Unit 4 **Practical / Field Activity : (15 Hours**)

Text Books:
1. National Service Scheme – A Youth Volunteers Programme for Under Graduate students as per UGC guidelines J.D.S.Panwar et al. Astral International. New Delhi.
2. National Service Scheme Revised Manual, 2006.Govt. of India. Ministry of Youth Affairs & Sports. New Delhi

Reference Books:
1. National Youth Policy-2014. Ministry of Youth Affairs & Sports. .Govt. of India
2. Youth in Perspective

On line resources:
1. Official Web site of National Service Scheme.www.nss.nic.in
2. National Service Scheme-Wikipedia https:// en.wikipedia.org/wiki/National-service-scheme

Scheme of Curriculum and Evaluation

National Service Scheme and Nation Building Skills Enhancement Course for UG Programme															
Course Code	Category	Course Title	Credits / Week				Hours / Semester			Attendance (%)	CIA- Theory/Practical (a) Marks	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial(T) / Clinical Training (CT)	Practical (P) / Research Project	Credits(C)	Lecture/Tutorial	Practical	Total			Theory (b) Marks	Practical/Viva (c)	Theory : a+b/2=100 Practical: a+ c=100
AS L01 4	**SL**	**National Service Scheme and Nation Building**	1		2	2	30	15	45	80	50	--	50	100

DEPARTMENT OF CLINICAL NUTRITION UG SEMESTER 1,3,5,7						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASL014	Culinary skills for Optimal Nutrition	1	-	1	**2**	**45**
Course Transactor: Dr.A.J.Hemamalini, Professor; <hemajanardh@rediffmail.com>						

Learning Objectives

- ✓ Understand the basic food groups, their nutrient composition and function
- ✓ Be informed about the concept of balanced diet and tips for planning a healthy menu
- ✓ Gain knowledge looking out for nutrition labeling and be able to make healthier food choices
- ✓ To 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

1. Peckham, G.G., Foundation of Food Preparation, The MacMillan Company, London, 1994
2. Sumati, M.R. Food Science, New Age International (p) Ltd Publishing House, New Delhi, 1997

Reference Text

1. Gupta LC, Gupta K, Gupta A. Foods and Nutrition Facts and Figures, 6th Ed., Jaypee, 2006.
2. Parker R O. Introduction to Food Science, Thomson Delmar Learning, 200

Web References

1.www.eatright.org
2.www.healthyeatingatschool.ca/uplaods/Tips_Lores_jul309.pdf

ASL015 : Culinary Skills for Optimal Nutrition Skills Enhancement Course for UG programmes															
Course code	Category	Course Title	Credits / Week				Hours/ semester			Attendance (%)	CIA - Theory / Practical (a) MARKS	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical Training (CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b) EST	Practical/ Viva (c) ESP	Theory: a+(b÷2) = 100 Practical: a + c = 100
ASL015	SE	Culinary Skills for Optimal Nutrition	1	-	1	2	15	30	45	80	50		50	100

Department of Accident & Emergency UG SEMESTER 2,4,6						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASL016	Basic Life Support	1	-	1	**2**	**45**
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

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

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															
Course code	Category	Course Title	Credits / Week				Hours/ semester			Attendance (%)	CIA - Theory / Practical (a) MARKS	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical Training (CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b)	Practical/ Viva (c)	Theory: a+(b÷2) = 100 Practical: a + c = 100
												EST	ESP	
ASL 015	SE	Basic Life Support	1		1	2	15	30	45	80	50		50	100

CENTRAL LIBRARY UG SEMESTER 1,3,5,7						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
ASL017	**LIBRARY SCIENCE AND E-RESOURCES**	1	-	1	**2**	**45**
Course Transactor:						

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 **LIBRARY SCIENCE AND E- RESOURCES**

Unit 1 **BASIC CONCEPTS AND INFORMATION SERVICES**

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**

Documentary Sources of Information, Print, and Non-print including Electronic, Human and Institutional sources: Nature, types, characteristics and utility. Internet as a source of Information. Primary sources of information – Journal, conference volume, patents, research reports, thesis and their electronic format – Secondary sources of information - Bibliography, Encyclopedia, Dictionary, Yearbook , Directory,

Geographical Source, Textbook, Index and Abstracts.

Unit 3 **LIBRARY AUTOMATION**

Definition need, Purpose, advantages. Planning for Library automation. Automation of Library operations - Acquisitions, Cataloguing, OPAC, Circulation and Serials control. Evaluation of Library automation systems - Application of Barcode and RFID Technology for Library Functions. Basic concepts: Bibliography, bibliographic coupling, Impact factor.

Unit 4 **Electronic Information Sources**

Electronic Information resources: Meaning and definition, Growth and development, Types. E-Journals, e-Books, e-Theses, e-newspapers, Blogs, Wikis. Free databases and fee based bibliographical and full text databases, subject related websites, Institutional repositories, Open Archives and digital Libraries. - Resource Sharing and Networks: Consortia- Importance and objectives. Study of Information networks and Digital Library Consortia. Types of computer networks: Local Area Networks – Concept, Topologies - Bus, Star, Mesh, Tree, and Ring). Wide Area Networks and Metropolitan Area Networks- Concepts, Circuit switching and Packet switching. Difference between LAN and WAN. Wireless Networks –Mobile telephones.

Unit 5 **Digital Libraries**

Digital Libraries: Concepts and issues. Understanding digital Libraries Content creation – Electronic documents, files and file formats. Study of different file formats. Studying PDF in detail- features of PDF. Digitization- scanning, Digital Preservation, Conservation and Archival Management – Problems and prospects. Open Access Movement and Institutional repositories.

PRACTICAL: (10 hours)

Classification of books and Cataloguing
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

1. Ranganathan, S.R The five Laws of Library Science UBS Publishers, 1988
2. Ranganathan, S.R. Library Manual Sarada Ranganathan endowment for Library Science, 1989
3. Ranganathan, S.R. Cataloguing Practice Sarada Ranganathan endowment for Library Science 1990

REFERENCE BOOKS

1. Pooja and Jain Introduction to Computer, Vikas Publication 2011
2. Dhawan, S.M. et.al Shaping the future of Special Libraries beyond Boundaries, Ane Books Pvt. Ltd, 2008

Scheme of Curriculum and Evaluation:

ASL017 LIBRARY SCIENCE AND E- RESOURCES Skills Enhancement Course for UG programmes														
Course code	Category	Course Title	Credits / Week				Hours/ semester			Attendance (%)	CIA - Theory / Practical (a) MARKS	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical Training (CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b)	Practical/ Viva (c)	Theory: a+(b÷2) = 100 Practical: a + c = 100
												EST	ESP	
ASL 017	SE	LIBRARY SCIENCE AND E-RESOURCES	1		1	2	20	10	30	80	50	100		100

UG Semester – I, 3,5,& 7						
Offered by Department of Biomedical Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
BSE 001	Good Laboratory Practices	2	-	-	**2**	**30**
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

Introduction to Bioethics and Biosafety.Biosafety Guidelines and Regulations.Legal and Socio-economic Impacts of Biotechnology.Use of Genetically Modified Organisms and their Release in theEnvironment. Hazardous Materials used in Biotechnologytheir Handling andDisposal. Good Laboratory Practice (GLP) and Good Manufacturing Practice(GMP). Public Education of Producing Transgenic Organisms.

UNIT II: GOOD LABORATORY PRACTICE PRINCIPLE

Test Facility Organization and Personnel: Management responsibility, Study director's responsibility, safety measures and personal responsibility. Quality assurance program. Facilities: Test System Facilities, Facilities for Handling test and Reference Substances. Archive Facilities. Waste Disposal, Animal Care Facilities, Animal Supply Facilities.

UNIT III: STANDARDED OPERATING PROCEDURES

Definition, Initiation of SOP, Preparation of SOP, Administration, Distribution and Implementation.Maintenance of laboratory records.Formatting 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:

UG Semester – 2,4,6						
Offered by Dept. of Biomedical Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
BSE 002	Human Rights and Value Education	2	-	-	**2**	**30**
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.

III United nation and human rights - Universal Declaration of human rights 1948, UN Declaration and Duties and Responsibilities of Individuals 1997.

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

1. T.S.N. Sastry, Introduction to human rights and duties, University of Pune, (2011).
2. Baxi, Upendra (2002) The Future of Human Rights. New Delhi: Oxford University Press.

Reference Books

1. Dube, M. P. and Neeta Bora, (ed.) (2000) Perspectives on Human Rights New Delhi:Anamika Publishers.
2. Sanajaoba, N. (2000) Human Rights in the New Millennium. New Delhi: Manas Publications.
3. Vadkar, Praveen, (2000) Concepts, Theories and Practice of Human Rights. New Delhi: Rajat publications

Web Links

www.ohchr.org/EN/Issues/Pages/WhatareHumanRights.aspx

UG Semester – I, 3,5,& 7						
Offered by Department of Biomedical Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
BSE 003	Fundamentals in Analytical Laboratory Skills	2	-	-	**2**	**30**
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

Distillation of water - distillation plants, purity checks. Storage of distilled water. Calibration of volumetric apparatus- flasks, burettes and pipettes, meniscus readers.

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
2. D.A. Skoog, D.M. West and F.J. Holler, Analytical Chemistry: An Introduction, 5th Edition, Saunders college publishing, Philadelphia, 1990.
3. Text book of Medical Biochemistry by Chatterjee Shinde

Reference Books

1. R. Gopalan, Analytical Chemistry, S. Chand and Co., New Delhi
2. Malhotra VK. Practical Biochemistry for students. Fourth Edition, 2003 Jaypee publishers
3. Daniel C Harris: Quantitative Chemical Analysis.

UG Semester – 2,4,6						
Offered by Dept. of Biomedical Sciences						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
BSE 004	Public Health and Hygiene	2	-	-	**2**	**30**
Offered to: UG Programs						

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

Indicators of health, Determinants of Health, (Social, Economic, Cultural, Environmental, Education, Genetics, Food and Nutrition). Burden and prevention of disease. Environmental health- sanitation, air, water pollution, waste management. Mental health.

III Epidemology

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

1. Introduction to Public Health, Raymond L. Goldsteen, Karen Goldsteen, David G. Graham, 2011, Springer publishing company
2. Introduction To Community Health Nursing, Kasturi Sundar Rao, 4th edition, Bi Publications Pvt Ltd
3. Concepts of Epidemiology, Raj S Bhopal, 2002, Oxford University press

Reference Books

1. A Treatise On Hygiene And Public Health, Birendra Nath Ghosh, 9th edition, Calcutta Scientific Publishing Co
2. An Introduction to Public Health, Caryl Thomas, 1949, John Wright and Sons Ltd.,

Web links

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

DEPARTMENT OF HUMAN GENETICS **UG SEMESTER 1,3,5,7**						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
BSL015	Medical Transcription	1	-	1	**2**	**45**
Course Transactor: Dr. J. Vijayalakshmi, Associate Professor < karthivi@yahoo.com>						

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)

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

	Proof reading Notations Formats and styles in document preparation Preparation of chart notes Listening Comprehension Transcription check off sheet

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 formedical document preparation

References Books:

1. Medical Key boarding, Typing, and Transcribing Techniques and procedures 4th Edition, March Otis Diehl, Marilyn Takahashi Fordney, W.B. Saunders Company
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:

1. Medical Key boarding, Typing, and Transcribing Techniques and procedures 4th Edition, March Otis Diehl, Marilyn Takahashi Fordney, W.B. Saunders Company
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:

BSL015 : Medical Transcription Skills Enhancement Course for UG programmes															
Course code	Category	Course Title	Credits / Week				Hours/ semester			Attendance (%)	CIA - Theory / Practical (a) MARKS	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical Training(CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b) EST	Practical/ Viva (c) ESP	Theory: a+(b÷2) = 100 Practical: a + c = 100
BSL 015	SE	**Medical Transcription**	1		1	2	15	30	45	80	50		50	100

DEPARTMENT OF BIOMEDICAL SCIENCE UG SEMESTER 1,3,5,7						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
BSL016	Basics of Electronics	1	-	1	**2**	**45**
Course Transactor: Ms. Betty Lincoln, Senior Lecturer < lincolnbetty@gmail.com>						

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

Units	**BASIC OFELECTRONICS**
Unit 1	**INTRODUCTION** Basic concepts – static and current electricity – Ammeter – Voltmeter – Multimeter– Capacitor – Resistors- Basic circuitry - Inductors – Rectifiers – Semiconductor theory - diodes – LED – Timer circuits
Unit 2	**ELECTRONIC GADGETS** Basic circuitry of home appliances – principle and working of gadgets –trouble shooting in home appliances- electrical safety –macro shock – micro shock – electrical accidents – protection devices.
Unit 3	**SENSORS** Introduction – Principle And Types – Biosensors – Transducers – Selection Of Transducer – Direct And Indirect Measurement –Strain Gauge – Controlling lighting and reducing wastage of Energy.
Unit 4	**PRACTICAL: (20 hours)** Understanding of Basic circuit connections and continuty in circuits Construction of light dark sensor Demonstration of sound level meter Construction of electronic alarm and buglar alarm Construction of FM receiver Demonstration of the working of thermostat and water heater Demonstration of minor day to day gadgets.

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

Reference Books:

1. Jacob Millman and Halkias C.,"Integrated Electronics," Mc Graw hill, New York, 2004.
2. Basic Electronics by Debashis De, Pearson publishers.

Online Resources:

1. *www.electronics-lab.com*
2. *Modern Devices: The Simple Physics of Sophisticated Technology, wiley online library.*

Scheme of Curriculum and Evaluation:

BSL016 : Basics of Electronics Skills Enhancement Course for UG programmes															
Course code	Category	Course Title	Credits / Week				Hours/ semester			Attendance (%)	CIA - Theory / Practical (a) MARKS	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical Training(CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b)	Practical/ Viva (c)	Theory: a+(b÷2) = 100 Practical: a + c = 100
												EST	ESP	
BSL 016	SE	**Basics of Electronics**	1		1	2	15	30	45	80	50	--	50	100

DEPARTMENT OF DENTAL UG SEMESTER 2,4,6						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
DSL001	Tooth Wisdom	1	-	1	**2**	**45**
Course Transactor: Dr.Madhan ,						

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 & Auxillary 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

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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 Skills Enhancement Course for UG programmes															
Course code	Category	Course Title	Credits / Week				Hours/ semester			Attendance (%)	CIA - Theory / Practical (a) marks	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b) EST	Practical/ Viva (c) ESP	Theory: a+(b÷2) = 100 Practical: a + c = 100
DSL 001	S L	Tooth Wisdom	1		1	2	15	30	45	80	50	--	50	100

DEPARTMENT OF MICROBIOLOGY PG SEMESTER 2						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
MSL001	Introduction to the principles and practice of Infection prevention and Control	1	-	1	**2**	**45**
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 kennamar
3. APIC Text of Infection Control and Epidemiology, 4th ed.
4. Hospital Epidemiology and Infection Control – Glen Mayhall . 4th Edition. Lippincott Williams
5. Hospital Clinical Waste, Hazards, Management and Infection Control . Dr. Ashok Saini . Indian Society of Health Administrators. Yem Yes Printers
6. Hospital Acquired Infections – Prevention and Control , PurvaMathur, 1st Edition, Lippincott Williams

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			Attendance (%)	CIA - Theory / Practical (a) MARKS	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical Training (CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b)	Practical/ Viva (c)	Theory: a+(b÷2) = 100 Practical: a + c = 100
												EST	ESP	
MSL001		Introduction to the principles and practice of Infection prevention and Control	1		1	2	15	30	45	80	50		50	100

DEPARTMENT OF COLLEGE OF MANAGEMENT UG SEMESTER 2,4, 6						
Course Code	Course Title	L	T	P	C	Total Hours
GSL001	**Physician Office Management**	2	-	-	2	45
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	Inpatient Section – Admitting office procedure – Inpatient record removal & forwarding – ward census. Assembling and deficiency check. IP record coding and indexing.
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. Medial 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

1. https://www.acponline.org/practice-resources/business-resources/office-management/patient-care-office-forms
2. http://www.physicianspractice.com/

Scheme of Curriculum and Evaluation:

Skills Enhancement Course for UG programmes offered by College of Management															
Course code	Category	Course Title	Credits / Week				Hours/ semester			Attendance (%)	CIA - Theory / Practical (a) Marks	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical Training (CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b) EST	Practical/ Viva (c) ESP	Theory: a+(b÷2) = 100 Practical: a + c = 100
GSL 001	SE	**Physician Office Management**	2	-	-	2	30	-	30	80	50	-	50	100

DEPARTMENT OF COLLEGE OF MANAGEMENT UG SEMESTER 1,3,5,7						
Course Code	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
GSL 002	**Interpersonal Skills**	**2**	**-**	**-**	**2**	**45**
Course Transactor: Ms. K. Rohini, Lecturer <rohinianusha@gmail.com>						

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:

1. http://www.trainingcoursematerial.com/free-training-articles
2. http://www.unimenta.com/materials/Unimenta-free-and-sample-materials

Scheme of Curriculum and Evaluation:

GSL 002 Interpersonal Skills Skills Enhancement Course for UG programmes															
Course code	Category	Course Title	Credits / Week				Hours/ semester			Attendance (%)	CIA - Theory / Practical (a) Marks	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical Training (CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b)	Practical/ Viva (c)	Theory: a+(b÷2) = 100 Practical: a + c = 100
GSL 002	SE	**Interpersonal skills**	2	-	-	2	30	-	30	80	50	-	50	100

DEPARTMENT OF NURSING Skills Enchancement course UG SEMESTER 2,4,6						
Course Code	Course Title	L	T	P	**C**	**Total Hours**
NSL 001	**Diabetic foot care**	**1**	**-**	**1**	**2**	**45**
Course Transactor: Mrs. K. Kavitha , Lecturer <Kavithamsc76@gmail.com>						

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

Unit	Diabetic foot care
I	**Introduction of the course** - Diabetes mellitus - Diabetic foot problems - Anatomy and Physiology of the pancreas, skin (callus), nail and foot
II	**Management of patients with diabetes mellitus** - Definitions - Risk factors - Pathophysiology of diabetes mellitus - Pathophysiology of diabetic foot ulcer - Clinical features - Diagnostic investigations - Management - Complications
III	**Assessment of diabetic foot** - Foot examination - Neurovascular assessment - Nerve conduction studies - Doppler study - Other investigations
IV	**Diabetic foot care practices for prevention of complications** - Screening the diabetic foot - Foot hygiene -Trimming nails - Cutting callus - Foot wear inspection and advice - Lifestyle modification - Monitoring blood sugar level - Follow-up care - Health education
V	**Practical (30 Hours)** -Foot examination - Neurovascular assessment - Foot hygiene - Foot wear inspection and advice - Health education on -Lifestyle modification, foot care, monitoring blood sugar level & follow-up care

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:

1. Levin and O' Neal. (2012). *The Diabetic Foot* (7th ed.). Philadelphia: Mosby and Elsevier.
2. John C-Pickup and Gareth Williams. (2006). *Textbook of Diabetes* (2nd ed.). Oxford: Blackwell.

Reference Books:

1. Rajeev Chawla. (1982). *Complications of Diabetes* (2nd ed.). New Delhi: Jaypee Brothers.
2. Roy Moeller DPM. (2011). *Diabetic Foot Care: A Guide for Patients and Healthcare Professionals* (1st ed.). Newyork: Hatherleigh Press

Online Resource:

1. www.diabeticfootcare.com
2. www.diabetesresearchconnection.org

Scheme of Curriculum and Evaluation:

NSL 001: Diabetic foot care Skills Enhancement Course for UG programmes															
Course code	Category	Course Title	Credits / Week				Hours/ semester			Attendance (%)	CIA - Theory / Practical (a) MARKS	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical Training (CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b)	Practical/ Viva (c)	Theory: a+(b÷2) = 100 Practical: a + c = 100
												EST	ESP	
NSL 001	SE	**Diabetic foot care**	1		1	2	15	30	45	80	50		50	100

DEPARTMENT OF PHYSIOTHERAPY UG Semester 2,4,6						
Course Code	**Course Title**	**L**	**T**	**P**	**C**	**Total Hours**
TSL001	**Ergonomics and Health Promotion**	**1**	**-**	**1**	**2**	**45**
Course Transactor: Mr. T. Senthil Kumar, Assistant professor < tsktill@yahoo.com>						

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

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:

1. William D. McArdle , Frank I. Katch , Victor L. Katch ,Exercise Physiology: Energy, Nutrition and Human Performance, Lippincott Williams and Wilkins; 5th Revised edition(2001)
2. Greg Welk, Physical Activity Assessments for Health-related Research, Human Kinetics, 2002
3. Perceptive in Rehab Ergonomics, Shrawan Kumar, Taylor and Francis, 1997.
4. Work Hardening: A Practical Guide, Linda M. Demers, Andover Medical Pub. 1992
5. Kinesiology of Musculoskeletal system, Donald. A Neuman.
6. Anatomy and Human Movement, Nigel Palastanga.
7. Joint structure and function, Cynthia.C Norkin, Pamela K.Levangie, Fourth edition.

TSL001: Ergonomics and Health Promotion
Skills Enhancement Course for UG programmes

Course code	Category	Course Title	Credits / Week				Hours/ semester			Attendance (%)	CIA - Theory / Practical (a) MARKS	End Semester Assessment		Grand Total
			Lecture (L)	Tutorial (T)/ Clinical Training (CT)	Practical (P)/Research	Credits(C)	Lecture/ Tutorial	Practical	Total hours			Theory (b)	Practical/ Viva (c)	Theory: a+(b÷2) = 100 Practical: a + c = 100
												EST	ESP	
TSL 001	SE	**Ergonomics and Health Promotion**	1		1	2	15	30	45	80	50		50	100

SRI RAMACHANDRA UNIVERSITY

Porur, Chennai – 600116
(Declared Under section 3 of the UGC act, 1956)
Accredited by NAAC with "A" grade
CHOICE BASE CREDIT SYSTEM

PROGRAM REGISTRATION CARD

REGISTRATION CARD FOR COURSE – ACADEMIC YEAR 2015-16			
UG/PG:	**Program Name:**	**Year of Study:**	**Semester:**

S. No.	Type	Details
1	Name of Student	
2	Program Admitted	
3	Year & Batch	
4	Semester Pursuing	
5	Admission Number/Registration/Bar Code	Same Number the Student Section Gives
6	Contact Details	
7	Email ID	
8	Phone Number/ Mobile	
9	Registration for Core Courses	

Course Number	Ten Digit Course Code	Category	Course Title			Credit
1		Core Theory				
2		Core Theory				
3		Core Theory				
4		Core Theory				
5		Discipline Specific Electives				
6		Generic Elective Open	Choice 1	Choice 2	Choice 3	
7		Generic Elective Open	Choice 1	Choice 2	Choice 3	
8		Ability Enhancement Course				
9		Ability Enhancement Course				
10		Skill Enhancement Course	Choice 1	Choice 2	Choice 3	
11		Skill Enhancement Course	Choice 1	Choice 2	Choice 3	
12		Core Lab				
13		Core Lab				
14		Research Project				
					Total Credit	

	Student	Student Advisor	Head of Department
Signature:			
Name:			
Designation:			
Time of Submission			
To be filled and sent to CBCS office within one week of joining a programme			**Seal of Department**

Type A5 for ALL GE/AE/SE Courses from April 2017 onwards		
UG And PG programs		
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**		
Objective type: (Answer ALL) [Define/give reasons/classify/ List any two (differences; advantages; functions; applications;....)]	5 x 3 marks	15 marks
Short essay (4 out of 5)	4 x 5 marks	20 marks
Long essay (1 out of 2)	1 x 15marks	15 marks
TOTAL		50 marks

FORMAT:

Course Code: UG and PG **ALL GE/AE/SE Courses**

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

4

5

Answer any **FOUR** of the following: (4x5 marks)

6

7

8

9

10

Answer any **ONE** of the following: (1x15)

11

12