

# **KARNATAKA STATE OPEN UNIVERSITY**

## **PROGRAMME GUIDE**

**M.SC. IN FOOD AND NUTRITION SCIENCES**



**DEPARTMENT OF POST GRADUATE STUDIES  
AND RESEARCH IN FOOD AND NUTRITION  
SCIENCE**

**Mukthagangothri, Mysuru 570006**

## VICE-CHANCELLOR'S MESSAGE

Dearest Learners.....

I believe am extravagant to be the heartiest Vice-Chancellor of Karnataka State Open University and solemnly welcome you to pursue your study through distance mode. The higher education sector is passing through a rapid transformation, both in India and across the world and I believe that the Karnataka State Open University is setting and achieving new standards of pedagogic quality. The conventional teaching of education and measurement of performance have changed in the new era. The 'classroom' is no longer confined to the physical space of the four walls of learning. The knowledge question has become a dynamic pushing everyone to make lifetime engagement by continuous upgrading of skills and understanding. Karnataka State Open University has never backed to embrace the challenges exerted in the new context of higher education.

Karnataka State Open University (KSOU) was originated through its pioneer Institute of Correspondence Course and Continuing Education (ICC & CE), which was established in 1996 under the state act. KSOU has inscribed its motto “**Higher Education to Everyone Everywhere**” by adopting various strategies to reach the students globally. University welcomes all age group of learners above 18 years of age. University has regional centres in different districts of Karnataka for smooth functioning and operations for students’ accomplishments. KSOU believes in accessing to sustainable and quality education through distance mode, hence, utilization of modern techniques of teaching have gathered best understanding. Few of the strategies include ‘KSOU connect’ which has helped in online teaching and learning, ‘KSOU App’ for provision of information in finger tips.

Karnataka State Open University offers under-graduate, post-graduate and research programmes in different streams of Arts, Humanities, Commerce, Science, Education and Management. KSOU also offers Diploma and certificate programmes in various subjects. University is encouraging the concepts of Skill development, Virtual labs, E-Content, E-Radio, E-Video for better approaches of students. University has adopted the guidelines of UGC in establishing grievance cell and placement cells, so that students are addressed during their stay as student as well as for their way forward. In order to maintain the standards of the University “Centre for Quality Assurance” (CIQA) is established which is gearing up for further accreditations of the University. University encourages SC/ST students and girl students with BPL by extending financial support through scholarships of State Government.

I wish the programme at Karnataka State Open University opted by you will provide the best of the knowledge and sustain your professional escalation and learning.

Yours sincerely  
Dr. S. Vidyashankar  
Vice-Chancellor,  
Karnataka State Open University,  
Mukthagangothri, Mysuru.

**MESSAGE FROM DEAN (ACADEMIC)**  
**Dean Academic's Message**

Dear Learner

Heartily welcome you all to our Karnataka State Open University (KSOU). KSOU is the only Privileged University in the state to provide higher education through distance mode. KSOU has become one of the pioneers in providing best quality education in India and World by offering different courses in Arts, Humanities, Science, Education, Commerce and Management through distance education. This was possible with the untiring efforts of our teaching faculty and administrators which imparts the services with present scenarios and current developments of Higher education for students to compete internationally. KSOU has been successful in shaping the contemporary system to conceivable form through various technologies like skill development, visual labs and E-Programmes.

Karnataka State Open University is providing the study material or self-learning material in virtual as well as actuals for better utilization by students. The self-learning materials have been written by respective experts in concerned areas in simpler words for better understanding. Hope the best utilizations of self-learning materials are ensured. Apart from learning through books/E-books our faculty have initiated in conducting online classes through KSOU-connect and also weekend classes for students in different professions. Wish the conductive classes will be well anticipated by the learners. Apart from the mentioned prospective services, faculty members will also conduct Personal Contact Programme (PCP) for specified days based on the courses and subjects opted at the University. Generally, evaluation will be based on internal assignment and theory examination, however, practical examinations, visit reports, tests, dissertation thesis will also be considered based on the subjects chosen.

With these initiatives, I warmly welcome you all to endeavour in the field of education, acceleration of your knowledge, enhancement in your career approaches through Karnataka State Open University.

Yours sincerely  
Prof. Ashok Kamble  
Karnataka State Open University,  
Mukthagangothri, Mysuru.

## **A WORD FROM CHAIRPERSON**

Dear Learner,

Welcome to M.Sc. in Food and Nutrition Science Course at Karnataka State Open University. Hope your deliberations to acquire knowledge in the coming two years will be fruitful and provide stars to your professional career. Department of Food Science and Nutrition at Karnataka State Open University has always been and will be enthusiastic in accomplishing good rapport between student and teacher. We are available for frequent conversations; provide information through E-mails, WhatsApp and also website about ongoing events of course, University, sister concern associations of Nutrition like Indian Dietetic Association and Nutrition Society of India and also placements.

Students on completion of the course are privileged to gain experience with laboratory instrumentation and community services. The students are trained to be specialised in Food Science, food nutrition, Food processing, research skills and client care. Students learn how to introduce science of food in art of cooking, protect the body from disease and aging through lectures, experiments and trainings. Students acquire technical knowledge in Food science and nutrition thus familiarizing with food culture and modern environmental food habits. Students are educated and trained to be nutritionists, food scientists who can widely support the food manufacturing industries and eating habits of people. The trained food scientists and nutritionists will have the skills to work in food industries, panellists in industrial units, hospitals, welfare institutions, school cafeterias, business establishments that serve lunches, health industries and within their own homes. The curriculum developed will ensure holistic approaches to enable themselves as professionals who can manage to be food scientists, nutritionists, health consultants and nutritional counsellors.

Department of Food Science and Nutrition is constantly leading or are involved in cutting edge research and engaging in some of the most interesting and applicable classes. We conduct classes through online, personal contact programme where practical classes in laboratory, hospitals and clinics are ensured. Self-learning materials provided will help as notes for frequent study to students of the classes conducted.

With hopefulness and optimism, I wholeheartedly welcome you all once again to M.Sc. in Food and nutrition Sciences at Karnataka State Open University.

With all the best wishes

Dr. Hemalatha M.S.  
Chairperson, DOS&R in Food Science and Nutrition  
Karnataka State Open University,  
Mukthagangothri, Mysuru.

# 1. DEPARTMENT OF STUDIES IN FOOD SCIENCE AND NUTRITION

Department of Food science and Nutrition at Karnataka State Open University was established in the year 2001. Earlier, certificate courses were conducted in collaboration with Department of Food science and Nutrition, University of Mysore. In the year 2010, Diploma in Nutrition and Health education and PG Diploma in Nutrition and Dietetics were introduced. Certificate course in Food Preservation was converted to Diploma in Food Preservation technology in order to accommodate Food technologists for higher prospective in Food Industries. Keeping view in the demand for Dieticians in Hospitals and Nutritionists in Drug Companies, Department came forward in starting M.Sc. in Clinical Nutrition and Dietetics. From the year 2021 we are also offering M.Sc. in Food and Nutrition Sciences also

The Department of Food Science and Nutrition comes under the ambit of **School of Sciences**. The various programmes offered by the department are as follows:

- ❖ Master of Science in Clinical Nutrition and Dietetics (M.Sc. CND)
- ❖ Master of Science in Food and Nutrition Sciences (M.Sc. FNS)
- ❖ General Bachelor of Science in which Food Science and Nutrition is optional (B.Sc. (Biochemistry, Microbiology, Food Science and Nutrition))
- ❖ Bachelor of Science in Home science (B.Sc. Human Development, Psychology, Human Nutrition)
- ❖ Post-Graduation Certificate in Nutrition and Dietetics (PGCND)
- ❖ Diploma in Nutrition and Health Education (DNHE)
- ❖ Certificate in Nutrition and Food (CNF)

## a. Faculty Details

Sl. No	Name and Designation	Specialization	Email ID and Phone Number
1	Dr. Hemalatha M. S. Chairperson	Food Science, Nutrition Science, Food chemistry	<a href="mailto:drmshemap@gmail.com">drmshemap@gmail.com</a> 9880983081
2.	Dr. Anitha C. Assistant Professor	Community Nutrition, Clinical Nutrition and Food Science	<a href="mailto:anithaksou@gmail.com">anithaksou@gmail.com</a> 9916030230
3.	Dr. Krishnaraj V. Assistant Professor (Contract basis)	Food Science, Nutrition Science	kitty_fsn@yahoo.co.in 8722221499

## **2. PROGRAMME: MASTER OF SCIENCE IN FOOD AND NUTRITION SCIENCES**

Agricultural and Industrial progress in the last decade has made India self-sufficient in major food grains. However, malnutrition continues to be major nutritional problem especially in rural India. While we are in the midst of combating these long-standing problems of undernutrition in children and women, a new situation has arisen. Pandemic disease of viruses has led to many disasters, the biggest affecting malnutrition and Food industries. Good Health for human is inevitable for total progress where food and nutrition happens to be the key to solve. Recent statistics show that coronary heart disease will be one of the leading causes of premature death in India. Unlike undernutrition, these diseases are less recognized to be associated with poverty. Clearly, the Indian population is passing through a transition phase where subsistence conditions are being replaced by plentiful food but reduced physical work and therefore, an understanding of the changing nutritional scene is critical.

India Food Processing Industry is estimated at \$135 billion industry which is growing at about 8% annually. This growth rate is significantly more than agricultural growth rate which remains around 4%. India has about 26 types of different climatic conditions, 46 varieties of soils and 120 'agro climatic zones'. Also, Indian food is known worldwide for its unique taste and aroma. India's regional and cultural diversity is perfectly reflected in food. Every state in India has something unique to offer. But they haven't been able to make inroads in other countries the way Mc Donald's, Domino's etc. has done in India. This is because lack of creativeness, innovation, branding and most importantly shallow pockets of Indian manufacturers.

In order to challenge the above, a comprehensive programme approach to improving complementary feeding practices and innovation in food processing sector is the need of the hour.

## **2.1 MISSION AND OBJECTIVES**

### **a. Mission:**

- To impart the knowledge and skill to the learners and thereby increase his/her professionalism.
- To provide education at affordable cost to the masses.
- To create effective human resources by employing the ICT.
- To enhance the capacity of the learners to realize their individual, corporate and social responsibility.
- To impart education such that the learners inculcate moral, civil and ethical values.
- To provide education to the learners to embrace the philosophy of learn, earn and return.

### **b. Objectives:**

- To provide an advanced learning of core principles and specialize knowledge in food science and nutrition
- To develop appropriate skills and attitudes in Food Science to serve in food industry, food product development units and Food service managing institutions
- To develop appropriate skills and attitudes in nutritional diagnostic therapy and counseling services for the purpose of disease management/malnutrition
- To enhance the requirements of Food Technologists, health professionals, Food scientists, and nutritionists/dieticians in different sectors
- To train Food scientists and nutritionists to abreast with latest Food science and nutrition knowledge, leadership skills as active partner in health care development and Food production sectors
- To provide professional nutrition services in a wide variety of settings including academic, government, corporate, military and community based organizations

- To provide basic and advanced understanding of Food Science and Nutrition required to clear competitive exams that are conducted based on interdisciplinary knowledge and application skills such as UGC, NET, CSIR, ICMR, etc.

## **2.2 PROGRAMME OUTCOMES:**

- Inculcate students to excel in Nutritionists, dieticians, entrepreneurship, and research with ethical standards
- Achieve quality and excellence in the course of Food and Nutrition Sciences.
- Job opportunity for the learners at the industries, rehabilitation centres, NGOs, etc.
- Qualified Food technologists, nutritionists/dieticians with classical and corporate responsibility with better employable skills.
- Demographic advantage to a knowledge and skill based healthy society.
- Quality lifespan

### **3. DELIVERY MECHANISM**

The delivery mechanism followed in this University is different from that of conventional universities. The Open University system is more learners centric, and is geared to cater to the needs of motivated students assuming that the student is an active participant in the teaching-learning process. Instruction to student is imparted through-

- \* Printed Self-Learning Material.
- \* Audio – visuals.
- \* Counselling/PCP

#### **a. SLM by Print Media**

SLM takes the role of a teacher in distance education system. The study material in English provided to you along with this programme guide are called self-learning material as it facilitates learning on your own. The study material is exhaustive and easy to understand. The SLM have been divided into blocks and units. Each block has one credit value which denote 30 hours of study for one block, be it studying, discussing with counsellors, attending classes, writing assignment and so on.

Objectives are given in the beginning of each unit which tells what is expected of you by learning that unit. Check your progress questions are given in content so that you can measure your progress while studying the material. References are given at the end of each unit which gives you sources for furtherance of your study.

#### **b. Audio-visuals**

In an endeavor to impart education to reach the unreached, the university has a system to provide information by audio-visuals. The Department has developed various audio lectures on various topics by involving well experienced academicians. The study material will be broadcasted by FM radio and other channels. The limited visuals are also pressed into action to clarify many issues during teaching learning process.

#### **c. Counseling/ PCP**

The university delivers the instructions **in English** through counseling/PCP; counseling may be weekend, while the PCP will be conducted for a period around 10 or more days at stretch. Well experienced teachers working in the department and from other universities will deliver lectures; thereby they clear many intricacies which may occur on the SLM. The academic counselors will help you to prepare yourself not only to face the examination with confidence besides, your carrier also.

#### 4. PROGRAMME STRUCTURE AND SYLLABUS

Semester	Course Code	Course Title	Credits	Counseling/PCP Hours	Max. Marks			Minimum Passing marks		Duration of Exam (hours)
					Internal Assessment	Term end exam	Total Marks	Internal Assessment	Term end exam	
I	MFNSDSC- 1.1	Advanced Nutrition-I	4	12	20	80	100	08	32	3
	MFNSDSC -1.2	Food Science	4	12	20	80	100	08	32	3
	MFNSDSC- 1.3	PRACTICALS – A	2	60	10	40	50	04	16	3
	MFNSDSC- 1.4	PRACTICALS – B	2	60	10	40	50	04	16	3
	MFNSDSE -1.5	Applied Physiology	3	09	20	80	100	08	32	3
	MFNSDSE -1.6	Research Methodology and Statistics	3	09	20	80	100	08	32	3
	MFNSDSE- 1.7	Food Chemistry	3	09	20	80	100	08	32	3
	MFNSDSE- 1.8	Nutritional Epidemiology	3	09	20	80	100	08	32	3
	ELMFNS –01	Interdisciplinary Elective-1	2	06	10	40	50	04	16	1 <sup>1/2</sup>
		<b>Total</b>	<b>20</b>	<b>168</b>	<b>110</b>	<b>440</b>	<b>550</b>	<b>44</b>	<b>176</b>	<b>-</b>

**DSC: Discipline Specific Core; DSE: Discipline Specific Elective**

Semester	Course Code	Course Title	Credits	Counseling/PCP Hours	Max. Marks			Minimum Passing marks		Duration of Exam (hours)
					Internal Assessment	Term end exam	Total Marks	Internal Assessment	Term end exam	
II	MFNSDSC 2.1	Advanced Nutrition -II	4	12	20	80	100	08	32	3
	MFNSDSC 2.2	Community Nutrition	4	12	20	80	100	08	32	3
	MFNSDSC 2.3	PRACTICALS – A	2	60	10	40	50	04	16	3
	MFNSDSC 2.4	PRACTICALS – B	2	60	10	40	50	04	16	3
	MFNSDSE 2.5	Food Analysis and Techniques	3	09	20	80	100	08	32	3
	MFNSDSE 2.6	Functional properties of foods	3	09	20	80	100	08	32	3
	MFNSDSE 2.7	Food laws and standards	3	09	20	80	100	08	32	3
	MFNSDSE 2.8	Nutraceuticals and Functional Foods	3	09	20	80	100	08	32	3
	ELMFNS –02	Interdisciplinary Elective-2	2	06	10	40	50	04	16	1 <sup>1/2</sup>
		<b>Total</b>	<b>20</b>	<b>168</b>	<b>110</b>	<b>440</b>	<b>550</b>	<b>44</b>	<b>176</b>	<b>-</b>

**DSC: Discipline Specific Core; DSE: Discipline Specific Elective**

Semester	Course Code	Course Title	Credits	Counseling/PCP Hours	Max. Marks			Minimum Passing marks		Duration of Exam (hours)
					Internal Assessment	Term end exam	Total Marks	Internal Assessment	Term end exam	
III	MFNSDSC 3.1	Food preservation	4	12	20	80	100	08	32	3
	MFNSDSC 3.2	Product Development and sensory evaluation	4	12	20	80	100	08	32	3
	MFNSDSC 3.3	PRACTICALS – A	2	60	10	40	50	04	16	3
	MFNSDSC 3.4	PRACTICALS – B	2	60	10	40	50	04	16	3
	MFNSDSE 3.5	Food Hygiene and food safety	3	09	20	80	100	08	32	3
	MFNSDSE 3.6	Storage and handling of foods	3	09	20	80	100	08	32	3
	MFNSDSE 3.7	Food packaging technology	3	09	20	80	100	08	32	3
	MFNSDSE 3.8	Food Biotechnology	3	09	20	80	100	08	32	3
	MFNSSEC-1	Food Processing Technology-T	2	06	10	40	50	04	16	1 <sup>1/2</sup>
		Total	20	168	110	440	550	44	176	-

**DSC: Discipline Specific Core; DSE: Discipline Specific Elective; SEC: Skill Enhancement Course**

Semester	Course Code	Course Title	Credits	Counseling/PCP Hours	Max. Marks			Minimum Passing marks		Duration of Exam (hours)
					Internal Assessment	Term end exam	Total Marks	Internal Assessment	Term end exam	
IV	MFNSDSC 4.1	Food Service Management in Institution	4	12	20	80	100	08	32	3
	MFNSDSC 4.2	Entrepreneurship and marketing	4	12	20	80	100	08	32	3
	MFNSDSC 4.3	PRACTICALS – A	2	60	10	40	50	04	16	3
	MFNSDSC 4.4	PRACTICALS – B	2	60	10	40	50	04	16	3
	MFNSDSE 4.5	Diet and health	4	12	20	80	100	08	32	3
	MFNSDSE 4.6	Quality control in food industry	4	12	20	80	100	08	32	3
	MFNSDSE 4.7	Dissertation	8	24	20	80	100	08	32	3
	MFNSSEC-2	Food Processing Technology-P	2	06	10	40	50	04	16	1 <sup>1/2</sup>
		Total		22	168	110	440	550	44	176

**DSC: Discipline Specific Core; DSE: Discipline Specific Elective; SEC: Skill Enhancement Course**

**Note: Any 2 Discipline specific electives should be selected in all the semesters; however, in Semester IV you have to choose either dissertation or Discipline specific electives 4.5 & 4.6.**

## Interdisciplinary Electives

SL No	Department	Sub Code	I Semester	Sub Code	II Semester
1	KANNADA	ELK-01	ಆಧುನಿಕ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಇತಿಹಾಸ	ELK-02	ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಇತಿಹಾಸ
2	ENGLISH	ELE-01	Indian Literature -I	ELE-02	Indian Literature -II
3	HINDI	ELH-01	Vyavaharik Hindi Vyakaran	ELH-02	Hindi Cinema
4	TELUGU	ELT-01	Tilak	ELT-02	Telugu Samskruthi – Samaajam
5	HISTORY	ELHS-01	Ancient World Civilisations  (Egypt, Mesopotamia, Greek, Roman, Inca, Chinese)	ELHS-02	Social Reform Movement in India
6	ECONOMICS	ELEC-01	Economic Policies of India Since 1991	ELEC-02	Institutions for International Development
7	POLITICAL SCIENCE	ELP-01	Local Government in India.	ELP-02	Indian Constitution
8	PUBLIC ADMINISTRATION	ELPA-01	Indian Polity-1	ELPA-02	Indian Polity-2
9	SOCIOLOGY	ELS-01	Invitation to Sociology	ELS-02	Study of Indian Society
10	JOURNALISM AND MASS COMMUNICATION	ELJ-01	Aspects of Journalism and Mass Communication - I	ELJ-02	Aspects of Journalism and Mass Communication - II
11	ANCIENT HISTORY	ELA-01	World heritage sites	ELA-02	Cultural History of

	AND ARCHEOLOGY		of India		Hoysalas
12	EDUCATION	ELED-01	Foundations of Education	ELED-02	Higher Education
13	COMMERCE	ELC –01	Personal Financial Planning	ELC –02	Entrepreneurship Development
14	MANAGEMENT	ELM –01	Disaster Management	ELM –02	E-Commerce
15	BIOCHEMISTRY	ELMBC –01	Basics of Bioinorganic and Biophysical chemistry for Biology graduates.	ELMBC –02	Basic Bioorganic chemistry for Biology graduates.
16	BIOTECHNOLOGY	ELMBT –01	Biotechnology Principles and applications	ELMBT –02	Fundamentals of Biotechnology
17	CHEMISTRY	ELMC –01	Open Elective I	ELMC –02	Open Elective II
18	CLINICAL NUTRITION AND DIETETICS	ELMCND –01	Healthy lifestyles and nutrition	ELMCND–02	Nutraceuticals and health foods
19	COMPUTER SCIENCE	ELMCS –01	Mobile App Development	ELMCS –02	E-Commerce
20	ENVIRONMENTAL SCIENCE	ELMES –01	Basics of Environmental Science	ELMES –02	Advances in Environmental Science
21	GEOGRAPHY	ELMG –01	Introduction to Physical Geography	ELMG –02	Geography of Karnataka
22	MATHEMATICS	ELMM –01	Fundamentals of Mathematics	ELMM –02	Combinatorics and Graph Theory
23	MICROBIOLOGY	ELMMB –01	Microbial World and Microbial Diversity	ELMMB –02	Microbes in Sustainable Agriculture and

					Development
24	PHYSICS	ELMP –01	Mechanics	ELMP –02	Waves and Optics
25	PSYCHOLOGY	ELMPHY –01	Introduction to Psychology	ELMPHY –02	Psychology in Everyday Life
26	INFORMATION TECHNOLOGY	ELMIT –01	Green Computing	ELMIT –02	E-Commerce
27	BOTANY (NEW)	ELMBOT –01	Plant-Microbe Interactions	ELMBOT –02	Plant Diversity and Human Welfare
28	ZOOLOGY (NEW)	ELMZ –01	Parasites Vectors & communicable diseases	ELMZ–02	Essential of Reproductive Health
29	FOOD AND NUTRITION SCIENCES	ELMFNS –01	Food Psychology	ELMFNS –02	Nutritional Management in Disaster Conditions

**Note:**

- A. I and II Semester Open elective (Interdisciplinary Electives) syllabus are attached in Annexure – I and Annexure - II respectively.
- B. The Students may contact respective department chairperson in case of any queries regarding open elective course. The contact details available in the university website.

# MASTER OF SCIENCE IN FOOD AND NUTRITION SCIENCE

## I SEMESTER

### ADVANCED NUTRITION - I

Credits: 4

#### BLOCK I: RECOMMENDED DIETARY ALLOWANCES

**Unit 1: Approaches for assessing nutrient requirements-** Dietary reference intakes (DRI) EAR, RDA, AI, TUL - for Macro and micro nutrients, advantages and disadvantages

**Unit 2: Nutritional requirements for adult and elderly-** physiological changes, nutrient needs, nutritional problems, factors affecting food choice.

**Unit 3: Nutritional requirements for children** – growth and development from infants to adolescence, special needs of preterm infants, physical and physiological changes in adolescence, nutrients needs, nutritional problems, food habits.

**Unit 4: Nutritional requirements for pregnant women and lactating mother-** physiological changes, maternal weight, nutrient needs, nutritional problems, health problems affecting nutrient needs

#### BLOCK II: BODY COMPOSITION AND ENERGY

**Unit 5: Techniques for measuring body composition-** Methods of studying body composition- underwater weighing, air displacement technique, DXA (dual X-ray absorptiometry), skin fold caliper, bio-impedance. Body composition changes during lifecycle. Nutritional disorders and effect on body composition- protein energy mal nutrition, cancer, renal failure and thyroid related disorders

**Unit 6: Body compositional changes in life cycle-** changes during growing period, adults and elderly, pregnancy and lactation, factors affecting body composition

**Unit 7: Energy requirement** – basic principle, requirements, determination of food energy, Basal and resting metabolism- influencing factors. Methods to determine energy requirements & expenditure. Thermo genesis, adaptation to altered energy intake, latest concepts in energy requirements and recommendations for different age groups.

**Unit 8: Energy metabolism and physical performance** - Physiology of Exercise - Fuels for Exercise - Carbohydrates -Fats – Proteins, Controlling the rate of energy production. Storing energy – high energy phosphates, The basic energy systems – ATP-PC system, Glycolytic system, Oxidative system. Energy expenditure and fatigue, Energy expenditure at rest and exercise- Basal and resting metabolic rates, metabolic rate during submaximal exercise, maximal capacity for aerobic exercise, anaerobic effort and exercise capacity.

### **BLOCK III: HUMAN NUTRIENT REQUIREMENTS**

**Unit 9: Water and Electrolyte** - Body water compartments. Regulation of water balance, disorders of water imbalance, role of electrolyte in human nutrition, electrolyte imbalance

**Unit 10: Regulation of food intake**- role of hunger and satiety centers, effect of nutrients, food intake and appetite control, conceptualization of the system controlling food intake behavior, episodic and tonic signals for appetite control, tonic signals for appetite control, physical activity and regulation of food intake, homeostatic and hedonic processes of appetite control, role of sweetness in appetite control

**Unit 11: Interaction of nutrition, immunity and infection**- Role of specific nutrients in immune suppression, Role of nutrients in immune promotion, effect of infection on nutritional status, Nutrition Immunity and Infections of Infants and Children, Probiotics Prebiotics and Immunity.

**Unit 12: Improving nutritional quality of diets and emerging concept of human nutrition**- Nutrigenomics, nutrient gene interactions, nutrigenomics and non-communicable diseases, impact of nutrigenomics – nutrition research, nutrition therapy, food industry and nutrition policy

### **BLOCK IV: MACRO NUTRIENTS**

**Unit 13: Carbohydrates**- Occurrence and physiological functions, factors influencing metabolism. Lactose intolerance. Dental caries. Artificial sweeteners. Role of dietary fiber in health and disease. Disorders related to carbohydrate metabolism. Glycemic index and glycemic load of foods and their uses, intrinsic and extrinsic factors affecting glycemic index.

**Unit 14: Proteins**- Concepts of essential and non-essential amino acids- their role in growth and development. Physiological functions of proteins. Requirements, nitrogen balance concept. Methods for evaluating protein quality. Protein energy malnutrition-clinical features and biochemical changes.

**Unit 15: Lipids** - Concepts of visible and invisible fats. EFA, SFA, MUFA, PUFA- sources and physiological functions. Role of lipoproteins and cholesterol, triglycerides in health and disease.

**Unit 16: Dietary fiber-** Components of dietary fiber, types of dietary fibre, Effects of dietary fiber, Potential health benefits of dietary fiber, Recommended intake of fiber.

**REFERENCES:**

1. Shubhangini A. Joshi, (1992)' "Nutrition and Dietetics" Tata Mc Grow- Hill publishing Company Ltd, New Delhi.
2. Srilakshmi. B – "Nutrition Science", V Edn, New Age International (P) Ltd, Publishers, Chennai
3. Passmore R. and Eastwood M.A, (1986), "Human Nutrition and Dietetics", English language book Society/Churchill Livingstone, Eighth edition, Hong Kong.

**MFNSDSC -1.2**  
**FOOD SCIENCE**

**Credits: 4**

**BLOCK - I: INTRODUCTION TO FOOD SCIENCE**

Unit-1: **Evolution of food processing**- primary, secondary and tertiary processing, effect of processing on physicochemical properties and nutritional profile

Unit 2: **Principles of processing**- Thermal and non-thermal processing, minimally processed foods, separation technologies

Unit 3: **Major food constituents**: Carbohydrates, proteins, fats- Occurrence, structure, classification, physicochemical properties, functionality, applications in food industry.

Unit 4- **other constituents**: water, flavors, vitamins, minerals, pigments- properties, factors affecting stability,

**BLOCK - II: COMPOSITIONAL AND NUTRITIONAL ASPECTS OF PLANT-BASED FOOD SYSTEMS**

Unit 5: **Wheat**- structure, composition, types, processing, role in food system, leavened and unleavened products of wheat

Unit 6 a) **Rice**: Structure, composition, advances in parboiling, role of starch in food system, by products of rice, novel applications of rice bran

b) **Millet**s- Structure, composition, nutritional profile, antinutrients, value added products.

Unit 7: **Legumes**- structure, types, nutritional composition, germination, antinutrients, role in Indian cookery, processed products

Unit 8. **Fruits and vegetables**- structure, classification, composition, harvesting, physicochemical changes during storage, pectins, pigments,

**BLOCK - III: PROTEIN FOOD SYSTEMS**

Unit 8: **Eggs**: Structure, biochemical aspects of proteins, types, characteristics, nutritional quality, factors affecting cooking quality and storage

**Unit 9- Meat** -Composition, nutritive value, grades, handling and processing, methods of cooking, techniques of preservation,

**Unit 10: poultry and marine foods** – composition and nutritive value, classification, Processing, selection, factors affecting cooking, storage

Unit 11: **Milk and milk products** – constituents, factors affecting composition, effect of heat on milk constituents, nutritional value, properties, techniques of processing, milk derived products and their nutritional profile, fermented and non-fermented dairy products,

Unit 12: **Nuts and oil seeds**- types, composition, nutritive value, processing, role in cookery, toxins in nuts, novel applications of oil seed meal

#### **BLOCK - IV: MISCELLANEOUS PRODUCTS**

Unit 13: **Sugar and jaggery**- types, composition, nutritional value, properties, processing, storage, role in Indian cookery

Unit 14: **Spices and herbs**- types, properties, essential oils, functions, nutraceutical aspects, applications in cookery

Unit 15: **Beverages and appetizers**- types, processing, nutritional profile (tea, coffee, fruit crush, fruit punch, cocktails, cordials, syrups)

Unit 16: **Additives**- definition, classification, categories, E-numbers, role in processing, ADI, Safety evaluation

#### **REFERENCES:**

1. Srilakshmi B (2005) Dietetics. New Age International Publishers, New Delhi
2. Food Science by Norman N Potter and Joseph H. Hotchkiss, CBS Publishers and Distributors.
3. Advanced Textbook on Food and Nutrition by Dr. M. Swaminathan Vol: I & II, The Bangalore Printing and Publishing Co. Ltd.
4. Food Facts and Principles Many N. S. & Shadakshasawamy M. New Age International Publishers.
5. Swaminathan M (1979) Food Science and Experimental foods. Ganesh and Co, Madras.
6. Potter, N. and Hotchkiss, J.H. Food Science, 5th Ed., CBS Publications and Distributors, Daryaganji, New Delhi, 1998.

## MFNSDSE- 1.5

### APPLIED PHYSIOLOGY

Credits: 3

#### **BLOCK I: CELLS & SKELETAL SYSTEM, DIGESTIVE, EXCRETORY AND CIRCULATORY SYSTEM**

**Unit 1: Cells and Organelles:** Cellular organization and function, Organelles, tissues, organs and systems. Cell membrane, transportation. Regulation of cell multiplication.

**Unit 2: Musculo-Skeletal System:** Structure and function of bone, cartilage and connective tissue. Disorders of skeletal system. Types of muscles, structure and function

**Unit 3: Digestive System:** Structure and function, secretory, digestive and absorptive functions. Liver, pancreas and gall bladder –role and dysfunction. Hormones of gastro-intestinal tract

**Unit 4: Excretory System:** Structure and function of nephron, role of kidney, urine formation, water, electrolyte and acid base balance, diuretics

#### **BLOCK II: CIRCULATORY, NERVOUS AND ENDOCRINE**

**Unit 5: Heart:** Structure and function of heart and blood vessels, Regulation of cardiac output and blood pressure, heart failure, hypertension.

**Unit 6: Circulatory System:** Blood formation, composition, blood clotting, haemostasis. Formation and function of plasma proteins. Erythropoiesis, blood groups and histocompatibility. Blood indices and anemia

**Unit 7: Nervous System:** Structure and function of neuron, nerve impulse, synapses, neurotransmitters. Central nervous system, structure and function of brain and spinal cord. Blood brain barrier, hypothalamus and its role in body functions

**Unit 8: Sense Organs:** Structure and function of skin, eye, ear, nose and tongue

#### **BLOCK III: REPRODUCTIVE, RESPIRATORY AND IMMUNE SYSTEM**

**Unit 9: Endocrine System:** Structure and function of endocrine glands, role of hormones, regulation of hormonal secretion. Disorders of endocrine glands with emphasis on diabetes and stress hormones

**Unit 10: Reproductive System:** Male and Female reproductive organs, menstrual cycle, parturition, menopause and spermatogenesis.

**Unit 11: Respiratory System:** Structure and functions, mechanism of breathing. Role of lungs in exchange of gases. Transport of oxygen and carbon-di-oxide. Cardio-respiratory response to exercise and physiological effects

**Unit 12: Immune System:** Natural immune system cell mediated and humoral immunity components of immune mechanism. Role of inflammation. Activation of WBC and production of antibodies. Disorders-immune deficiency, hypersensitivity

## **REFERENCES:**

1. Ganong (1995) Review of Medical physiology. Prentice Hall international, London.
2. .Guyton, A.C, and Hall. , J. B. (2010): Text Book of Medical Physiology, 9 th Edition, W.B. Sanders company, Prime Books (Pvt.) Ltd., Bangalore.
3. S.Subramanian and S.M.Kutty (1971) Text Book of Physiology, Orient Longman.
4. Elaine N and Marie RN (1997) Human Anatomy and Physiology. Addison Wesley Longman, Inc., UK.
5. Chatterjee CC (1988) Text Book of Medical Physiology. W B Sounder's Co. London.
6. Chatterjee C.C (2004), Human Physiology Volume I, Medical Allied Agency, Kolkata.

## MFNSDSE- 1.6

### RESEARCH MEHODOLOGY AND STATISTICS

Credits: 3

#### **BLOCK I: RESEARCH: METHODS, DESIGNS, INSTRUMENTS**

**Unit 1: Introduction to Research:** Meaning and Objectives of Research, Types of scientific Research, different research approaches, significance of research. Difference between research methods and methodology, Research process, criteria of good research. Research in home science, nutrition and dietetics. Research problems, Techniques involved in defining a problem.

**Unit 2: Research Design:** Meaning of Research Design, need for research design features of a Good Design, Important concepts relating to Research Design, Different types of research designs, Basic Principles of experimental designs.

**Unit 3: Research Instruments:** Goal of research: exploratory, constructive and empirical research. Research hypothesis, elements of a good hypothesis, formulation of research problem. Measurements in Research, scales of measurement, error in measurement, tests of sound measurement, developing measurement tools. Scaling and important scaling techniques

**Unit 4: Research article and publications:** Introduction, critical analysis of research, writing research proposal, research article structure, significance, mechanics and precautions of report writing, steps in report writing. Publishing of an article.

#### **BLOCK II: TOOLS: SAMPLING, DATA COLLECTION AND ORGANIZATION**

**Unit 5: Sampling and scaling techniques:** Introduction, terminologies, criteria of selecting a sampling procedure, characteristics of a good sample design, types of sample designs, selection of a random sample, sample size determination, sampling errors, sampling problems.

**Unit 6: Data Collection tools:** Concepts of data collection, data sources, methods, techniques – quantitative and qualitative. Tools for data collection – types, characteristics and their development. Item analysis, Validity and reliability of the tools, Pilot study.

**Unit 7: Basic Statistics:** Definition of Statistics, concepts, types, significance. Data organization and presentation – Classification, tabulation, frequency distribution of the data (univariate and bi-variate), cumulative frequencies, marginal and conditional frequencies.

**Unit 8: Data Presentation:** Concept of data presentation, guidelines, advantages and limitations. Diagrammatic representation- line diagram, simple bar diagram, multiple bar diagram, component bar diagram, percentage bar diagram, pie diagram, pictogram; Graphical representation – Histogram, frequency curve, frequency polygon, cumulative frequency curves, scatter plot. Difference between diagrammatic and graphical presentation.

### **BLOCK III: STATISTICAL TOOLS FOR ANALYSIS**

**Unit 9: Descriptive Statistics:** Measure of Averages – Arithmetic mean, geometric mean, harmonic mean, Median, Partition values, Mode; Measures of Dispersion – Absolute and Relative measures – Range, IQR, Quartile deviation, Mean deviation, Standard deviation, Measures of Skewness –Karl Pearson’s and Bowley’s measures; Kurtosis-definition and types.

**Unit 10: Measures of Relationship:** Correlation – need and meaning; types of correlation, methods of studying correlation - scatter plot method, Karl Pearson’s coefficient of correlation, Rank order correlation; Regression – definition, regression line, regression coefficients, properties, estimation

**Unit 11: Probability and random variable:** Concept of probability, experiment and types, trial, sample space, event and types, Classical, empirical and axiomatic definitions of probability, Addition theorem of two and three events (definition only), independent and dependent events, conditional probability, multiplication theorem (definition only), Bayes theorem (definition only). + Problems; Definition of random variables, types, mathematical expectation, mean and variance of a random variable. Bernoulli random variable and properties, Binomial random variable and properties, Poisson random variable and properties, Uniform random variable (Discrete and continuous) and properties, Normal random variable, standard normal Variable- Properties and applications

**Unit 12: Statistical Inference:** Hypothesis, definition and types, type of errors, size and power of the test, one tailed and two tailed tests, critical region. Parametric tests - Z-test for single

population proportion and difference of population proportion. t-test for single mean, difference of two population mean (dependent/paired and independent), Chi-square test – test of independence of attributes, test for variance, F-test for equality of two variances, ANOVA – one way and two ways; Non-Parametric tests – Sign test, run test for randomness, Median test, Mann Whitney U test.

#### **REFERENCES:**

1. Bell, J. (1997): *Doing Your Research Project: A Guide for First-time Researchers in Education and Social Science*, Viva Books, New Delhi.
2. Kothari, C.R. (2000): *Research Methodology: Methods and Techniques*, Wishwa Prakashan, New Delhi.
3. Kumar, A. (1997): *Social Research Method (The Art of Scientific Investigation)*, Anmol Publication, New Delhi.
4. Festinger, L. and Katz, D. (ed.) (1977): *Research Methods in the Behavioral Sciences*, Amerind Publishing, New Delhi.

**MFNSDSE- 1.7**  
**FOOD CHEMISTRY**

**Credits: 3**

**BLOCK - I: WATER AND MACROUNITS OF FOODS**

**Unit-1:** Water: water molecule structure, liquid water and ice, water activity, phase transition of foods containing water, WLF equation. Water in foods, Types of water in foods: Water Activity- Definition, measurement of water activity, role and importance of water activity in foods

**Unit 2:** Carbohydrates: chemical structure and classification, monosaccharides, disaccharides, polysaccharides: physical and sensory properties, chemical and functional properties. Role of carbohydrates in food industry. Sugar, starch, cellulose, glucans, hemicelluloses, gums, peptic substances, polysaccharides. Modified starch

**Unit 3:** Proteins: Amino acids: chemical structure and classification, protein structure and classification, functional properties of proteins. Purification and denaturation of proteins. Protein interaction and degradation, protein-protein interaction, protein-lipid complexes and protein-carbohydrate complex. Modified protein.

**Unit 4:** Lipids: fatty acids, nomenclature and classification, physical properties, chemical reactions, functional properties. Refining of crude oils, hydrogenation and winterization. Vegetable and animal fat, margarine, lard, butters. Lipid oxidation and factors affecting.

**BLOCK - II: MICROUNITS OF FOODS AND ENZYMES**

**Unit 5:** Vitamins: classification, structure and properties, occurrence, biological role, stability and degradation, functional properties in food processing. Role of vitamins in food industry, effect of various processing treatments and fortification of foods

**Unit 6:** Minerals: classification, chemical properties and role, functional properties in food. Role of minerals in food industry, effect of various processing treatments.

**Unit 7:** Enzymes: classification, uses of enzymes, factors influence enzyme action, enzymes endogenous to foods and their control. Food enzyme technology, immobilization of enzymes, removal of toxicants through enzymes, flavor production by enzymes.

**Unit 8:** Biological Changes in Food: Plant Pigments and their role in Food Industry: Bitter substance and tannins. Phenolics- occurrence, classification, biological role

**BLOCK - III: REACTANTS OF FOODS**

**Unit 9:** Dietary Fiber- classification, biological importance, analysis, Resistant Starches– Definition, Sources and Functions

**Unit 10:** Browning reaction in foods: Enzymatic and Non-Enzymatic browning in foods of vegetable and animal origin during storage and processing of foods. Single cell Protein.

**Unit 11:** Food Additives: Definition, importance, classification and properties;

Toxicology - evaluation techniques and uses.

**Unit 12:** Metabolic rate and caloric needs. Requirements and role of nutrients in human health, Biological value of proteins. Energy value of foods.

## **REFERENCES:**

1. Food Chemistry by O. R. Fennema McGraw Hill.
2. Principles of Food Chemistry by J M DeMan AVI.
3. Food Chemistry by L H Meyer AVI, New York.
4. Miller DD (2014) Food chemistry: a laboratory manual. First Edition, John Wiley & Sons.
5. Damodran, Parkin, Fennema, Fennema's Food Chemistry, Fifth Edition, Apple Academic Press Inc., ISBN: 9781482208122, 1482208121 Pages: 1107.

## MFNSDSE- 1.8

### NUTRITIONAL EPIDEMIOLOGY

Credits: 3

#### BLOCK I: INTRODUCTION TO EPIDEMIOLOGY

**Unit 1: Introduction to epidemiology:** Definition of epidemiology, Principles of epidemiology, Uses of epidemiology, Relevance of epidemiology in Nutrition

**Unit 2: Measurements in epidemiology:** Rates, ratios and proportions: Meaning with examples, Indicators of health with reference to nutrition, Introduction to prevalence and incidence of disease, Measures of association

**Unit 3: Epidemiological study designs:** Classification of epidemiological studies, Descriptive epidemiological studies, Cross sectional studies, Longitudinal studies, Analytical epidemiological studies- Case control studies and Cohort studies, Randomized control trials, Non randomized studies, Community trials, Field trials

**Unit 4: Designing epidemiological:** Studies including protocol development for nutritional epidemiological research, Relevance of epidemiological studies in nutrition

#### BLOCK II: EPIDEMIOLOGICAL STUDY AND NUTRITION

**Unit 5: Collection of nutrition related information:** Methods of nutritional assessment, Basics of diet survey, Methods of nutritional survey- tools and interviews. Role of epidemiological studies in evaluation of nutritional intervention programme

**Unit 6: Public Nutrition and Health care system:** Aim, scope, content and ethics in public health nutrition. Role of public nutrition professionals' in the health care delivery. Health-definition, dimensions, determinants, and indicators.

**Unit 7: Public health aspects of under nutrition:** Etiology, prevalence, clinical manifestations, preventive measures/ curative strategies for PCM and micronutrient deficiencies of public health importance (Vitamin A, iron, iodine and zinc)

**Unit 8: Role of National and International organizations to combat malnutrition:** National organizations concerned with food and nutrition- ICMR, ICAR, NIN, CSIR and others. International organizations concerned with food and nutrition - FAO, WHO, UNICEF, AFPRO, World Bank and others.

### **BLOCK III: EPIDEMIOLOGICAL STUDY AND NUTRITION**

**Unit 9: Health Economics and Economics of Malnutrition:** Productivity and national development. Cost–Benefit, Cost effectiveness and Cost Efficiency.

**Unit 10: Approaches and Strategies for improving nutritional status and health:** Health–based interventions, Food–based interventions including fortification and genetic improvement of foods, supplementary feeding, Nutrition education for behavior change, environmental sanitation

**Unit 11: Assessing food and nutrition security:** Definition and assessment schedule, national and household food security. Factors affecting food security system: their implication for nutrition and health.

**Unit 12: Computer applications:** Role of Computers and software’s in epidemiology

#### **REFERENCES:**

1. Nutritional Epidemiology by Walter Willett (3 rd. edition, Oxford University Press, 2013). Available at University Bookstore.
2. Design Concepts in Nutritional Epidemiology by Barrie Margetts and Michale Nelson (2nd edition, Oxford University Press, 1997).

## II SEMESTER

### HC- 2.1 ADVANCED NUTRITION – II

#### **BLOCK-I: FAT SOLUBLE VITAMINS**

- Unit-1: Vitamin A, Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).
- Unit-2: Vitamin D, Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).
- Unit-3: Vitamin E, Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).
- Unit-4: Vitamin K, Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).

#### **BLOCK-II: WATER SOLUBLE VITAMINS**

- Unit-5: Vitamin C, Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).
- Unit-6: Thiamine (B<sub>1</sub>) and Riboflavin, (B<sub>2</sub>), Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).
- Unit-7: Niacin and Vitamin B<sub>6</sub>, Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).
- Unit-8: Pantothenic acid, Biotin, Folic acid, Vitamin B<sub>12</sub>, Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).

#### **BLOCK-III: MACRO MINERALS**

- Unit-9: Calcium, Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any)
- Unit-10: Phosphorus and Magnesium, Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any)
- Unit-11: Sodium, Potassium: Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).
- Unit-12: Nutrition education and National Nutrient (Minerals) Deficiency Control Programs.

#### **BLOCK-IV: MICRO MINERALS**

- Unit-13: Iron and Iodine, Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).
- Unit-14: Copper, Selenium, Chromium and Manganese Major Sources, Functions, Mechanism of Action, RDA, Deficiency and Toxicity (If Any).
- Unit-15: Zinc, fluoride Molybdenum and Major sources, functions, mechanism of action, RDA, deficiency and toxicity (if any).

Unit-16: Ultra trace minerals: Arsenic, Boron, Nickel, Silicon, Vanadium & Cobalt: Functions, Toxicity, Interaction with Other Nutrients, RDA and Food Sources.

**REFERENCE:**

Shubhangini A. Joshi,(1992)' "Nutrition and Dietetics"Tata Mc Grow- Hill publishing Company Ltd, New Delhi.

Srilakshmi. B – "Nutrition Science", V Edn, New Age International (P) Ltd, Publishers, Chennai

Passmore R.and Eastwood M.A,(1986), "Human Nutrition and Dietetics", English language book Society/Churchill Livingstone,Eighth edition, Hong Kong.

Swaminathan (1995): "Food & Nutrition", The Bangalore Printing & publishing co. ltd., Vol I, Second Edition, Bangalore.

Mudambi .R. Sumathi & Rajagpal M.V (1983), "Foods & Nutrition", Willey Eastern Ltd, Second Edition, New Delhi.

Neiman N. Catherine, (1990), "Nutrition",Wm.C. Brown Publishers. USA.

## **HC-2.2: COMMUNITY NUTRITION**

### **BLOCK-I: CONCEPT AND SCOPE OF COMMUNITY NUTRITION ASSESSMENT**

Unit-1: Concept of Community, Health, and Malnutrition. Under Nutrition – Causes and Effects.

Unit-2: Assessment of Nutritional Status in community.

Unit-3: Clinical Assessment of Nutritional Status.

Unit-4: Biochemical Assessment of Nutritional Status.

### **BLOCK-II: NUTRITIONAL ASSESSMENT AND NUTRITIONAL PROBLEMS**

Unit-5: Diet Survey- Purpose, Types, Methods and measuring food consumption.

Unit-6: Assessment of Nutritional Status Based on Vital Statistics.

Unit-7: Major Nutritional Problems Prevalent in India- PEM and IDD.

Unit-8: Major Nutritional Problems Prevalent in India- IDA and VAD.

### **BLOCK-III: NATIONAL AND GLOBAL NUTRITION PROGRAMMES, AGENCIES AND POLICIES**

Unit-9: National and Global Nutrition Policy- POSHAN, Swachh Bharat Abhiyaan, National Health Policy 2017, National Food Security Act 2013, ICAR, ICMR, NIN, NNMB, FNB and NFI.

Unit-10: National and Global Nutrition Programs- ICDS, WHO, UNICEF, FAO, CARE and Midday Meal.

Unit-11: National Nutrition Surveillance System- Food for Work Etc., NGO in Community Development Operations.

Unit-12: Concept and Meaning of Food Quality and Food Safety, Food Adulteration, Food Hazards, Natural Toxins.

### **BLOCK-IV: APPROACHES/ STRATEGIES FOR IMPROVING NUTRITION AND HEALTH STATUS OF THE COMMUNITY**

Unit-13: Health Based Interventions- Immunization, Safe Drinking Water/ Sanitation, Prevention and Management of Diarrheal Diseases.

Unit-14: Food Based Interventions: Food Fortification, Dietary Diversification, Supplementary Feeding, Role of Kitchens Garden in Combating Malnutrition.

Unit-14: Nutrition Education Based Interventions- : Growth Monitoring, Promotion (GMP), Health / Nutrition Related Behaviour Change Communication and Nutrition for Special Children.

Unit-16: Planning, Executing and Evaluation of Nutrition Education.

#### **REFERENCES:**

- Swaminathan, M (2007) Essentials of Food and Nutrition. An Advanced Textbook Vol.I, the Bangalore Printing and Publishing Co. Ltd, Bangalore,
- Srilakshmi B (2010), Nutrition Science, New Age International Publication, New Delhi.
- Bamji M.S, PrahladRao N, Reddy V (2004)Textbook of Human Nutrition, II Edition, Oxford and PBH Publishing Co. Pvt. Ltd , New Delhi,.
- Gibney, M.J., Margetts, B.M., Kearney, J.M., Arab, L (2004), Public Health Nutrition, BLOCKwell Publishing Co. UK.
- Bamji M. S, Prahlad Rao N and Vinodinireddy (2003). Text book of Human Nutrition (p-p 197201), New Delhi. Oxford & IBH Publishing Co. PVT. LTD
- Mahan, K. L., Stump E. S. (2012). Food and the Nutrition Care Process. (13thed) USA: Saundus Elsevier. 8. Mary, M. Mary K.R. &Scott .A. S. (2008).Clinical Nutrition for surgical patients.Jones&Barlett Publishers.
- Michael C Latham, Human Nutrition in the Developing World. Ithaca, New york, USA.
- Srilakshmi B (2005) Nutrition Science (pp 3-14), New Delhi. New Age International (P) Limited.
- Swaminathan, M. 1997, Essentials of Food and Nutrition, vol I Second edition, BAPPCO, Bangalore p-p 107-111.

## **SC-2.1: FOOD ANALYSIS AND TECHNIQUES**

### **BLOCK-I: ANALYTICAL TECHNIQUES**

Unit-1: Analytical Techniques in Microbiology.

Unit-2: Screening and Enumeration of Spoilage from Microorganisms.

Unit-3: Detection of Pathogens in Food, Rapid Detection Technique for Microorganisms

Unit-4: Immunological, Bacteriophage Based Markers Etc.

### **BLOCK-II: PROXIMAL ANALYSIS,**

Unit-5: Moisture Analysis, Carbohydrates Analysis, Protein Analysis

Unit-6: Lipid Analysis, Enzyme Analysis

Unit-7: Modern Food Analysis, Sampling

Unit-8: Data Analysis, Buffers and Titratable Acidity.

### **BLOCK-III: PRINCIPLES OF ULTRAVIOLET AND VISIBLE SPECTROSCOPY**

Unit-9: Principles of Ultraviolet and Visible Spectroscopy, Mass Spectrometer (MS) in Food Analysis,

Unit-10: Principles and Practice of GC, HPLC, and HPLC in Food Analysis with demonstration using selected food samples. Pesticide Residue Analysis using GC ECD/GC-MS.

Unit-11: Role of sensory science in defining the food quality, Sensory evaluation methods

Unit-12: Sensory Science in food industry,, Flavour perception and measurement Consumer analysis.

### **REFERENCES:**

Food Analysis, Third Edition, S. Suzanne Nielsen (2003), Official Methods of Analysis. Association of Official Analytical Chemists, 15th ed. (1990), Food Analysis: Theory and Practice. Pomeranz and Meloan, 3rd. ed., (1994).

Fennema's Food Chemistry, Fourth Edition; Srinivasan Damodaran, Kirk L. Parkin and Owen R. Fennema (Editors). (2007).

Kirk, R.S and Sawyer, R (2005), Pearson's Composition and Analysis of Foods, Longman Scientific and Technical. 9th Edition, England

## **SC- 2.2: FUNCTIONAL PROPERTIES OF FOODS**

### **BLOCK-I: INTRODUCTION TO FUNCTIONAL FOODS**

Unit-1: Functional foods defining the concept.

Unit-2: Functional food science.

Unit-3: Communicating functional claims.

Unit-4: Food technology and its impact on functional food development.

### **BLOCK-II: FUNCTIONAL FOODS AND HEALTH**

Unit-5: Colonic functional foods

Unit-6: Functional foods and acute infections: probiotics, and gastrointestinal disorders

Unit-7: Coronary heart disease

Unit-8: Anti-tumour properties

### **BLOCK- III: DEVELOPING FUNCTIONAL FOOD PRODUCTS**

Unit-9: Maximising the functional benefits of plant foods.

Unit-10: Developing functional ingredients.

Unit-11: Functional fats and spreads.

Unit-12: Functional confectionery.

### **REFERENCES:**

Glenn R. Gibson and Christine M. Williams (2001), Text book of Functional foods Concept to product, published by Wood head publishing Limited Abington Hall, Abington Cambridge CB1 6AH England.

Jim Smith and Edward Charter (2010), Functional Food Product Development, published by A John Wiley & Sons, Ltd., ISBN 978-1-4051-7876-1, Newfoundland, Canada.

## **SC- 2.3: FOOD LWAS AND STANDARDS**

### **BLOCK-I: FOOD LAWS AND REGULATIONS**

Unit- 1: National and international food laws, Governing bodies

Unit- 2: Exposure, estimation, toxicological requirements and risk assessment.

Unit- 3: Safety aspects of water and beverages such as soft drinks, tea, coffee, cocoa.

Unit- 4: Safety of foods- Safety assessment of food contaminants and pesticide residues.

### **BLOCK-II: INTERNATIONAL AGENCIES**

Unit- 5: International Agencies -WHO, FAO, USFDA,

Unit- 6: Codex Standards. Food Quality Management System

Unit- 7: Food Safety Management System.

Unit- 8: FSSAI and WTO.

### **BLOCK-III: INDEX OF NUTRITIONAL QUALITY (INQ)**

Unit- 9: Need for INQ, INQ as an evaluating tool in the food industry,

Unit- 10: Nutrition labelling of foods.

Unit- 11: Methods of assessing food quality

Unit- 12: Consumer and Industry Standards, AGMARK, Bureau of Indian Standard, Safety of Food Additives, GRAS.

### **REFERENCE:**

A.V. Savov and G.B. Kouzmanov, Food quality and safety standards at a glance. Biotechnology & Biotechnological Equipment. (23) 2009 No 4, pp.1462-1468.

RadomirLasztity, Marta Petro-Turza, Tamas Foldesi, (2004), HISTORY OF FOOD QUALITY STANDARDS, in Food Quality and Standards, [Ed. RadomirLasztity],in Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford ,UK, [<http://www.eolss.net>]

Swaminathan, M. 1997, Essentials of Food and Nutrition, vol I Second edition, BAPPCO, Bangalore p-p 107-111.

## **SC-2.4: NUTRACEUTICALS AND FUNCTIONAL FOODS**

### **BLOCK 1. NUTRACEUTICALS**

Unit- 1: Introduction to nutraceuticals.

Unit- 2: Use of nutraceuticals in traditional health sciences.

Unit- 3: Functional foods:

Unit- 4: Development of nutraceutical and functional foods

### **BLOCK 2: PREBIOTICS, PROBIOTICS AND PHYTOCHEMICALS**

Unit- 5: Prebiotics.

Unit- 6: Probiotics.

Unit- 7: Bio active peptides.

Unit- 8: Phyto Chemicals.

### **BLOCK 3: FUNCTIONAL FOODS**

Unit- 9: Sugar substitutes / sweeteners.

Unit- 10: Fats and Oils.

Unit- 11: Omega 3 fatty acids.

Unit- 12: Fundamentals of nutrigenomics.

### **REFERENCES:**

Mine, Y and Fereidoon, S. (2006). Nutraceutical Proteins and Peptides in Health and Disease: TF, Boca Raton.

Bagchi, D. (2008). Nutraceutical and Functional Food Regulations in United States and Around the World: Elsevier, London.

Shi, J. (2007). Functional Food Ingredients and Nutraceuticals: Processing Technologies: CRC Press, London.

Guo, M. (2009). Functional Food: Principles and Technology: WP, New Delhi.

Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam, Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi.

Srilakshmi, B. Second Edition, Food Science, New Age International (P) Limited Publishers,  
New Delhi, 2010.

Simopoulos, A.P. and Ordovas, K.J.M., 2004, Nutrigenetics and Nutrigenomics, Vol. 93, Karger,  
Switzerland.

## III SEMESTER

### HC-3.1: FOOD PRESERVATION

#### **BLOCK-I: INTRODUCTION TO FOOD PRESERVATION**

Unit-1: Introduction, Scope and Importance of Food Preservation,

Unit-2: Historical Developments in Food Processing

Unit-3: Definition of Shelf Life, Types of Foods (PF, SPF and SS) and Causes of Food Spoilage.

Unit-4: Principles of Food Preservation.

#### **BLOCK-II: FOOD MICROBIOLOGY**

Unit-5: Microorganisms Associated With Foods- Bacteria, Yeast and Mold,

Unit-6: Importance of Bacteria, Yeast and Molds in Foods.

Unit-7: Classification of Microorganisms Based On Temperature, PH, Water Activity, Nutrient and Oxygen Requirements.

Unit-8: Typical Growth Curve of Micro-Organisms. Food Infection, Food Intoxication.

#### **BLOCK-III: FOOD PRESERVATION BY LOW AND HIGH TEMPERATURE, FREEZING AND REFRIGERATION**

Unit-9: Introduction and Definition, To Refrigeration, Cool Storage and Freezing.

Unit-10: Principle of Freezing, Freezing Curve, Changes Occurring During Freezing, Types of Freezing.

Unit-11: Introduction to Thawing, Changes during Thawing and its Effect on Food.

Unit-12: High Temperature Thermal Processing, Commercial Heat, Sterilization, Pasteurization, and Blanching.

#### **BLOCK-IV: FOOD PRESERVATION BY IRRADIATION, MOISTURE CONTROL DRYING AND DEHYDRATION**

Unit-13: Definition, Drying As a Means of Preservation, Differences Between Sun Drying and Dehydration

Unit-14: Factors Affecting Rate of Drying, Normal Drying Curve, Types of Driers Used in The Food Industry.

Unit-15: Evaporation– Factors Affecting Evaporation, Names of Evaporators Used in Food Industry.

Unit-16: Food Preservation by Irradiation.

## **REFERENCES:**

Sivasankar, B. (2014). Food processing and preservation: Hall of India Pvt., New Delhi.

Sivasankar, B. (2013) Food Processing and preservation 2nd edition, prentice Hall, Pvt, Ltd.

Fellows, P. J. (2009). Food processing Technology: Principles and Practice: Woodhead Publishing.

Brennan, J. G. (2006). Food Processing Handbook: Weinheim: Wiley-VCH.

Zeuthen, P. & Bogh- Sprensen, L. (2003). Food Preservation Techniques: CRC Press, Boca raton.

Vonloesecka, H. W. (1998). Drying and Dehydration of Foods: Allied, Bikaner

. B. Srilakshmi, (2002), Food science, New Age Publishers.

Meyer, Food Chemistry, New Age,2004.

Bawa. A.S, O.P Chauhan et, al (2013), Food Science. New India Publishing agency,

Frazier WC and Westhoff DC (2004), Food Microbiology, TMH Publication, New Delhi.

## **HC- 3.2: PRODUCT DEVELOPMENT AND SENSORY EVALUATION**

### **BLOCK-I: DESIGNING NEW PRODUCTS**

Unit-1: Basic Principles of Food Product Development.

Unit-2: The R and D process

Unit-3: Developing standard products Types of products and logistics.

Unit-4: Processing- primary and secondary, various food ingredients, food additives.

### **BLOCK-II: CHEMICAL AND PHYSICAL PROPERTIES OF FOODS AND PACKAGING**

Unit-5: Chemical and Physical Properties of Foods.

Unit-6: Shelf Life Studies of Products.

Unit-7: Suitability and Development of the Package, Management

Unit-8: Management Design and Package Graphics, Labelling, Research and Testing.

### **BLOCK-III: SENSORY EVALUATION**

Unit-9: Role of sensory science in defining the food quality.

Unit-10: Sensory evaluation methods.

Unit-11: Sensory Science in food industry.

Unit-12: Flavour perception and measurement Consumer analysis.

### **BLOCK-IV: FOOD SAFETY ISSUES IN PRODUCT DEVELOPMENT**

Unit-13: Food Quality Regulations and Standards, Quality Control and HACCP.

Unit-14: Food Quality Regulations and Standards

Unit-15: Product Formulation and Development for General and Therapeutic Use.

Unit-16: Food Safety and Regulatory Aspects, Sanitation and Waste disposal.

### **REFERENCE:**

Altschul Aaron M. 1993. Low Calorie Foods. Marcel Dekker

Goldberg I (1994), Functional Foods, Designer Foods, Pharma Foods, Nutraceuticals. Springer.

Metz SA. 2004. Formulating & Processing Dietetic Foods. CHIPS Publ.

S. Suzanne Nielsen. (2003). Food Analysis: Third Edition Official Methods of Analysis.

3Kirk, R.S and Sawyer, R. (2005) Pearson's Composition and Analysis of Foods, Longman Scientific and Technical. 9th Edition, England.

## **SC-3.1: FOOD HYGIENE AND FOOD SAFETY**

### **BLOCK-I: GENERAL PRINCIPLE OF FOOD HYGIENE**

Unit-1: Hygiene in rural and urban areas in relation to food preparation.

Unit-2: Sanitary aspects of building and equipment.

Unit-3: Chemical contamination, Physical contamination

Unit-4: Risk classification, Microbial contamination, Allergen contamination.

### **BLOCK-II: PERSONAL HYGIENE**

Unit-5: General Principle of Food Hygiene and Food Handling Habits.

Unit-6: Importance of worker hygiene, health status, illness and injuries.

Unit-7: Personal cleanliness and behaviour.

Unit-8: visitors, hygiene verification, Hand washing procedure.

### **BLOCK-III: FOOD SAFETY CONCEPT AND FOOD SAFETY PROGRAMS**

Unit-9: National and international food regulatory agencies,

Unit-10: General food laws and food safety regulations, Nutritional labelling regulation.

Unit-11: Good Manufacturing Practices (GMPs), Pest Control Program,

Unit-12: Sanitation Program, (Sanitation Standard Operating Procedures (SSOPs), Education and Training Program.

### **REFERENCES:**

Early, R. (2005): Guide to Quality Management Systems for the Food Industry, BLOCKie, Academic and professional, London.

M.Swaminathan (1995) Food Science, Chemistry and Experimental Foods, The Bangalore Printing & Publishing Co. Ltd, Bangalore.

Desrosier and Desrosier (1999) Technology of food preservation, 4th edition, CBS Publishers. New Delhi.

## **SC- 3.2: STORAGE AND HANDLING OF FOODS**

### **BLOCK-I: HARVESTING, HANDLING, PROCESSING AND STORAGE OF FRUITS AND VEGETABLES**

Unit-1: Harvesting and handling of important fruits and Vegetables, Harvesting, Handling and Storage tools.

Unit-2: Primary Processing Factors Affecting Postharvest Losses and Handling Losses.

Unit-3: Processing of Fruits and Vegetables, Wax Coating, Pre-Packing, Irradiation, and Chilling

Unit-4: Handling and Packaging of Fruits and Vegetables. Principles of Transport and Commercial Transport Operations.

### **BLOCK-II: SAFE STORAGE GUIDELINES**

Unit-5: Biotic and Abiotic Factors Affecting the Crops during Storage.

Unit-6: Safe Storage Guidelines, Various Types of Storage Structures (Traditional and Modern).

Unit-7: Factors Affecting the Raw and Processed Products during Storage.

Unit-8: Guidelines for Various Meat-Based Products, Various Types of Storage Structures (Traditional and Modern).

### **BLOCK-III: STORAGE AND HANDLING OF FISH, MILK, CEREALS, PULSES AND OILSEEDS**

Unit-9: Handling, Package and Storage of Fish and milk.

Unit-10: Handling, Package and Storage of Cereals, Pulses and Oilseeds.

Unit-11: Safe Storage Guidelines For, Fish, Milk, Cereals, Pulses and Oil Seeds

Unit-12: Various Types of Storage Structures Fish and milk, Cereals, Pulses and Oilseeds (Traditional and Modern).

### **REFERENCE:**

Brennan, James, G. (Ed.), 2012. Food Processing Handbook. Wiley-VCH Verlag GmbH Co.  
FAO. 2004. Post-harvest Manual. FAO Corporate Document Repository.

Fellows, P. J. (2009), Food processing technology: principles and practice. Elsevier.

Varzakas, T., & Tzia, C (Eds.), (2015). Handbook of food processing: food safety, quality, and manufacturing processes (Vol. 35). CRC Press.

## **SC- 3.3: FOOD PACKAGING TECHNOLOGY**

### **BLOCK-I: INTRODUCTION TO FOOD PACKAGING**

Unit-1: Introduction to Food Packaging- Packaging Functions and Requirements.

Unit-2: Printing of packages, Barcodes and other marking.

Unit-3: Labelling Laws Glass: Composition, Properties, Methods of bottle making, and Types of closures.

Unit-4: Food Packaging Materials.

### **BLOCK-II: PACKAGE DESIGNING FOR FOODS**

Unit-5: Package Design for Fresh Horticultural Produce and Animal Foods.

Unit-6: Dry and Moisture Sensitive Foods, Frozen Foods.

Unit-7: Fats and Oils.

Unit-8: Thermally Processed Foods and Beverages.

### **BLOCK-III: TESTING AND REGULATORY ASPECTS OF FOOD PACKAGING**

Unit-9: Testing Procedures for Packaging Materials.

Unit-10: Testing Procedures for Packaged Foods.

Unit-11: Food Packaging Laws and Regulations.

Unit-12: Packaging Machinery and Systems.

### **REFERENCES:**

Robertson GL (2012), Food Packaging – Principles and Practice, CRC Press Taylor and Francis Group.

Coles R, McDowell D, Kirwan M J (2003) , Food Packaging Technology. BLOCKwell.

Paine F A and Paine H Y, A (1992), Handbook of Food Packaging, BLOCKie Academic and Professional.

Vijaya Khader (2001), Text book of Food Science and Technology, Indian Council of Agricultural Research, New Delhi.

Stanley Sacharous, Roger C Griffin (1972), Principles of Food Packaging, 2nd Edition AVI Publishers Co. Westport.

## **SC- 3.4: FOOD BIOTECHNOLOGY**

### **BLOCK-I: INTRODUCTION TO BIOTECHNOLOGY**

Unit-1: Scope of Biotechnology and Concept of Gene Cloning.

Unit-2: Vectors- Properties of Good Vector,

Unit-3: Introduction of Genes, Selection of Recombinants.

Unit-4: Marker Techniques-PCR, RFLP, RAPD and Blotting Techniques.

### **BLOCK-II: GENETIC ENGINEERING AND FOOD FERMENTATION**

Unit-5: Genetically modified foods.

Unit-6: safety aspects of foods produced by genetic engineering,

Unit-7: Application of genetic engineering in food biotechnology.

Unit-8: Concept of microbial fermentation, fermentation process, factors and Fermented food products.

### **BLOCK-III: ENZYMES IN FOOD PROCESSING INDUSTRIES AND BIOTECHNOLOGY FOR FOOD PRODUCTION**

Unit-9: Principles and types of enzyme immobilization.

Unit-10: Immobilized enzymes in food processing.

Unit-11: History, developments, current status of transgenic crops.

Unit-12: Food products with enhanced shelf-life, processing, functional quality and Nutritional enhancement.

### **REFERENCES:**

Satyanarayana, U (2007), Biotechnology, Books and Allied (P) Ltd, Kolkata.

Owen Pward (1989), Fermentation Biotechnology Principles, Processes and Products, Prentice H New Jersey.

Dubey, R.C (2001) Text Book of Biotechnology, S.Chand and Co. Ltd, New Delhi.

Frazier and West Hoff (1996) Food Microbiology, Tata McGraw Hill Publishing Company Ltd, New Delhi.

Israel Goldberg (2001), Functional foods, Pharma foods and Nutraceuticals, Culinary and hospitality Industry Publication Services.

Robert Easy Wildman (2001), Handbook of Nutraceuticals and functional foods, Culinary and Hospitality Industry Publication Services.

## **SEC-1: FOOD PROCESSING TECHNOLOGY**

### **BLOCK-I: FOOD PROCESSING OPERATIONS**

Unit-1: Cold Preservation techniques.

Unit-2: Freezing- Mechanism and Freezers.

Unit-3: Dehydration Techniques.

Unit-4: Food Irradiation and Microwave Heating.

### **BLOCK-II: PACKAGING TECHNIQUES AND THERMAL PROCESSING**

Unit-5: Packaging of Foods.

Unit-6: Material Handling.

Unit-7: Thermal Processing Techniques.

Unit-8: Separation Processes Techniques.

### **REFERENCES:**

Desrosier N W and Desrosier J N (1998), The Technology of Food Preservation, CBS Publication, New Delhi.

Paine F A and Paine H Y (1992), Handbook of Food Packaging, Thomson Press India Pvt Ltd, New Delhi.

Potter N H (1998), Food Science, CBS Publication, New Delhi.

Ramaswamy H and Marcott M (2006), Food Processing Principles and Applications CRC Press.

Rao PG (2010), Fundamentals of Food Engineering, PHI Learning Pvt Ltd, New Delhi.

Toledo Romeo T (1999), Fundamentals of Food Process Engineering, Aspen Publishers.

## **IV SEMESTER**

### **HC- 4.1: FOOD SERVICE MANAGEMENT IN INSTITUTION**

#### **BLOCK-I: DEFINITION AND TYPES OF FOODSERVICE INSTITUTIONS**

Unit-1: Introduction, Definition of Food Service Industry,

Unit-2: Principles of Food Service Industry, Objectives.

Unit-3: Types of Food Service Industry, Hospitals, School Meals, Hostels, Industrial Canteens,

Unit-4: Commercial Hotel, Canteens Institutions Catering To Different Types of Handicapped Personnel.

#### **BLOCK-II: THEORIES OF MANAGEMENT.**

Unit-5: Theories of Management and Approaches -Classical or Traditional Theory, Neoclassical Approach.

Unit-6: Quantitative Approach, MBO Approach, System Approach.

Unit-7: Behavioural and Human Relations, Contingency Approach, JIT Approach

Unit-8: Total Quality Management Approach, Management Science or Operation Research.

#### **BLOCK-III: DEVELOPING GOALS, POLICIES, RULES AND PROCEDURES FOR FOOD SERVICE INSTITUTION.**

Unit-9: Developing Objectives and Goals -Definition, Importance, Types of Goals, Policies, Procedures, Rules.

Unit-10: Principles and Procedures of Management

Unit-11: Functions of Management, Managerial Roles, Responsibilities of Manager and Leadership Quality.

Unit-12: Tools of management

#### **BLOCK-IV: MANAGEMENT OF STAFF EMPLOYMENT, FINANCE HYGIENE AND METHODS OF FOOD PURCHASING**

Unit-13: Personnel management and personnel policies, staff employment

Unit-14: Material management, Quantity food preparation and service.

Unit-15: Financial management

Unit-16: Hygiene and sanitation in preparation and serving area

#### **REFERENCES:**

Sathe, A.Y., A (1999), First Course in Food Analysis.

Sethi, Mohini (2015), Catering Management: An Integrated Approach.

Sethi, Mohini (2008), *Fasting and Feasting – Then and Now*.

Sethi, Mohin (2004), *Institutional Food Management*.

Minor L and Roland F (1984), *Food service Systems management*. AVI, Westport.

Spears M (2000), *Food service Organizations. A Managerial and Systems approach*. 4thed.

## **HC- 4.2: ENTREPRENEURSHIP AND MARKETING**

### **BLOCK- I: ENTREPRENEURIAL DEVELOPMENT**

Unit- 1: Case Studies of Successful Entrepreneurs.

Unit- 2: Exercises on Ways of Sensing Opportunities – Sources of Idea, Creating Efforts, Swot Analysis.

Unit- 3: Entrepreneurial Skill Assessment Test.

Unit- 4: Techniques of Development of Entrepreneurial Skills, Positive Self-Image and Locus of Control.

### **BLOCK- II: FOOD BUSINESS MANAGEMENT**

Unit- 5: Case Studies of Food Processing Business and Its Aspects

Unit- 6: Business Opportunity Identification and Assessment Techniques

Unit- 7: Preparation of Business Plan and Preparation of Project Report

Unit- 8: Methods of Arrangement of Inputs – Finance and Material

### **BLOCK-III: MARKET ASSESSMENT AND BUSINESS EVALUATION EXERCISE**

Unit- 9: Introduction to New Venture Planning, Business Idea Generation and Evaluation Exercise.

Unit- 10: Market Assessment Study and Analysis of Competitive Situation.

Unit- 11: SWOT Analysis for Business and for Competitors.

Unit- 12: Role of Marketing and Its Importance, Innovations for Entrepreneurs, Cooperative Marketing in Rural Areas.

### **BLOCK-IV: INITIATING MARKETING PLANNING**

Unit- 13: Market research and its importance

Unit- 14: Demand Forecasting and Its Perils, Innovative, Survey and Model Based Forecasting

Unit- 15: Rural and International Market Demand Forecasting.

Unit- 16: Overcoming Financial, Operational and Organizational Hurdles.

**REFERENCES:**

Vasant Desai (2012), Fundamentals of Entrepreneurship and Small Business Management, Himalya Publishing House Pvt. Ltd., Mumbai.

Vasant Desai (2011), The Dynamics of Entrepreneurial Development and Management, Himalya Publishing House Pvt. Ltd., Mumbai.

David H. Holt (2002), Entrepreneurship – Anew Venture Creation, Prentice Hall of India, New Delhi.

Chandra Prasanna, (1996), Projects, Planning, Analysis, Selection, Implementation and Review, Tata McGraw-Hill Publishing Company Limited, New Delhi.

## **SC- 4.1: DIET AND HEALTH**

### **BLOCK-I: INTRODUCTION TO DIET**

Unit-1: Definition, Concept, Principles and Importation of Diet.

Unit-2: Factors, Types of diet, Diet Classification and Dietary Choice.

Unit-3: Religious and Cultural Dietary Choices.

Unit-4: Role of Diet in Weight Management.

### **BLOCK-II: DIET MADIFICATIONS**

Unit-5: Definition, Concept, Importation of Diet Modifications.

Unit-6: Types and objectives of Diet Modifications.

Unit-7: Diet Modification in Texture, Consistency, Food Allergy and Intolerance.

Unit-8: Diet modification in Nutrients and Balanced/ Modified Diets.

### **BLOCK-III: INTRODUCTION TO HEALTH**

Unit-9: Definition, Concept, Importation of Health.

Unit-10: Changing Concepts of Health.

Unit-11: New Philosophy of Health and Dimensions of Health.

Unit-12: Concept of Well Being and Positive Health.

### **BLOCK-IV: COMPOSTITE INDICATER IN HEALTH**

Unit-9: Importance, Indicators and Characteristics of Health Indicators.

Unit-10: Physical Quality of Life Index (PQLI) and Human Development Index. (HDI).

Unit-11: Determinants of Health, Responsibility and International Suffering index.

Unit-12: Current Health Status of Developed and Developing Countries.

### **REFERENCES:**

Davis J and Sherer K (1994), Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.

Antia F.P. (1989), Clinical Dietetics and Nutrition, Third Edition (pp- 226-239), Bombay, Oxford University Press.

Mark A. Korsten and Charles S. Lieber. (1994), Modern Nutrition in Health and Disease. (pp-1066-1077). Edited by Shills M E, Olson J A & Moshe Shike. USA, Publishers Wilhams& Wilkins.

Sheel Sharma. (2006). Human Nutrition and Meal Planning. (pp 390-400). New Delhi, JnanadaPrakasham (P&D).

## **SC- 4.2: QUALITY CONTROL IN FOOD INDUSTRIES**

### **BLOCK-I: CONCEPT OF QUALITY CONTROL IN FOOD INDUSTRY**

Unit-1: Principles of quality control and Quality Attributes - Physical, Chemical.

Unit-2: Quality Attributes -Nutritional, Microbial and Sensory.

Unit-3: Quality Control in Food Industry, Concepts of Quality Management,

Unit-4: Concepts of Quality Management, Objectives, Importance and Functions of Quality Control.

### **BLOCK-II: QUALITY AND SAFTY MANAGEMENT SYSTEMS IN INDIA**

Unit-5: Sampling Procedures and Plans,

Unit-6: Food Safety and Standards Act, 2006

Unit-7: Domestic Regulations

Unit-8: Global Food Safety Initiative.

### **BLOCK-III: CERTIFICATION AND QUALITY ASSURANCE**

Unit-9: Various Organizations Dealing with Inspection.

Unit-10: Various Organizations Dealing with Inspection.

Unit-11: Certification and Quality Assurance (PFA, FPO, MPO, AGMARK, BIS).

Unit-12: Labelling Issues and International Food Standards.

### **BLOCK-IV: TOTAL QUALITY STANDARD MANAGEMENT AND HACCP IN PROCESSING OF FOODS**

Unit-13: Use of hazard analysis and critical control points in processing of foods.

Unit-14: GMP/GHP, GLP, GAP; Sanitary and Hygiene practices; Quality manuals, Documentation and Audits

Unit-15: Indian and International Quality, Standards like ISO and Food codex, Export and Import policy and documentation.

Unit-16: Laboratory quality procedures, assessment and performance; Applications in different food industries.

**REFERENCES:**

Inteaz Alli (2003), Food Quality Assurance, Principles and Practices, CRC Press.

Mark Clute (2008), Food Industry Quality Control Systems (1st Edition), CRC Press.

Pieter A. Luning and Willem J. Marcelis (2009), Food Quality Management, Technological and Managerial principles and practices, Wageningen Academic Publishers.

Amihud Kramer and Bernard A. Twigg, Quality Control for the Food Industry: Fundamentals v. 1 (3rd Revised Edition), AVI Publishing Co Inc.

## **5. EVALUATION SYSTEM**

Students of MSc. Clinical Nutrition and Dietetics are assessed by both internal assessment and term end examination. The weightage given are 20 and 80 percent respectively. The internal assessment covers:

- Class test
- Student seminars
- Project works, dissertation, and viva-voce component
- MCQ's Google forms

The assignment questions will be uploaded in the university website. The term end examination will be conducted to assess the knowledge, skill and attitude of the student on the curriculum.

## INTER- DISCIPLINARY COURSE (Open Elective) for First Semester

### ವಿಭಾಗ- ಕನ್ನಡ

ಪತ್ರಿಕೆ-೬: ಆಧುನಿಕ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಇತಿಹಾಸ EL 1.1 (ಕ್ರೆಡಿಟ್-೨)

ಬ್ಲಾಕ್-೧೯: ಆಧುನಿಕ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಮುಖ್ಯ ಘಟ್ಟಗಳು

ಘಟಕ-೨೨: ಆಧುನಿಕ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಹಿನ್ನೆಲೆ ಮತ್ತು ಪ್ರೇರಣೆಗಳು.

ಘಟಕ-೨೪: ನವೋದಯ ಪೂರ್ವ, ನವೋದಯ- ಬಿ.ಎಂ.ಶ್ರೀ., ಕುವೆಂಪು, ದ.ರಾ.ಬೇಂದ್ರೆ, ಶಿವರಾಮಕಾರಂತ, ಮಾಸ್ತಿವೆಂಕಟೇಶ್ ಅಯ್ಯಂಗಾರ್, ಕೆ.ಎಸ್. ನರಸಿಂಹಸ್ವಾಮಿ.

ಘಟಕ-೨೫: ಪ್ರಗತಿಶೀಲ ಮತ್ತು ನವ್ಯ: ಅನಕೃ, ಕಟ್ಟೀಮನಿ, ನಿರಂಜನ, ಚದುರಂಗ, ವಿ.ಕೃ. ಗೋಕಾಕ, ಅಡಿಗ, ಜಿ.ಎಸ್. ಶಿವರುದ್ರಪ್ಪ, ಶಾಂತಿನಾಥ ದೇಸಾಯಿ, ಅನಂತಮೂರ್ತಿ, ಯಶವಂತ ಚಿತ್ತಾಲ, ಲಂಕೇಶ್, ತೇಜಸ್ವಿ, ವೈದೇಹಿ, ವೀಣಾ ಶಾಂತೇಶ್ವರ, ವಿಜಯಾದಿಬೈ.

ಘಟಕ-೨೬: ಬಂಡಾಯ ಮತ್ತು ದಲಿತ:

ಬರಗೂರು ರಾಮಚಂದ್ರಪ್ಪ, ಬಿ.ಟಿ. ಲಲಿತಾನಾಯಕ, ಸಾರಾ ಅಬೂಬಕ್ಕರ್, ದೇವನೂರು ಮಹಾದೇವ, ಸಿದ್ದಲಿಂಗಯ್ಯ, ಅರವಿಂದ ಮಾಲಗತ್ತಿ, ಮೊಗ್ಗಿ ಗಣೇಶ.

ಬ್ಲಾಕ್-೨೦: ಆಧುನಿಕ ಕನ್ನಡ ಕಾವ್ಯ ಮತ್ತು ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳು

ಘಟಕ-೨೭: ಕಾವ್ಯ ಪ್ರಕಾರಗಳು: ಭಾವಗೀತೆ, ಸುನೀತ, ಶೋಕಗೀತೆ, ಪ್ರಗಾಥ.

ಘಟಕ-೨೮: ಕಥನ ಕಾವ್ಯ, ಖಂಡ ಕಾವ್ಯ, ಮಹಾಕಾವ್ಯ.

ಘಟಕ-೨೯: ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳು: ಕಥೆ, ಕಾದಂಬರಿ, ನಾಟಕ ಜೀವನ ಚರಿತ್ರೆ.

ಘಟಕ-೩೦: ಲಲಿತ ಪ್ರಬಂಧ, ಆತ್ಮಕತೆ, ಪ್ರವಾಸ ಸಾಹಿತ್ಯ, ಸಂಪಾದನೆ, ವಿಚಾರ ಸಾಹಿತ್ಯ, ವಿಜ್ಞಾನ ಸಾಹಿತ್ಯ.

### ಪರಾಮರ್ಶನ ಗ್ರಂಥಗಳು

೧. ಹೊಸಗನ್ನಡ ಸಾಹಿತ್ಯ: ಎಲ್.ಎಸ್. ಶೇಷಗಿರಿರಾವ್, ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪರಿಷತ್, ಬೆಂಗಳೂರು, ೧೯೯೨

೨. ಯುಗಧರ್ಮ ಮತ್ತು ಸಾಹಿತ್ಯ ದರ್ಶನ: ಕೀರ್ತಿನಾಥ ಕುರ್ತಕೋಟಿ, ಮನೋಹರ ಗ್ರಂಥ ಮಾಲೆ, ಧಾರವಾಡ, ೧೯೯೧

೩. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಇತಿಹಾಸ: ರಂ.ಶ್ರೀ. ಮಗುಳಿ, ಗೀತಾ ಬುಕ್ ಹೌಸ್, ಮೈಸೂರು, ೨೦೧೮

೪. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಂಗಾತಿ: ಕೀರ್ತಿನಾಥ ಕುರ್ತಕೋಟಿ, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಹಂಪಿ, ಹೊಸಪೇಟೆ, ೧೯೯೫

೫. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಂಗಾತಿ: (ಪ್ರ.ಸಂ) ಬರಗೂರು ರಾಮಚಂದ್ರಪ್ಪ, ಕರ್ನಾಟಕ ಸಾಹಿತ್ಯ ಅಕಾಡೆಮಿ, ೨೦೧೮

೬. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ: ತ.ಸು. ಶಾಮರಾಯ, ತಳುಕಿನ ವೆಂಕಣ್ಣಯ್ಯ ಸ್ಮಾರಕ ಗ್ರಂಥಮಾಲೆ, ಮೈಸೂರು, ೨೦೧೪

೭. ಹೊಸಗನ್ನಡ ಕಾವ್ಯ ಪ್ರಕಾರಗಳು: ಪ್ರಧಾನ ಸಂಪಾದಕರು, ಎ.ರಂಗಸ್ವಾಮಿ, ಲೇ. ಮ. ರಾಮಕೃಷ್ಣ, ಪ್ರಸಾರಂಗ, ಕರಾಮುವಿ, ಮೈಸೂರು, ೨೦೧೦

೮. ಆಧುನಿಕ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳು: ಪ್ರಧಾನ ಸಂಪಾದಕರು, ಎ. ರಂಗಸ್ವಾಮಿ, ಲೇ. ಡಾ. ಜಿ.ಆರ್. ತಿಪ್ಪೇಸ್ವಾಮಿ, ಪ್ರಸಾರಂಗ, ಕರಾಮುವಿ, ಮೈಸೂರು, ೨೦೧೦

## DEPARTMENT - ENGLISH

### EL-1.1: INTER- DISCIPLINARY COURSE-I (OPEN ELECTIVE)

#### INDIAN LITERATURE-I

#### OBJECTIVES

- To help to understand the contribution of Kalidasa to Sanskrit drama as a playwright
- To create an awareness of the importance of Shakuntala and Mrichhakatika as classical Indian texts
- To evaluate Lord Macaulay and Raja Ram Mohan Roy writers of English Prose.
- To introduce the role of Autobiographies in Indian writing in English

#### BLOCK -I

**Kalidasa:** Shakuntala

**Shudraka:** Mrichhakatika

#### BLOCK -II

**Jawaharlal Nehru:** An Autobiography

**Ram Mohan Roy:** Letter to Lord Amherst

**Macaulay:** Minutes on Indian Education

**Vivekananda:** Address to the Parliament of Religions

#### Suggested Reading:

- **M.K.Naik:** Critical Essays on Indian Writing in English. Sahitya Akademi, 1969.
- **Narasimhaiah. C.D:** The Swan and the Eagle. Indian Institute of Advanced Study, 1987.
- **Meenakshi Mukherjee:** The Twice Born Fiction. Heinemann Educational Publishers, 1972.
- **Chirantan Kulshrestha.** Contemporary Indian English Verse: An Evaluation. Arnold-Heinemann, 1981.

# DEPARTMENT - HINDI

## व्यावहारिक हिंदी एवं व्याकरण

### वर्ण विचार

- वर्ण
- स्वर और उसका वर्गीकरण
- व्यंजन और उसका वर्गीकरण
- वर्णों का उच्चारण स्थान
- संधि
- समास

### शब्द विचार

- शब्द के भेद
- अर्थ के आधार पर शब्द भेद
- व्युत्पत्ति के आधार पर शब्द भेद
- रचना के आधार पर शब्द भेद
- प्रयोग के आधार पर शब्द भेद
- विकारी और अविकारी शब्द भेद
- अव्यय
- संज्ञा और उसके भेद
- वचन- उसके भेद, वचन परिवर्तन के नियम
- लिंग- उसके भेद, लिंग परिवर्तन के नियम
- काल और उसके भेद
- कारक और विभक्ति- उसके प्रकार,
- सर्वनाम और उसके भेद
- विशेषण और उसके भेद
- क्रिया और उसके भेद
- क्रिया विशेषण और उसके भेद
- समुच्चय बोधक और उसके भेद
- संबंधबोधक और उसके भेद
- विस्मयादिबोधक और उसके भेद
- परसर्ग और उपसर्ग

- वाच्य और उसके प्रकार

## वाक्य विचार

- वाक्य का अर्थ और परिभाषा
- वाक्य के प्रकार .... आदि

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## DEPARTMENT - TELUGU

### E. L. 1.1 Thilak Prathyeka Adhyayanam

#### Block - 1:Thilak Kavithvam - 1

Unit - 1:Amrutham Kurisina Raathri

Unit - 2:Thilak Padhya Kavithaa Vaibhavam

Unit - 3:Thilak Abhiruchulu - Alavaatlu

Unit - 4: Thapala bantrothu

#### Block - 2: Thilak Kavithvam

Unit - 1:Thilak Sahithya Parichayam - 1

Unit - 2: Thilak Sahithya Parichayam - 2

Unit - 3:Thilak vachana kavithaa Vaibhavam - 1

Unit - 4: Thilak Vachana Kavithaa Vaibhavam – 2

# DEPARTMENT - HISTORY

## ANCIENT WORLD CIVILIZATIONS

(Egypt, Mesopotamia, Greek, Roman, Inca, Chinese)

**Objective:** The course is aims to understand major world civilizations. It is to provide a global historical perspective of ancient world which special reference to Egypt, china, Greek, Roman, Inca civilizations.

**Pedagogy:** personal contact programmes, audio video programmes, online lectures  
Assignments, etc

**Credits:** 2.

**Examination Duration:** 11/2 hours and Maximum Marks:40

**Course outcomes:**

After completing this course the students should be able to

- Discuss the Egyptian and Mesopotamian civilizations.
- Analyse the political socio economic conditions of Greek Roman civilizations.
- Evaluate the Chinese contributions to ancient world.

### Block – I

#### Unit-1

Egyptian Civilization: Importance of the Nile, Geographical importance, Gift of Nile, Political conditions.

#### Unit-2

Social, Economic and religious conditions, Literature and learning, arts and architecture.

#### Unit-3

Mesopotamian Civilization, Sumer and Babylonian, Hammurabi's code, Society and Culture, Economic conditions, art and literature, Assyrian Empire.

#### Unit - 4

Greek Civilization, Political Organizations, the city, State, Alexander the Great, Greek political theory, Religion, Philosophy, art and architecture, Characteristic of Hellenistic Civilization.

### Block – II

#### Unit - 5

Roman Civilization, The Land and the people, the Government, Roman Republic, Roman Empire, Roman Republic, The Empire, The Patricians and Plebeians, Punic wars.

#### Unit – 6

Julius Caesar, his wars, fall Augustus Caesar, Social Economic Conditions, Roman art and architecture.

### Unit - 7

Painting, Sculpture, Roman Law, Roman Religion, Philosophy, Roman literature, Decline of the Roman Empire.

### Unit - 8

Inca Civilisation, Socio – economic Political conditions, Chinese Civilisation, Socio – economic Political conditions.

### Suggested readings:

1. Breasted, J.H. : Ancient Times, A History of the early world.
2. Rostovzeff, M.S. : History of Ancient World
3. Schvieder, H. : The History of Civilization
4. Swain, J.E. : A History of World Civilization
5. Breasted, J.H. : History of Egypt
6. Jastrow, M. : The Civilization of Babylonia and Austria
7. Bury, J.E. & OTHERS: The Hellenistic Age
8. Bailey, C. : The Legacy of Rome and others
9. Abot, F.F.: Society and Politics of Ancient Rome

## DEPARTMENT – ECONOMICS

### EL1.1: Economic Policies of India Since 1991.

- **Objective:** To enable the Students to understand the economic policies of India in the era of new economic policy.
- **Pedagogy:** A Combination of Lectures, Group Discussion, Assignments.
- **Credits:** 2 ; Examination Duration: 1½ and Maximum Marks: 50 (Internal Assessment Marks = 10 and Semester-end Examination = 40)

### Course Inputs

#### BLOCK – I: India's Economic Policies

#### UNIT : 1 Economic Policies in India Since 1991

Economic reforms in India – Economic Scenario in India during 1990-91 – Domestic Financial Crisis – Balance of Payment Crisis – Extent of External debt and debt Trap Problem.

#### UNIT : 2 Need for Reforms

Measures Taken – Devaluation – Privatization – Liberalization – Globalization.

#### UNIT : 3 Monetary Policy and Fiscal Policy

Narasimhan Committee on Banking and Financial Sector Reforms Since 1998 – Fiscal Reforms: Raja Chellaiah Committee and Tax Reform Policies – Fiscal Prudence and Policies.

#### UNIT : 4 Structural Adjustments and External Sector in India

Foreign Trade: Trends in Exports and Imports – Balance of Payment and its Crisis – Export Import Policy – In Defence of Import Substitution – Foreign Exchange Policy.

**BLOCK : II      FDI and the Role of State**

**UNIT : 5      Foreign Direct Investment (FDI)**

Trends in FDI – FDI Policy – Its Impact on the Domestic Economy – Labour Migration: causes and Consequences on Indian Economy – Information and Communication Revolution and India.

**UNIT : 6      Challenges to Development in India**

Poverty – Unemployment – Poverty alleviation Programmes - urban Poverty and Problems – Income Inequality – Employment Generating Schemes.

**UNIT: 7      The Role of State**

Parallel Economy in India – Black Money – Corruption – Slams – Redefining the Role of the State and the Markets – Balance between Economic and Socio - Political Goals.

**UNIT : 8      Administrative Reforms**

Rights to Information – Measures Towards Good Governance – NITI Ayoga and aftermath – Digitalized India – Demonetization – GST – Make in India.

**References:**

1. Acharya Shankar, (2003) India's Economy: Some Issues and Answers, Academic Foundation, New Delhi.
2. Byres J Terence (Ed.) (1999) The Indian Economy, Major Debates since Independence, OUP, New Delhi.
3. Datt Ruddar, (2002) Economic Reforms in India - A Critique, S.Chand and Co, New Delhi.
4. Kapila Uma (Ed) (2015) Indian Economy since Independence, Academic Foundations, New Delhi.
5. Kapila Uma, (2005) Understanding the Problem of Indian Economy, Academic Foundation, New Delhi.
6. Misra S.K. & V.K. Puri, (2011) Indian Economy-Its Development Experience, Himalaya Pub., House, Mumbai.
7. NCAER, Economic and Policy Reforms in India, NCAER, New Delhi.
8. Rangarajan C, (1998) Indian Economy- Essays on Money and Finance, UBSPD, New Delhi.
9. Sachs D.Jeffrey, A.Varshney & N Bajpai (Ed)(1999) India in the Era of Economic Reforms,OUP, New Delhi.
10. Vaidyanathan A, India's Economic Reforms and Development, OUP, New Delhi

## **DEPARTMENT - POLITICAL SCIENCE**

### **(OEL-I) Local Government in India**

## **Block-I**

- Unit:1            Meaning, Nature and Scope of Local Governments.
- Unit:2            Evolution of Panchayat Raj Institution in India.
- a)    Constitute Assembly and Village Panchayat.
  - b)    Balavanth Roy Mehta Committee Report
  - c)    Ashok Mehta Committee Report.
  - d)    G.V.K. Rao Committee Report.
- Unit:3            Constitutional Amendments and Panchayat Raj Institutions:
- a)    Basis of Constitutional Amendment.
  - b)    73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendment.
  - c)    Karnataka Panchayat Raj At of 1983.
  - d)    Karnataka Panchayat Raj Act of 1993.
- Unit:4            Zilla Panchayat: Structure, Functions and Sources of Revenue.

## **Block-II**

- Unit:5            Taluk Panchayat : Structure, Functions, Executive Officer, Powers and Functions.
- Unit:6            Gram Panchayat: Gram Sabha, Ward Sabha: Structure, Functions and Sources of Revenue.
- Unit:7            Panchayat Development Officer and Secretary: Powers and Functions.
- Unit:8            Role of Panchayat Raj Institutions in Development (with Reference to Karnataka)
- a)    Panchayat Raj in Rural Development.
  - b)    Social Change: Empowerment of the Weaker Sections.

### **References:**

1. Verma B. M, Social justice and Panchayath Raj
2. Mutarib-M.A. and Others, Theory of Local Government,
3. Dr. Arjun darshankar, Panchayath Raj aani Nagari.
4. V. B. Patil, Pancayath Raj.
5. A.N. Kulkarni, Bharatiya Sthanik Swashasan,
6. Shantaram Bhosale, Bharatiya Sthanik Shasan,
7. Kikherji. S, Essays on Rural Development.
8. Balaramu. C. H. Administration of Anty Poverty Programmes.
9. 73<sup>rd</sup> Constitutional Amendment Act, Government of India, 1993.
10. Karnataka Panchayatraj Acts, 1985, 1995.

## **DEPARTMENT – PUBLIC ADMINISTRATION**

### **INDIAN POLITY – I**

#### **BLOCK – 1**

- UNIT – 1 Indian Constitution.
- UNIT – 2 Preamble - Meaning and Importance.
- UNIT – 3 Fundamental Rights and Duties.
- UNIT – 4 Directive Principles of State Policy and Relation with Fundamental Rights.

## **BLOCK – 2**

- UNIT – 5 Indian Federalism and Parliamentary system of Government.
- UNIT – 6 Centre - State Relations. Legislative Administrative and Financial
- UNIT – 7 Union Executive - President Elections, Powers and Positions.
- UNIT – 8 Council of Ministers and Prime Ministers - Powers and Functions

# **DEPARTMENT - SOCIOLOGY**

## **Invitation to Sociology**

( 02 Credits )

### **Course Description**

This course introduces learners to the basic concepts of sociology. It is particularly designed to orient the learners from interdisciplinary background about the essence of sociology and intends to inculcate sociological imagination.

### **Course Objectives**

- To introduce the learner to the basic concepts and processes of sociology
- to comprehend the structural and organizational aspects of society
- to examine the process of social change

### **Learning Outcomes and Competencies**

After successfully completing the course, following outcomes and competencies are possible among the learners. Learner will have/can

- Conceptual precision and clarity about the basic sociological concepts
- Develop sociological imagination and apply to analyze the contemporary events
- explain major social processes of society

- analytical view about Indian social structure
- explicate major process of social change and can conceptualize the changing aspects of Indian society

### **Course Contents**

#### **Block-1 Basic Concepts and Processes**

Unit-1 Emergence of Sociology-Factors and Early Thinkers-Sociological Imagination

Unit-2 Society, Community- Associations and Institutions- Culture and Socialization

Unit-3 Social System, Structure and Function

Unit-4 Social Processes-Cooperation, Competition, Conflict, Accommodation and Assimilation

#### **Block-2 Social Organization and Social Change**

Unit-5 Caste and Class System-Changes in Caste

Unit-6 Social Mobility and Types

Unit-7 Factors of Social Change

Unit-8 Process of Social Change in India (Sanskritization, Westernization, Modernization and Globalization)

### **References**

1. Berger, Peter L. 1978. An Invitation to Sociology, Allen and Unwin, London. Davis, Kingsley. Human Society, Macmilan, New Delhi.
2. Dumont, Louis, 1988, Homo Hierarchicus. Oxford University Press. Giddens, Anthony. 2009. Sociology. Politi Press, Malden.
3. Inkle, Alex. 2002. What is Sociology, Prentice Hall India, New Delhi. Jayaram, N, 1990, Introductory Sociology, Macmilan, New Delhi.
4. Johnson Harry M., 2011: Sociology: A Systematic Introduction: Allied Publishers, New Delhi.
5. MacIver, R.M and C.H. Page. Society - Introduction to Sociology, Macmilan, New Delhi
6. Samuel, Koenig. 1957. Sociology: An Introduction to Science of Society, Barnes & Nobel Books, London.
7. Singh, Yogendra. 1993: Social Change in India: Crisis and Resilience, Har-Anand, New Delhi.

## **DEPARTMENT – ANCIENT HISTORY AND ARCHEOLOGY**

## **World Heritage Sites of India**

### **Block - 1**

#### **Introduction**

Unit - 1 Nature - Scope - Criteria for incorporation of World Heritage sites

Unit - 2 Types of World Heritage sites in India

### **Block - 2**

#### **Archaeological and Cave Heritage sites**

Unit - 3 Bimbetka - Sanchi- Nalanda – Champaner - Dholavira

Unit – 4 Ajanta – Ellora - Elephant

### **Block - 3**

#### **North Indian World Heritage Sites**

Unit – 5 Bodh Gaya — Kajuraho–Konarak–Rani kivav– Jaipur,

Unit – 6 Agra Fort – Red Fort - FatehpurSikri–Taj Mahal – Humayun’s Tomb –  
Ahamadabad, Qutub Minar

### **Block - 4**

#### **South Indian World Heritages Sites**

Unit – 7 Mahabalipuram – Pattadakallu – Chola temples

Unit - 8 Monuments of Hampi – Churches and Convents of Old Goa – Ramappa Temple

#### **References:**

1. Marco Canneo, Jasmina: The world heritage sites of UNESCO –  
TheTreasure of Art
2. ASI: World Heritage Sites Series
3. Individual guide: Books on respective city Individual

## **DEPARTMENT - EDUCATION**

### **IDC – 1 FOUNDATIONS OF EDUCATION**

#### **BLOCK-1 FOUNDATIONS OF EDUCATION – I**

Unit-1 Philosophical Foundations

Unit-2 Basic Concepts of Philosophy

Unit-3 Psychology as a Science

Unit-4 Basic Concept in Psychology related to Education

#### **BLOCK-2 FOUNDATIONS OF LEARNING – II**

Unit-5 Sociological bases of Education  
Unit-6 Educational Issues in Indian Society  
Unit-7 Cultural and Historical Foundations  
Unit-8 Political and Economic bases of Education

**References:**

1. Harison and Myers (1970), Education, Manpower and Economic Growth, McGrothill, Oxfords, IBH Publishing Co., New Delhi.
2. Kamala Bhatia & Baldev Bhatia, (1974) The Philosophical and Sociological Foundations of Education, Doaba House, New Delhi.
3. Bhatia B.D, (1974), 'Theory and Principles of Education, Doaba House, Delhi'.
4. Sorokim .P, (1947) 'Society, Culture and Personality', Harper and Brothers Publishers, New York.

## **DEPARTMENT – COMMERCE**

### **EL1.1: Personal Financial Planning**

**Objective:** To enable the Students to understand about the different Investment Avenues, Saving Schemes designed by various agencies particularly for the individuals.

**Pedagogy:** A Combination of Lectures, Group Discussion, Assignments.

**Credits:** 2

**Examination Duration:** 1<sup>1</sup>/<sub>2</sub> and Maximum Marks: 50

(**Internal Assessment Marks** = 10 and Semester-end Examination =40)

### **Course Inputs**

#### **Block I**

- **Unit -1: Introduction to Financial Planning:** Introduction - The Process Financial Planning – Client Interactions – Time Value of Money Applications – Personal Financial Statements – Cash Flow ad Debt Management – Planning to Finance Education.
- **Unit -2: Financial Planning Process:** Introduction - Setting Goals – Informal Budget Preparation – Investment Opportunities – Financial Vs Physical Investments – Role of a Financial Planner.
- **Unit -3: Savings Plans:** Introduction - Setting Goals – Savings Instruments – Savings Plan – Tax Savings Schemes.

- **Unit -4: Investment Planning:** Introduction - Risk Return Analysis – Mutual Fund – Derivatives – Asset Allocation – Investment Strategies and Portfolio Construction and Management.

**Block II**

- **Unit -5: Risk Analysis and Insurance Planning:** Introduction - Risk Management and Insurance Decision in Personal Financial Planning – Various Insurance Policies and Strategies for General Insurance – Life Insurance – Motor Insurance – Medical Insurance.
- **Unit -6: Retirement Planning and Benefits:** Introduction - Retirement Need Analysis Techniques – Savings and Investment Plans for Retirement –Employee Provident Fund – Public Provident Fund – Superannuation Fund – Gratuity – Annuity Plans.
- **Unit -7: Tax Planning:** Introduction - Income-tax Computation for Individuals – Companies - Trust and other bodies – Statutory Provisions Pertaining to Capital Gains and Indexation – House Property – Deduction and Allowances.
- **Unit -8:Health Financing:** Introduction - Health Financing Models – Financing of Health in India – National Rural Health Mission – Challenges of Access to Health Care and Service Quality – Health Insurance Mechanism & Financial Protection.

**Books Recommended for Reference**

01. Khan M.Y, Financial Services, Tata MacGraw Hill.
02. Singhanar V.K, Students’ Guide to Income Tax, Taxmann.
03. Ranganathan and Madhuamathi, Investment Analysis and Portfolio Management, Pearson Publications.
04. Gordon and Natarajan, Emerging Scenario of Financial Services, Himalaya Publishing House.
05. George Rejda, Principles of Risk Management and Insurance, Pearson.

**DEPARTMENT - MANAGEMENT**

**COURSE: OE-1 : Disaster Management - Credit: 2**

**MBAS 459: DISASTER MANAGEMENT**

Objectives	: The course aims at familiarizing the students with the concepts of disaster management, need for disaster management and its relevance.
Pedagogy	: Lectures, assignments, Industrial visits and practical exercises, discussions.

1. Understanding Disasters · Meaning, nature, characteristics and types of Disasters, Causes and effects, Disaster: A Global View, Disaster Profile of India, The Disaster Management cycle.
2. Geological and Mountain Area Disasters · Earthquakes · Volcanic Eruption · Landslides Snow Avalanches, Wind and Water Related Natural Disaster · Floods and Flash Floods · Droughts · Cyclones · Tsunamis, Man Made Disasters · Understanding Man-Made Disasters · Fires and Forest Fires · Nuclear, Biological and Chemical disaster · Road Accidents
3. Introduction to disaster Preparedness · Disaster Management: Prevention, Preparedness and Mitigation · Disaster Preparedness: Concept & Nature · Disaster Preparedness Plan · Disaster Preparedness for People and Infrastructure · Community based Disaster Preparedness Plan
4. Roles & Responsibilities of Different Agencies and Govt. · Roll of Information, Education, Communication & Training · Role and Responsibilities of Central, State, District and local administration. · Role and Responsibilities of Armed Forces, Police, Para Military Forces. Role and Responsibilities of International Agencies, NGO's, Community Based Org. (CBO's)
5. Technologies for Disaster Management · Role of IT in Disaster Preparedness · Remote Sensing, GIS and GPS · Use and Application of Emerging Technologies · Application of Modern Technologies for the Emergency communication. · Application and use of ICST for different disasters.
6. Disaster Mitigation · Disaster Mitigation: meaning and concept · Disaster Mitigation Strategies · Emerging Trends in Disaster Mitigation · Mitigation management · Role of Team and Coordination
7. Disaster Management in India Disaster Profile of India – Mega Disasters of India and Lessons Learnt Disaster Management Act 2005 – Institutional and Financial Mechanism National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Inter-Governmental Agencies. National Disaster management Authority.

### **References**

1. Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K.
2. Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.
3. Central Water Commission, 1987, Flood Atlas of India, CWC, New Delhi.
4. Central Water Commission, 1989, Manual of Flood Forecasting, New Delhi.
5. Government of India, 1997, Vulnerability Atlas of India, New Delhi.
6. Sahni, Pardeep et.al. (eds.) 2002, Disaster Mitigation Experiences and Reflections, Prentice Hall of India, New Delhi.

## **DEPARTMENT - BIO CHEMISTRY**

**Basics of Bioinorganic and Biophysical chemistry for Biology graduates.**

### **Bioinorganic chemistry**

Coordination Compounds: Transition metals, properties (Colour, Oxidation states, Magnetic properties) Coordinate bond, double and complex salts– differences with examples.

Postulates of Warner's theory. Types of ligands: For examples: uni, bi, polydentate ligands. Coordination number, examples.

Porphyrin nucleus and their classification. Important metallo-porphyrins occurring in nature. Structure and biological importance of Heme, cytochrome, chlorophyll, Vitamin B<sub>12</sub>.

Nitrogen, Fixation of atmospheric nitrogen – Symbiotic and non-symbiotic. Nitrogen cycle.

Environmental pollution by nitrogen compounds. Phosphorous: Importance of Phosphorous compounds in biological system, phosphorous cycle

Oxygen, Formation of ozone in atmosphere. Role of ozone in maintenance of life on earth. Effect of environmental pollutants on ozone layer.

Sulphur and Selenium, Importance of compounds of Sulphur and Selenium in biological systems. Effect of sulphur compounds on environmental pollution.

### **Biophysical chemistry.**

Units in chemistry, Avogadro's number, Mole, Mole fraction, Molarity, Equivalent weight, Normality, Molality. Colligative Properties, Osmotic pressure and its measurements. Hypo-, Hyper- and isotonic solutions. Effect of osmotic pressure on living cells.

Donnan membrane equilibrium. Relative lowering of vapour pressure, Raoult's law. Elevation of boiling point, depression in freezing point.

Adsorption: Freundlich and Langmuir's adsorption isotherm. Applications of adsorption.

Viscosity: Definition, determination of viscosity of liquids & solutions by Ostwald's viscometer (solutions of gum and protein to be taken as examples).

Distribution law, Distribution law, partition coefficient, application of distribution law.

Acids, bases and buffers- Lewis concept of acids and bases. Ionic product of water. pH scale, buffers, Henderson- Hasselbach equation, buffer capacity Choice of buffers. Theory of acid base indicators. pH titration curve and iso-electric pH of amino acids.

### **Selected References:**

1. Basic Principles of Organic Chemistry, Roberts and Caserio, W. A. Benjamin, Inc. (1964).
2. Organic Chemistry, Morrison and Boyd, Allyn and Bacon Inc (1992).
3. Principles of Inorganic chemistry by Cotton & Wilkinson, Wiley (1999).
4. Textbook of Organic chemistry by Ahluwalia V K & Madhuri G Narosa publications (2001).
5. Physical chemistry by Castellan G W, Narosa Publications (2004).
6. Physical chemistry by Chakraborty D K, Narosa Publications (2004).

## **DEPARTMENT - BIOTECHNOLOGY**

### **MBT EL –I- Biotechnology and its Applications**

Introduction to biotechnology. Principles of biotechnology, classification.

### **Recombinant DNA Technology**

Introduction, outline of genetic engineering procedure, restriction endonucleases, cloning & expression vectors- plasmids, cloning in plasmid, transformation and detection of transformants- lacZ, genomic and cDNA libraries, gene analysis techniques-hybridization: Southern, Northern, Western, in situ, Polymerase chain reaction.

### **Microbial and food and environmental Biotechnology**

Basics of fermentation technology: Types of microbial culture- batch, continuous and fed-batch. Microbial production: Use of microbes in production of vitamins, enzymes, organic acids, amino acids, polysaccharides, flavors, sweeteners, proteins and antibiotics.

Fermented food products- yogurt, cheese, tempeh, sauerkraut; beverages- wine and beer. Pre- and Pro-biotics, single cell proteins, Genetically modified foods, designer foods.

Current status of biotechnology in environment. Bioconservation, biofuels, gasohol, biogas. Bioremediation: Concepts and principles, bioremediation using microbes, in situ and ex situ bioremediation, biosorption and bioaccumulation of heavy metals.

### **Plant Biotechnology**

Landmarks in Plant tissue culture. Types of cultures- embryo, organ, callus and cell cultures, Somatic embryogenesis, Haploid Production, Androgenesis, Protoplast culture and somatic hybridization. Micropropagation- Methods and stages, applications. Synthetic seeds, somaclonal variation. Production of secondary metabolites by plant cells, Biotransformation.

Plant transformation techniques: Direct and indirect methods of gene transfer in plants. Transgenic plants and crop improvement- herbicide tolerance, disease resistance, abiotic stress tolerance, delayed ripening, improvement of nutritional quality, molecular pharming.

### **Animal Biotechnology**

Basics of animal cell culture techniques, cell lines, physical conditions for culturing animal cells, equipments required, scale-up of culture methods.

Application of animal cell culture- Hybridomas, production of therapeutic antibodies, stem cell technology, cell and tissue engineering.

Genetic engineering of animals: Methods for gene transfer in animals, microinjection, nuclear transplantation, retrovirus-mediated gene transfer, gene knockdown techniques. Transgenic- animals- sheep, pigs, cattle, chickens; applications of transgenic animals.

## **DEPARTMENT - CHEMISTRY**

<b>Block-1</b>	<b>Title: Periodic Table and chemical Periodicity</b>
<b>Unit-1</b>	Elements, atomic structure, atomic number, atomic mass, quantum numbers, electronic configuration,
<b>Unit-2</b>	Periodic properties of elements, State of Matter, their resources. Important periodic properties of the elements, covalent radii, ionic radii, ionization potential, electron affinity and electronegativity
<b>Unit-3</b>	Concepts of Acids and Bases: Review of acid base concepts. Lux-Flood and solvent system concepts. Hard-soft acids and bases. Applications.
<b>Unit-4</b>	Solutions: Concentration units, solutions of liquids in liquids, Raoult's law, ideal and non-ideal solutions.

<b>Block-2</b>	<b>Title: Bonding and molecular structure</b>
<b>Unit-5</b>	Calcification of matter: (elements, compounds, substance and mixture), The three states of matter, physical and chemical properties of matter, fundamental particles of atoms, atomic number, atomic mass, atomic structure of atom molecular formula, empirical formula, molecular mass.
<b>Unit-6</b>	Ions and ionic compounds, properties of ionic compounds, formation of ionic compounds, covalent compounds, properties of covalent compounds, properties of covalent compounds
<b>Unit-7</b>	Metals, properties of metals, theory of metallic bond formation, types of metals conductor, semiconductor and insulators, n-type semiconductors and p-type semiconductors, alloys and superconducting materials.
<b>Unit-8</b>	Acids and bases, general properties of acid and bases, Acid base reactions, oxidation reduction reactions, oxidation number, types of redox reactions, balancing oxidation-reduction equation, exothermic and endothermic reactions energy change in chemical reactions.

## **DEPARTMENT : CLINICAL NUTRITION AND DIETETICS**

**OEL-1: HEALTHY LIFESTYLES AND NUTRITION**

**3 Credits**

## **BLOCK 1: INTRODUCTION TO FOOD AND NUTRITION**

**Unit 1.-** Factors affecting food habits, choices and dietary patterns – Definition of Food, Nutrition, Health, Fitness. Interrelationship between nutrition and health, concept of a desirable diet for optimum nutrition, health and fitness.

**Unit 2.-** A brief review of nutrients in general –

- Energy and macronutrients – Carbohydrates, Protein, Fat - functions, sources deficiency disorders and recommended intakes.
- Micronutrients: Minerals – calcium, Iron, Iodine, and other elements, Vitamins – Fat Soluble & Water Soluble.

**Unit 3:** Nutritional assessment- Anthropometric, biochemical, clinical, dietary and Biochemical assessments

**Unit 4:** Basic principles of planning diet –, RDA for Indians, Food groups, Dietary guides and balanced diets.

## **BLOCK 2: PLANNING OF DIET**

**Unit 5:** Principles of planning a normal diet: characteristics of a normal diet, meeting nutrient requirements of individuals and family. Use of Dietary guidelines for Indians.

**Unit 6:** Objectives of diet therapy- Regular diet and rationale for modifications in energy and other nutrients, texture, fluid, soft diets etc.

**Unit 7:** Role of dietician in hospital- specific functions, team approach in patient care, psychological consideration, interpersonal relationship with patients. Nutrition and medical ethics. Hospital dietary- scope and importance, types of food service, quality management.

**Unit 8:** Nutrition counseling: definition, concept, role of clinical dietician, the recipient and counseling environment and goals of counseling. An overview of systems approach to nutritional care and its components (planning, implementation and evaluation).

## **REFERENCES**

- Srilakshmi B (2004) Nutrition Science. New Age International (P) Ltd, Publishers.
- Kango M (2005) Normal Nutrition, Curing diseases through diet. First Edition CBS Publications. Paul S (2003) Text Book of Bio-Nutrition, Fundamental and Management. RBSA Publishers.
- Williams SR (2000) Nutrition and Diet Therapy. Sixth Edition C.V. Melskey Co.
- Mudambi SR and Rajagopal MV (1997) Fundamentals of Foods and Nutrition. New Age International (P) Ltd, Publishers.
- Swaminathan M (1999) Essential of Food and Nutrition. Vol I and II, Bappco publications, Madras.
- Corinne, H. Robinson 2010– “Normal and Therapeutic nutrition”, Oxford and IBH publishing company, Bombay.

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B.

## **DEPARTMENT - COMPUTER SCIENCE**

### **ELMCS-01 Mobile App Development: Credit 2**

#### **Block – I**

**Unit-1:** Introduction to Mobile Computing: applications, a simplified reference model, Wireless Transmission:

**Unit-2:** Frequencies of radio transmission, signals, antennas, signal propagation, multiplexing, modulation, spread spectrum, cellular system.

**Unit-3** Media Access Control: motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA ,and Comparisons.

**Unit-4:** GSM, DECT, Wireless LAN: Infrared vs. radio transmission, Infrastructure and ad-hoc networks, IEEE 802.11, HPERLAN, Bluetooth.

#### **Block – II**

**Unit-5:** Mobile Network Layer: mobile IP, dynamic host configuration protocol,

**Unit-6:** ad-hoc networks. Mobile Transport Layer: Traditional TCP, classical TCP improvements,

**Unit-7:** TCP over 2.5/3G wireless networks. File Systems, World Wide Web,

**Unit-8:** Wireless Application Protocol (WAP) and WAP 2.0.

#### **Text book:**

1. Jochen H. Schiller, Mobile Communications(2e)

#### **Reference**

1. Raj Kamal, Mobile Computing
2. Asoke K. Talukder, Roopa R. Yavagal, Mobile Computing
3. Mazliza Othman,Principles of Mobile Computing and Communications
4. Prasant Kumar Pattnaik, Rajib Mall, Fundamentals of Mobile Computing
5. Ivan Stojmenovic,Handbook of Wireless Networks and Mobile Computer
6. David Taniar, Mobile Computing Concepts, Methodologies, Tools, and Applications

## **DEPARTMENT - ENVIRONMENTAL SCIENCE**

### **ESOEL-1: Basics of Environmental Science**

#### **Block I: Ecology and Environment**

**Unit 1:** Definition, Principles and Scope. Biotic and abiotic factors of environment. Ecosystems: pond, forest, river, grassland and estuary ecosystems

**Unit 2:** Ecosystem – trophic structure, energy flow, food chain, food web, Ecological pyramids.

**Unit 3:** Population dynamics: Definition, population density, Natality, Mortality, Age structure, Growth pattern, population dispersion.

**Unit 4:** Biogeochemical cycle – types, sedimentary and gaseous cycles, N, C, S, P, O cycles. Rock and hydrological cycles.

## **Block II: Biodiversity and Conservation**

**Unit 5:** Biodiversity, Definition, Types of Biodiversity, importance and roles.

**Unit 6:** Needs and benefits of biodiversity, Loss of biodiversity- causes and consequences, Need for conservation of biodiversity

**Unit 7:** Conservation strategies, endemic and exotic species, Red Data book, National parks, wildlife sanctuaries, biosphere reserves, biodiversity hotspots, wildlife protection act, biodiversity act, wetland conservation and management, Hotspots of biodiversity.

**Unit 8:** Project Tiger, Project elephant, Ramsar site and other conservation projects. Experts Committee Reports on Environmental conservation

# **DEPARTMENT - GEOGRAPHY**

## **ELMG –01, Introduction to Physical Geography (Credit-2)**

### **Block-1**

Origin, Shape and Size of the Earth, Movement of the Earth- Rotation and Revolution, Effects of the movement of Earth, Coordinates -Latitude, Longitude and Time; Structure of the Earth, Rocks - types, significance, Weathering –types; Agents of Denudation - River, Glacier, Wind and Under Ground water; Structure and Composition of Atmosphere, Weather and Climate

### **Block-2**

Atmospheric Pressure, Winds and Precipitation; Distribution of Land and Sea, Submarine Relief of the Ocean, Temperature and Salinity of Sea Water; Ocean Tides and Oceanic Currents- Atlantic, Pacific and Indian Oceans; Biosphere- Elements, Ecology, Ecosystem, World's Biomes, Biodiversity – Importance, Types and Conservation

### **References**

1. B.S. Negi (1993) Physical Geography. S.J. Publication, Meerut
2. D.S.Lal (1998) Climatology. Chaitnya publishing house, Allahabad
3. K. Siddhartha (2001) Atmosphere, Weather and Climate. Kishorey publication, New Delhi
4. R.N.Tikka (2002) Physical Geography. Kedarnath Ramnath & co, Meerut
5. William D. Thornbury (1997) Principle of Geomorphology. New Age International (Pvt Ltd.) New Delhi.

# DEPARTMENT -MATHEMATICS

## ELMM –01 - FUNDAMENTALS OF MATHEMATICS

(2 Credits)

**Block-I:** Number Theory: Natural numbers, integers, Real numbers, GCD, LCM, Prime numbers. Surds, Indices, Logarithms, Progressions, Arithmetic Progression, Geometric Progression, Harmonic Progression,

**Block-II:** Set Theory: Operations of Union, Intersection, Complementation. Relations & Functions: Types of relations One-one, onto, Many-one functions, graphs of functions. Mathematical Logic: Propositions, logical connectives, Methods of proofs.

### Books for Reference:

1. Kolman and Busby: Discrete Mathematics, PHI.
2. S. L. Loney: The Elements of Coordinate Geometry, London Macmillan & Co.
3. B. S. Grewal: Higher Engineering Mathematics, 36<sup>th</sup> Ed., Khanna Pub.
4. S. Lipschutz and M. Lipson: Theory and Problems of Discrete Mathematics. Schaum Series. 2nd Ed. Tata McGraw Hill.

# DEPARTMENT - MICRO BIOLOGY

## Microbial World and Microbial Diversity

- i. Introduction to microbial world, Physiochemical and biological characteristics; Characteristics of Acellular microorganisms (Viruses); Baltimore classification, general structure with special reference to viroids and prions.
- ii. Binomial Nomenclature, Whittaker's five kingdom and Carl Woese's three kingdom classification systems and their utility.
- iii. Difference between prokaryotic and eukaryotic microorganisms
  - i. General characteristics of Cellular microorganisms, types - archaebacteria, eubacteria, wall-less forms - MLO (mycoplasma and spheroplasts) with emphasis on distribution and occurrence, morphology, mode of reproduction and economic importance.
  - ii. Structure, reproduction and economic importance of Mycoplasma.
    - i. General concept of Phytoplanktons and Zooplanktons. Characteristics, occurrence, thallus organization and classification of Algae.
    - ii. Cyanobacteria - occurrence, thallus organization, cell ultra structure, reproduction and economic importance. Applications of algae in agriculture, industry, environment and food.
- i. Historical developments in the field of Mycology including significant contributions of eminent mycologists.

- ii. General characteristics of fungi including habitat, distribution, nutritional requirements, fungal cell ultra- structure, thallus organization and aggregation, mode of reproduction and
- iii. Economic importance of fungi with examples in agriculture, environment, Industry, medicine and food.
- i. General characteristics, structure, mode of reproduction and economic importance of Actinomycetes with special reference to its application in medicine and industry.
- ii. General characteristics, occurrence, classification structure, reproduction and economic importance of Protozoa.

### **References:**

1. Singh,R.P. General Microbiology. Kalyani Publishers, New Delhi (2007).
2. Aneja, K.R. Experiments in Microbiology, Plant pathology and Biotechnology, Fourth edition, NewAge International publishers.
3. Dubey, R.C. and Maheshwary, D.K. Text book of Microbiology. S.chand and company (1999).
4. Powar, C.B. and Dagainawal, H.F. General Microbiology. Vol-I and Vol- II, Himalaya Publishing House.
5. Chakraborty P. A Textbook Of Microbiology. New central book Agency (2005).
6. Prescott, M.J., Harley,J.P. and Klein, D.A. Microbiology. 5th Edition WCB Mc Graw Hill, New York, (2002).
7. Tortora, G.J., Funke, B.R. and Case, C.L. Microbiology: An Introduction. Pearson Education, Singapore, (2004).
8. Alcomo, I.E. Fundamentals of Microbiology. VI Edition, Jonesand Bartlett Publishers. Sudbury. Massachusetts, (2001).
9. Black J.G. Microbiology-Principles and Explorations. JohnWiley &Sons Inc. New York, (2002).
10. Pelczar, MJ Chan ECS and Krieg NR, Microbiology McGraw-Hill.
11. Willey, Sherwood, Woolverton. Prescott, Harley, and Klein's Microbiology McGraw-Hill publication
12. Tortora, Funke, Case. Microbiology. Pearson Benjamin Cummings.
13. JACQUELYN G. BLACK. Microbiology Principles and explorations. JOHN WILEY & SONS, INC.
14. Madigan, Martinko, Bender, Buckley, Stahl. Brock Biology of Microorganisms. Pearson
15. Tom Besty, D.C Jim Koegh. Microbiology Demystified Mc GRAW-HILL.

## **DEPARTMENT -PHYSICS**

### **MP-EL1: Mechanics**

BLOCK-A

**Unit-1: Laws of Motion:** Frames of reference, Newton's Laws of motion,

Dynamics of a system of particles, Centre of Mass.

**Unit-2: Momentum and Energy:** Conservation of momentum, Work and energy, Conservation of energy, Motion of rockets.

**Unit-3: Rotational Motion:** Angular velocity and angular momentum, Torque, Conservation of angular momentum.

**Unit-4: Gravitation:** Kepler's Laws (statement only), Newton's Law of gravitation, motion of a particle in a central force field, satellite in circular orbit and applications, geosynchronous orbits, weightlessness, basic idea of global positioning system (GPS).

BLOCK-B:

**Unit-5: Oscillations:** Simple harmonic motion, differential equation of SHM and its solutions, kinetic and potential energy, total energy and their time averages, damped oscillations.

**Unit-6: Elasticity-1:** Hooke's law, stress-strain diagram, elastic moduli-relation between elastic constants, Poisson's ratio, expression for Poisson's ratio in terms of elastic constants, work done in stretching and work done in twisting a wire.

**Unit-7: Elasticity-2:** Twisting couple on a cylinder - determination of rigidity modulus by static torsion, torsional pendulum-determination of rigidity modulus and moment of inertia -  $q, \eta$  and  $\square$  by Searles method.

**Unit-8: Special Theory of Relativity:** constancy of speed of light, postulates of special theory of relativity, length contraction, time dilation.

## DEPARTMENT -PSYCHOLOGY

### EL-1 Introduction to Psychology 2 Credits

#### Block 1: Introduction to Psychology-I

**Unit 1:** Introducing Psychology -Definition, Scope, and goals

**Unit 2:** Branches of Psychology

**Unit 3:** Motivation

**Unit 4:** Emotions

#### Block 2: Introduction to Psychology-II

**Unit 5:** Sensation, Attention and Perception

**Unit 6:** Learning, Memory and Forgetting

**Unit 7:** Intelligence

**Unit 8:** Personality

**References:**

1. Charles G.Morris. Albert A. Maisto Psychology an Introduction , Prentice Hall. New Jersey.
2. Feldman, A. R.,Understanding Psychology IV th Ed, 1996, McGraw Hill, New Delhi.
3. Morgan, King, Weisz &Schopler, Introduction to Psychology-V11 Ed,1993, Tata McGraw Hill, New Delhi.
4. Ernest R Hilgard, Richard C Atkinson ,Rita L Atkinson Introduction to Psychology Oxford Publication, New Delhi.

## **DEPARTMENT : INFORMATION TECHNOLOGY**

### **ELMIT –01: Green Computing**

(2 Credits)

**Course Objective:** Study the concepts related to Green IT, Green devices and hardware along with software methods, green enterprise activities, managing the green IT and various laws, standards, protocols along with outlook of green IT.

#### **BLOCK 1: Overview of Green Computing**

**Unit 1:**Green IT Introduction, Overview and issues, Initiatives and standards, Pathways of Green computing, Benefits of Green IT, Environmental Impacts of IT

**Unit 2: Green devices and hardware** Environmental issues arising from electronic devices, life cycle of electronic devices, Hazards and E-waste Recycling, Going paperless, Hardware considerations, Greening information systems, Managing Green IT, 3Rs of Green IT, Thinking About Money-Saving Efforts

**Unit 3:** Green Data Centres and Associated Energy Challenges, Data Centre IT Infrastructure, Data Centre Facility Infrastructure: Implications for Energy Efficiency, IT Infrastructure Management, Green Data Storage, Storage Media Power Characteristics,

**Unit 4:** Green network and communications, objectives and challenges of green networking, Enterprise Green IT strategy, Approaching Green IT strategies, Business drivers and dimensions for Green IT strategies, Steps in Developing a Green IT Strategy, Metrics and Measurements in Green Strategies

#### **BLOCK 2: Management of Green Computing**

**Unit 5:** Sustainable Information Systems and Green Metrics, Sustainable IT Services, Sustainable IT Roadmap, Enterprise, Green IT Readiness, Readiness and Capability Green Enterprises and the Role of IT, Organizational and Enterprise Greening, Information Systems in Greening Enterprises, Greening the Enterprise: IT Usage and Hardware,

**Unit 6:** Managing Green IT, Strategizing Green Initiatives, Implementation of Green IT, Regulating Green IT: Laws, Standards and Protocols,

**Unit 7:** Green Cloud Computing and Environmental Sustainability, Cloud Computing and Energy Usage Model: A Typical Example, Features of Clouds Enabling Green Computing, Green Cloud Architecture

**Unit 8:** Green IT: An Outlook, Awareness to Implementation, Green IT Trends, Greening by IT, A Seven-Step Approach to Creating Green IT Strategy

**Text Books:**

1. Gangadharan, G. R., & Murugesan, S. (2012). *Harnessing Green IT: Principles and practices*. Wiley Publication, ISBN: 9788126539680.
2. Smith, B. E. (2013). *Green Computing: Tools and Techniques for Saving Energy, Money, and Resources*. CRC Press.

## **DEPARTMENT -BOTANY**

### **Plant-Microbe Interactions**

Overview of plant microbes interactions,

Introduction, beneficial microbes, Rhizobium bacterium and nitrogen fixation, mycorrhizal fungi.

Plant pathogens, *Agrobacterium tumefaciens* and crown gall disease,

Mechanisms of plant disease mechanism, some bacterial plant diseases,

Plant viruses and mechanism of plant against viruses attacks.

Fungal pathogen- mechanism of plant disease,

Oomycete pathogens, Fungal mediated plant.

General concept of plant immunity,

PAMP-triggered immunity (PTI) and effectors-triggered immunity (ETI).

Transcription activator like effector and their role in virulence and disease resistance.

### **References**

1. Lautenberg, B. (2015). *Principles of Plant-Microbes Interactions: Microbes for sustainable Agriculture*, Springer.
2. Stacey, G. and Keen, N. T. (1997). *Plant-Microbes Interactions*, Vol 4, . Springer.
3. Ramasamy, K, (2015). *Plant Microbes Interactions*, New India Publishing Agency.
4. Martin, F. and Kamoun, S. (2014). *Effectors in Plant-Microbes Interactions* 1st Edition, Wiley Blackwell.

## **DEPARTMENT -ZOOLOGY**

### **MZO-IE-1: Parasites, Vectors & Communicable Diseases**

#### **Introduction to parasites.**

Distribution, types, origin and evolution of parasites. Parasitism.

Types: Ecto-parasites, Endo-parasites and their adaptations.

Pathogenic micro-organisms, brief outline and classification of parasitic protozoan's: Entamoeba, Balantidium, Giardia, Trichomonus, Plasmodium, Leishmania and Trypanosoma and their diseases.

Control measures, diagnosis and therapy.

### **Pathogenic helminthes and vectors.**

Etiology, epidemiology, pathogenesis, diagnosis, prevention and control of disease due to *Trichinella spiralis*, *Ancylostoma duodenale*, *Fasciola hepatica*, Schistosoma species.

Pathogenic Cestodes: Life cycle, treatment of diseases caused by Echinococcus, Hymenolepis and Diphyllbothrium. Scope and importance of vectors. Origin and evolution of vectors. Habitat, life cycle, pathogenicity of fleas, mites, ticks, lice's and mosquitoes.

Historical perspectives and scientists involved in the discovery of vectors and communicable Diseases.

Epidemiology, bio-ecology, life cycle of biological and mechanical Vectors. Vector-host-parasites interactions, Host-pathogen interaction, insects transmitting Bacteria and viruses.

### **Control and management of vectors and vector borne diseases**

Control measures: cultural, chemical, biological, genetic and environmental Methods of vectors. Management of biological and mechanical vectors during Different seasons. Integrated Vector Control and Management.

Insecticide resistance in vectors, Drug resistance in pathogens.

Importance of education, awareness among public on communicable diseases and community participation. Covid-19 pandemics. Epidemiology of corona virus and its mutants. Vaccination against corona virus in India and other parts of the world.

**Annexure II**

**INTER- DISCIPLINARY COURSE**  
**(Open Elective) for Second Semester**  
**ವಿಭಾಗ- ಕನ್ನಡ**

**ಪತ್ರಿಕೆ-೬: ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಇತಿಹಾಸ** **EL-2.1 (ಕ್ರೆಡಿಟ್-೨)**

**ಬ್ಲಾಕ್-೨೮: ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಉಗಮ ಮತ್ತು ವಿಕಾಸ**

**ಘಟಕ-೧೪೯:** ಸಾಹಿತ್ಯದ ಉಗಮ, ಬೆಳವಣಿಗೆ, ಉದ್ದೇಶ.

**ಘಟಕ-೧೫೦:** ಪ್ರಾಚೀನ ಪೂರ್ವ ಶಾಸನಸಾಹಿತ್ಯ.

**ಘಟಕ-೧೫೧:** ಪಂಪ ಪೂರ್ವ ಯುಗದ ಸಾಹಿತ್ಯ.

**ಘಟಕ-೧೫೨:** ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ವಿಭಾಗಕ್ರಮ.

**ಬ್ಲಾಕ್-೨೯: ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯ**

**ಘಟಕ-೧೫೩:** ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯ ರೂಪಗಳು; ಚಂಪೂ, ವಚನ, ರಗಳೆ, ಷಟ್ಪದಿ, ಸಾಂಗತ್ಯ ಇತ್ಯಾದಿ.

**ಘಟಕ-೧೫೪:** ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪರಿಕಲ್ಪನೆಗಳು;

ಚರಿತ್ರೆ-ಪುರಾಣ, ಧರ್ಮ-ಕಾವ್ಯಧರ್ಮ, ಹಿಂಸೆ-ಅಹಿಂಸೆ, ಮಾರ್ಗ-ದೇಶಿ, ಲೌಕಿಕ-ಆಗಮಿಕ, ವಸ್ತುಕ-ವರ್ಣಕ, ಪ್ರಭುತ್ವ-ಪ್ರತಿರೋಧ.

**ಘಟಕ-೧೫೫:** ಪ್ರಾಚೀನ ಕನ್ನಡ ಕವಿ-ಕೃತಿ-ಕಾಲ-ದೇಶ-ಭಾಗ ೧.

ಪಂಪ, ರನ್ನ, ಪೊನ್ನ, ೧ನೆ ಚಾವುಂಡರಾಯ, ನಾಗವರ್ಮ ೨ನೆಯ ಚಾವುಂಡರಾಯ, ನಾಗಚಂದ್ರ, ನಯಸೇನ, ದುರ್ಗಸಿಂಹ, ಬ್ರಹ್ಮಶಿವ, ಕರ್ಣಪಾರ್ಯ, ಜನ್ನ.

**ಘಟಕ-೧೫೬:** ಪ್ರಾಚೀನ ಕನ್ನಡ ಕವಿ-ಕೃತಿ-ಕಾಲ-ದೇಶ-ಭಾಗ ೨.

ಆಂಡಯ್ಯ, ನೇಮಿಚಂದ್ರ, ರುದ್ರಭಟ್ಟ ಪ್ರಮುಖ ವಚನಕಾರರು - ಜೇಡರ ದಾಸಿಮಯ್ಯ, ಬಸವಣ್ಣ, ಅಕ್ಕ ಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಚನ್ನಬಸವಣ್ಣ, ಹರಿಹರ, ರಾಘವಾಂಕ, ಕುಮಾರವ್ಯಾಸ, ಲಕ್ಷ್ಮೀಶ, ಪ್ರಮುಖ

ಕೀರ್ತನಕಾರರು, ಚಾಮರಸ, ಕುಮಾರವಾಲ್ಮೀಕಿ, ಸರ್ವಜ್ಞ, ಷಡಕ್ಷರಿ, ಸಂಜೆ ಹೊನ್ನಮ್ಮ, ನಂಜುಂಡ, ರತ್ನಾಕರವರ್ಣಿ, ಮುದ್ದಣ, ಕೆಂಪುನಾರಾಯಣ.

## ಪರಾಮರ್ಶನ ಗ್ರಂಥಗಳು

೧. ಗತಿಬಿಂಬ : ಜಿ.ಎಸ್. ಶಿವರುದ್ರಪ್ಪ, ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಬೆಂಗಳೂರು
೨. ಕಾವ್ಯ ವಿಹಾರ : ಕುವೆಂಪು, ಉದಯರವಿ ಪ್ರಕಾಶನ, ಮೈಸೂರು, ೧೯೬೯
೩. ಸಮಗ್ರ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ : ಬೆಂಗಳೂರು, ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಬೆಂಗಳೂರು, ೨೦೦೨
೪. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ : ಕೆ. ವೆಂಕಟರಾಮಪ್ಪ, ಪ್ರಸಾರಾಂಗ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು
೫. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ: ದೇವುಡು, ಶಾರದಾ ಪ್ರಕಾಶನ, ಮೈಸೂರು, ೧೯೩೫
೬. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಂಗಾತಿ : ಕೀರ್ತಿನಾಥ ಕುರ್ತಕೋಟಿ, ಮನೋಹರ ಗ್ರಂಥಮಾಲೆ, ಧಾರವಾಡ
೭. ಶೈಲಿ : ಎಸ್.ವಿ.ರಂಗಣ್ಣ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು, ೧೯೭೬
೮. ಶತಮಾನದ ಕನ್ನಡ ಸಾಹಿತ್ಯ : ಸಂಪಾದಕರು, ಜಿ.ಎಸ್. ನಾಯಕ, ಕನ್ನಡ ಸಾಹಿತ್ಯ ಅಕಾಡೆಮಿ, ಬೆಂಗಳೂರು
೯. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಇತಿಹಾಸ : ರಂ. ಶ್ರೀ. ಮುಗಳ, ಕೇಂದ್ರ ಸಾಹಿತ್ಯ ಅಕಾಡೆಮಿ, ನವದೆಹಲಿ, ೧೯೬೩
೧೦. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ : ರಂ.ಶ್ರೀ. ಮುಗಳ, ಉಷಾ ಸಾಹಿತ್ಯ ಮಾಲೆ, ಮೈಸೂರು, ೧೯೭೧
೧೧. ಬಿಂಬ: ಚದುರಂಗ, ಸಂವಹನ ಪ್ರಕಾಶನ, ಮೈಸೂರು
೧೨. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ ಸಂಪುಟಗಳು : ಕುವೆಂಪು ಕನ್ನಡ ಅಧ್ಯಯನ ಸಂಸ್ಥೆ, ಮೈಸೂರು. ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು, ೧೯೮೨
೧೩. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಾಚೀನತೆ: ಪ್ರಧಾನ ಸಂಪಾದಕರು, ಎ. ರಂಗಸ್ವಾಮಿ, ಲೇ. ಎಚ್.ಪಿ. ಗೀತಾ, ಜನಪ್ರಿಯ ಕನ್ನಡ ಮಾಲೆ, ಕನ್ನಡ ಅಧ್ಯಯನ ಮತ್ತು ಸಂಶೋಧನಾ ವಿಭಾಗ, ಕರಾಮುವಿ, ಮೈಸೂರು, ೨೦೧೧
೧೪. ಪ್ರಾಚೀನ ಕನ್ನಡ ಕಾವ್ಯ ಸ್ಥಿರತೆ ಮತ್ತು ಚಲನ ಶೀಲತೆ : ಪ್ರಧಾನ ಸಂಪಾದಕರು, ಎ. ರಂಗಸ್ವಾಮಿ, ಲೇ. ಶಿವರಾಮಯ್ಯ, ಜನಪ್ರಿಯ ಕನ್ನಡ ಮಾಲೆ, ಕನ್ನಡ ಅಧ್ಯಯನ ಮತ್ತು ಸಂಶೋಧನಾ ವಿಭಾಗ, ಕರಾಮುವಿ, ಮೈಸೂರು, ೨೦೧೨
೧೫. ಕನ್ನಡ ಕೈಪಿಡಿ: ಸಂಪುಟ ೨, ಪ್ರಸಾರಂಗ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು, ೨೦೦೭

## DEPARTMENT - ENGLISH

### EL-2.1: INDIAN LITERATURE-II

#### OBJECTIVES

- To appreciate artistic values in *Hayavadana* and the use of myth
- To know the importance of Indian English historical plays
- To appreciate Sri Aurobindo as a poet and critic
- To comprehend the different theories of aesthetic experience of art

#### BLOCK -I

**Girish Karnad:** Hayavadana

**Gurucharan Das:** Larin Sahib

## **BLOCK –II**

**M. Hiriyanna:** Art Experience

**Sri Aurobindo:** Selections: The Poets of the Dawn and The Poets of the Dawn 3 (The Future Poetry)

### **Suggested Reading:**

- **K.R.Srinivas Iyengar:** Indian Writing in English .Macmillan, 1979.
- **M.K.Naik:** Critical Essays on Indian Writing in English.Sahitya Akademi, 1969.
- **Narasimhaiah C.D:** The Swan and the Eagle. Indian Institute of Advanced Study, 1987.
- **Meenakshi Mukherjee:** The Twice Born Fiction. Heinemann Educational Publishers, 1972.

## **DEPARTMENT - HINDI**

### **हिंदी सिनेमा**

- सिनेमा का उद्भव और विकास
- मूक चलचित्र और दादा साहब फाल्के युग
- दूसरा पढ़ाव, सवाक चलचित्र अथवा आलमआरा
- रंगीन सिनेमा का युग
- सामाजिक सिनेमा एक विवेचन
- धर्म एवं सांस्कृतिक सिनेमा एक विवेचन
- राजनैतिक सिनेमा एक विवेचन
- आर्थिक सिनेमा एक विवेचन
- हास्य एवं व्यंग्य सिनेमा एक विवेचन
- बाल सिनेमा
- सिनेमा एवं संवेदना
- सिनेमा एवं भाषा-शिल्प सिनेमा एवं गायन
- सिनेमा एवं पात्र संयोजना
- सिनेमा एवं नैतिक मूल्य
- अनूदित सिनेमा
- सिनेमा का तुलनात्मक अध्ययन
- फिल्म समीक्षा.....आदि



- सिनेमा साहित्य और समाज- प्रहलाद अग्रवाल, अनामिका प्रकाशन, नई दिल्ली
- कथाकार कमलेश्वर और हिंदी सिनेमा- उज्ज्वल अग्रवाल, राजकमल प्रकाशन, नई दिल्ली
- बॉलिवुड पाठ विमर्श के संदर्भ- ललित जोशी, वाणी प्रकाशन, नई दिल्ली

- फलैशबैक, प्रभुनाथ आजमी, शिल्पायन, नई दिल्ली
- नाटक के सौ बरस, हरिश्चंद्र अग्रवाल और अजित पुष्कल, शिल्पायन, नई दिल्ली

## DEPARTMENT – TELUGU

### E. L. 2.1 TELUGU SAMSKRUTHI - SAMAJAM

#### Block - 1: ANDHRULA CHARITHRA - SAMSKRUTHI

Unit - 1:Samskruthi Vaisistyam

Unit - 2:Andhrula Charithra - Samskruthi Paraspara Prabhavam

Unit - 3:Andhrula kalalu

Unit - 4: Andhrula basha - samajam

#### Block - 2: ANDHRULA AACHARALU -SAMPRADHAYALU

Unit - 1:Andhrula Pandugalu

Unit - 2: Sthrela Nomulu - Vrathalu

Unit - 3: Andhrula Sangikaacharalu

Unit - 4: Andhrula Sampradhayalu

## DEPARTMENT - HISTORY

### OEL2.1 Social Reform Movements in Modern India

**Objective:** The course is aims to trace the causes for the division of society in various sections and need for reformation. Further it explains age old social evils which crippled Indian society.

**Pedagogy:** personal contact programmes, audio video programmes, online lectures  
Assignments, etc

**Credits:** 2. **Examination Duration:** 1 1/2 hours and Maximum Marks: 40

#### Course outcomes

After completing this course the students should be able to

- Understanding the contributions of the Raja ram Mohan Roy Dayananda Sarawathi towards the Indian modernity
- Analyse the Jyothibai pule Savithribai Pule Ambedkar's contributions to Indian social reform movements
- Evaluate the works of Sahu Maharaj and Krishna raja wadiyar IV patronage to social Justice.

#### Block-I

##### Unit : 1

Colonial Discovery of India : Orientalism, Anglicism, Evangelism-Understanding Indian Society, Meaning of Social Reform. The Concept of Modernity : Western Impact – Indian Response.

**Unit : 2**

Rajaram Mohan Roy and Brahma Samaj, Dayananda Sarawathi and Arya Samaj- Nationalism and Society – Prarthana Samaj.

**Unit : 3**

Jyothi Ba- Phle and Savithri Ba Pule, Social and education reforms.

**Unit : 4**

Communalism, Eradication of Communalism, Muslim League, Wahhabi and Pan Islamism-Syed Ahmed and Aligarh Movement.

**Block-II****Unit : 5**

The debate over the interpretation of Shastras – Ishwar Chandra Vidya Sagar - B.M.Malabari – Vivekananda –M.G. Ranade—Bal Gangadhar Tilak.

**Unit :6**

Dr. B.R.Ambedkar-, His views on Society, A caste and its annihilation, Religion and Economy, M.K.Gandhi- E.V.Ramswamy Periyar and Sri.Narayanguru, Ayyan kali.

**Unit :7**

The reformers – Kandukuri Veereshalingam – Pandit Shivanatha Shastry – Gopal Ganesh Agarkar-K.T.Telang-Maharma.

**Unit :8**

D.K.Karve, Maharaj Saiyyaji Rao Gaekwad of Baroda – Chatrapathi Shahu Maharaj of Kolhapur and Maharaja Krishnaraja Wodeyar IV of Mysore.

**Suggested readings:**

1. Nararajan : A Century of Social Reform in Indian.
2. Seetharam Singh : Nationalism and Social Reform in India
3. Dhananjaya Keer : Ambedkar, Life and Mission
4. Dhananjaya Keer :Mahatma Jyoti Rao Phule : Father of Social Revolution in India
5. Charless Heimsath R : Indian Nationalism and Hindu social Reform
6. A.S.Altekar : Position of Women In Hindu Civilization.
7. Gail Omvedt : Cultural Revolt in a Colonial Society – The Non – Brahmin Movements in Western India.
8. Gail Omvedt : Dalits and Democratic Revolution.
9. Ravindrakumar : Selected Documents of B.G.Tilak.
10. S. Ramkrishna : Social Reform Movements in Andhra
11. M.K.Gandhi : Women and Social Injustice.

ವಿಜಯ ಪೂರ್ಣಚ್ಚ ತಂಬಂಡ (ಸಂ), ಭಾರತ ಉಪಖಂಡದ ಆಧುನಿಕ ಪೂರ್ವ ಚರಿತ್ರೆ ವಿವಿಧ ಆಯಾಮಗಳು - ಸಂಪುಟ-03, ಪ್ರಸಾರಾಂಗ, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಹಂಪಿ.

## DEPARTMENT - ECONOMICS

### EL2.1: Institutions for International Development

- **Objective:** To enable the Students to understand the need and importance of various International Institutions.
- **Pedagogy:** A Combination of Lectures, Group Discussion, Assignments.
- **Credits:** 2 ; Examination Duration: 1½ and Maximum Marks: 50 (Internal Assessment Marks = 10 and Semester-end Examination =40)

### **Course Inputs**

#### **Block – I                      Economic Issues at Global and National Level**

##### **Unit – 1                      Globalisation**

Globalisation – Forces Driving Globalisation – Income Inequality – National Integrity – Impact on Labour – Multinational corporations – Global Business Environment – National Business Environment.

##### **Unit – 2                      Legal Issues of Business at Global and National Level**

Political Risks – Legal System – Business Ethics – Centrally Planned Economy – Mixed Economy – Market Economy – Human Development

##### **Unit – 3                      International Trade**

Importance – Volume – Direction – Composition – Trends – Theories of Trade - Mercantilism – Absolute Advantage – Comparative Advantage – International Product Life Cycle – Political, Economic and Cultural Motives behind Government Intervention.

##### **Unit – 4                      GATT and WTO**

Importance – objectives – Functions - GATT and W.T.O – India and WTO.

#### **Block – II                      Economic Integration and International Business Issues**

##### **Unit – 5                      Regional Economic Integration**

Meaning – Effects – Integration in Europe: European Union – Integration in Americans : North American Free Trade Agreement (NAFTA) – Latin American Integration Association (LAIA) – Free Trade Area of Americans (FTAA) and Transatlantic Economic Partnership.

##### **Unit – 6                      Integration in Asia**

Association of Southern East Asian Nations (ASEAN) - Asia Pacific Economic Cooperation (APEC) – Integration in middle East : Gulf Cooperation Council (GCC) – BRICS – SAARC.

##### **Unit – 7                      International Financial Markets**

International capital markets – Foreign Exchange markets – Currency Convertibility – International Monetary System.

## **Unit – 8      Issues in International Business**

Trade War – Balance of Payment – Terrorism – Oil Crisis – Smuggling – Dumping – Environmental Degradation – Exhibit of Nuclear power – Covid 19 and other pandemics.

### **References:**

01. Apte A.N. (2011) International Financial Management, Tata McGraw Hill Pub., Co. Ltd., New Delhi.
02. Bhambari C.P, (1980) The World Bank and India, Vikas Publishing House, New Delhi.
03. International Development Association, Annual Reports.
04. International Finance Corporation, Annual Reports.
05. International Monetary Fund, Annual Reports.
06. World Bank, (1995) The Evolving Role of the World Bank in the First Half Century, Washington D.C.
07. World Bank, World Bank in India, Washington, D.C. USA
08. World Bank, World Development Reports, and Annual Reports.  
Palle Krishna Rao, (2005) WTO, Text and Cases, PSG Excel Series, New Delhi.

## **DEPARTMENT - POLITICAL SCIENCE**

### **(OEL-I) Indian Constitution**

#### **Block-I**

- Unit:1            Framing of the Indian Constitution.  
Unit:2            Preamble and Salient Features of the Indian Constitution.  
Unit:3            Fundamental Rights and Duties.  
Unit:4            Directive Principles of the State Policy.

#### **Block-II**

- Unit:5            Union Legislature : Composition, Powers and Functions.  
Unit:6            Union Executive : President and Vice-President - Election, Powers and Functions, Prime ministers and Council of Minister - Powers and Functions.  
Unit:7            State Legislature : Composition, Powers and Functions, State Executive -Governor and Chief Minister.  
Unit:8            The Judiciary : Supreme Court and High Court - Composition, Jurisdiction and Functions.

### **References:**

1. Andre Beteille, 1965. Caste,class, and Power. Berkley: University of California Press.
2. Appadorai, A 1968. india: Studies In Social And Political Development 1947-1967. New Delhi: Aisa Publishing House.
3. Desai, A R. 2016. Social Background of Indian Nationalism. Los Angeles: Papular Prakashan.

4. Granville Austin, 2000. The Indian Constitution: Cornerstone of a Nation. Melbourne: Oxford University Press.
5. Hanson and Douglas, 1972. India`s Democracy. New York city: W W Norton & Co Inc.
6. Johari J C 1974. Indian Government and Politics. New Delhi: Vishal Publications.
7. Karunakaran, K.P 1964. Continuity and Change in Indian Politics. New Delhi: People`s Pub. House.
8. Kochanek. A. 1968. The Congress Party of India: the Dynamics of a One-Party Democracy. New Jersey: Princeton University Press.
9. Morris Jones, 1967. The Government and Politics of India. London: Hutchinson University Library.
10. Myron Weiner, 1957. Party Politics in India. New Jersey: Princeton University Press.
11. Myron Weiner, 1967. Party Building in New Nation. Chicago: University of Chicago Press.
12. Palmer, N D 1971. The Indian Political System. Boston: Houghton Mifflin.
13. Partha Chatterjee, 1998. State and Politics in India. University of Michigan: Oxford University Press.
14. Pylee, M V 1960. Constitutional government in India. Bombay: Asia Pub. House.
15. Rajni Kothari, 1970. Politics in india. The University Of Michigan: Little Brown
16. Rajni Kothari, 1995. Caste in Indian Politics. Telangana: Orient Blackswan.
17. Venkatarangaiya: M Shiviah, 1975. Indian Federalism. New Delhi: Arnold-heinemann Publishers.
18. Zoya Hasan, 2000. The State in Indian Politics. Landon: Sage publication.

## **DEPARTMENT - SOCIOLOGY**

### **Study of Indian Society -02 Credits**

#### **Course Description**

Every science has its own classical theories, which stand as eternal in their explanatory power and prowess to transcend the time and region. This course intends to introduce the learners to the classical period of sociology which is not just a bundle of theories but a consistent tradition and formative period, even contemporary theories cannot eschew from being inspired. After studying this course, following learning outcomes can be expected.

#### **Course Objectives**

1. To appreciate the organizational framework of Indian society
2. To appreciate the aspects unity and diversity of Indian society
3. Examine the social issues in contemporary India

#### **Learning Outcomes**

Following outcomes are expected from the learners after successfully completing the course.

Learner can/has

LOC-1: sociological insights about the social structural and organizational aspects of Indian society

LOC-2: present the changes in institutional framework of Indian society

LOC-3: recognize the causes for major social issues and present realistic remedies

## **Course Content**

### **Block-1 Social Organizations**

Unit-1 Unity and Diversity-Problem of Integration

Unit-2 Caste-Characteristics and Recent Changes

Unit-3 Marginalization-SC, ST, OBC and Minorities

Unit-4 Changes in Family and Concerns of the Aged

### **Block-2 Social Issues in Contemporary India**

Unit-5 Environmental Sanitation and Ecological Degradation

Unit-6 Educated Unemployment and Employability

Unit-7 Social Unrest-Terrorism, Naxalism, Communalism and Corruption

Unit-8 Child Rights and Right to Education (RTE)

## **References**

- Ahuja, Ram. 2002. Study of Social Problems. Jaipur & New Delhi: Rawat Publications
- Atal, Yogesh. 1979. The Changing Frontiers of Caste. National Publishing House: Delhi
- Beteille, Andre. 1971. Caste, Class and power. Berkeley: University of California.
- Beteille, Andre. 1974. Social Inequality, New Delhi: Oxford University Press.
- Beteille, Andre. 1992. Backward Classes in Contemporary India. New Delhi: Oxford University Press.
- Berreman, G.D. 1979. Caste and Other Inequalities: Essays in Inequality. Meerut: Folklore Institute.
- Dube, Leela. 1997. Women and Kinship, Comparative Perspectives on Gender Southern South Asia.
- Das, Veena. 2006. Oxford Handbook of Indian Sociology. New Delhi: Sage
- Dube, S C. 1990. Study of Indian Society. New Delhi: National Book Trust
- Jha, Hetukar. 2015. Sanitation in India. Delhi: Gyan Books.
- Karve, Iravathi. 1990. Kinship Organization in India.
- Pais, Richard. 2015. Sociology of Sanitation. Delhi: Kalpaz Publications.
- Pathak, Bindeshwar. 2015. Sociology of Sanitation. Delhi: Kalpaz Publications.
- Singer, Milton & Cohen, Bernards. 1996. Structure and change in Indian Society. Jaipur: Rawat
- Singh, Yogendra, Modernization of Indian Tradition. Jaipur & New Delhi: Rawat
- Srinivas, M N. 1995. Social Change in Modern India: Orient Blackswan
- Srinivas, M. N. 1962. Caste in Modern India and Other Essays. Asia Publishing House: Delhi

# **DEPARTMENT – ANCIENT HISTORY AND ARCHEOLOGY**

AHA  
OE 2.1

**Cultural History of Hoysalas (OE)**

**Block - 1**

**Early Kings**

Unit - 1	Archeological and Literary Sources
Unit - 2	Theories of Origin of Hoysalas – Sala – Nripakama – Ereyanga
<b>Block - 2</b>	<b>Important Rulers</b>
Unit - 3	Vishnuvardhana - VeeraNarasimha – I
Unit - 4	Ballala – II - Narasimha – II - Narasimha III and Ballala – III
<b>Block - 3</b>	<b>Cultural Contributions</b>
Unit - 5	Hoysala polity - Economy
Unit –6	Hoysala Society – Religion – Education - literature
<b>Block - 4</b>	<b>Art and Architecture</b>
Unit - 7	Hoysala Architecture
Unit – 8	Hoysala Art

#### References:

1. Epigraphia Carnatica: Relevant Volumes
2. Derrett Duncan, M.J: The Hoysalas, 1957
3. Dhakey M.A: Encyclopedia of Indian Temple Architecture
4. Desai P.B: History of Karnataka
5. Foekema Gerard: A Complete Guide to Hoysala Temples
6. Gopinatha Rao T.A: Elements of Hindu Iconography, Vols
7. Kelleson Collyer: The Hoysala Artists – Their Identity Style
8. Krishna Murthy M.S: The Hoysala Art, Kuppam, 2007
9. Padmnabha K: Hoysala Sculptures : A cultural Study
10. Sheik Ali B (Ed): The Hoysala Dynasty , 1972
11. William Cohelo: The Hoysala Vamsha, 1950
12. Annual Reports of the Department of Archaeology, Mysore 1939 – 46
13. Settar S: Hoysala Temples
14. Marg: In Praise of Hoysala Art
15. Narasimhachar R; Lakshmidēvi Temple at Doddagaddhāvalli
16. Shastri KAN: The Cholas, 17. Shastri KAN: History of South India

## **DEPARTMENT - EDUCATION**

### **IDC - 2 HIGHER EDUCATION**

#### **BLOCK - 1 HIGHER EDUCATION – ORGANIZATION AND TEACHING – LEARNING**

Unit-1 Higher Education

Unit-2 Teaching Learning in Higher Education – I

Unit-3 Teaching-Learning in Higher Education – II

Unit-4 Problems and Innovations in Higher Education

## **BLOCK - 2 HIGHER EDUCATION – SOCIO-PSYCHOLOGICAL AND MANAGEMENT DIMENSIONS**

Unit-5 Socio-Psychological Background of College Students

Unit-6 Problems of College Students

Unit-7 Higher Education – Management Dimensions

Unit-8 Higher Education Teacher

### **References:**

1. Shills Edward (1989) 'The modern university Liberal Democracy'.
2. Abraham, Abu (1988) The Penguin, Book of Indian cartoons, New Delhi.
3. Chandra, Bipan (1984) Communalism Modern India, New Delhi.
4. Chauhan S.S (1989) Innovations in Teaching Learning Process, New Delhi, Vikas.
5. Srivastva A.B and Sharma K.K (1985) Elementary Statistics in Psychology and Education, New Delhi, Sterling Publishers Pvt. Ltd.,

## **DEPARTMENT - COMMERCE**

### **Elective Course – EL2.1: Entrepreneurship Development**

- **Objective:** To enable the Students to understand about the different aspects of Entrepreneurship Development.
- **Pedagogy:** A Combination of Lectures, Group Discussion, Assignments.
- **Credits:** 2 ; Examination Duration: 1½ and Maximum Marks: 50 (Internal Assessment Marks = 10 and Semester-end Examination =40)

### **Course Inputs**

#### **Block I**

- **Unit -1: Entrepreneur and Entrepreneurship:** Introduction - Evolution – Characteristics – Distinction between Entrepreneur and Manager – Functions – Types – Entrepreneur - Concept of Entrepreneurship – Growth of Entrepreneurship in India – Role of Entrepreneurship in Economic Development
- **Unit – 2: Women Entrepreneurship:** Introduction - Concept – Statistical Evidence – New Age Women – Functions – Growth - Problems – Recent trends in Development of Women Entrepreneurship.
- **Unit -3: Rural Entrepreneurship:** Introduction - Meaning – Need – Rural Industrialisation in Retrospect – Problems – Development of Rural Entrepreneurship – NGOs and Rural Entrepreneurship.
- **Unit -4: Conceptual Models of Entrepreneurship:** Introduction - Models of John Kao – Udai Pareek and Nadakarni– NISIET.

#### **Block II**

- **Unit – 5: Factors Affecting Entrepreneurial Growth And Competencies:** Introduction - Economic Factors – Non-Economic Factor – Government Actions - Entrepreneurial

Competencies: Meaning – Major Entrepreneurial Competencies – Developing Competencies.

- **Unit -6: Entrepreneurial Motivation and Mobility:** Introduction - Motivation – Motivation Theories – Motivating Factors – Achievement Motivation – Factors Influencing Mobility – Occupational Mobility – Locational Mobility.
- **Unit – 7: Entrepreneurship Development Programmes:** Introduction - Need for EDPs - Objectives of EDPs – Course Contents and Curriculum of EDPs – Phases of EDPs – Evaluation of EDPs.
- **Unit -8: Institutional Support System for Entrepreneurship:** Introduction - DICs – SISIs – SIDCOs – NISIET – EDIT – NIESBU – TCOs- A Broad Overview of Central and State Level Financing Institutions.

### **Books Recommended for Reference**

- a. Vasanth Desai, The Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House.
- b. A. N Desai, Entrepreneurship Management, Ashish Publishing House.
- c. Chandra Prasanna, Project Preparation, Appraisal and Implementation, Tata McGraw Hill.
- d. Khanka, S.S, Entrepreneurial Development, S. Chand Publications.
- e. Prasanna Chandra, Projects: Planning, Analysis, Selection, Implementation and Review, Tata McGraw Hill.

## **DEPARTMENT - MANAGEMENT**

### **E-COMMERCE**

**Credits: 2**

#### **Module 1: E-commerce and its Technological Aspects:**

Overview of developments in Information Technology and Defining E-Commerce: The scope of E commerce, Electronic Market, Electronic Data Interchange, Internet Commerce, Benefits and limitations of E-Commerce, Produce a generic framework for E-Commerce, Architectural framework of Electronic Commerce, Web based E Commerce Architecture.

**Module 2: Electronic Data Interchange:** Benefits of EDI, EDI technology, EDI standards, EDI communications, EDI Implementation, EDI Agreements, EDI Security. Electronic Payment Systems, Need of Electronic Payment System: Study and examine the use of Electronic Payment system and the protocols used, Study Electronic Fund Transfer and secure electronic transaction protocol for credit card payment. Digital economy: Identify the methods of payments on the net – Electronic Cash, cheques and credit cards on the Internet.

#### **References:**

1. Elias. M. Awad, " Electronic Commerce", Prentice-Hall of India Pvt Ltd.
2. Ravi Kalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley.
3. Efraim Turban, Jae Lee, David King, H.Michael Chung, “Electronic Commerce–A Managerial Perspective”, Addison-Wesley.
4. Elias M Award, “Electronic Commerce from Vision to Fulfilment”, 3rd Edition, PHI, Judy Strauss, Adel El-Ansary, Raymond Frost, “E-Marketing”, 3RDEdition, Pearson Education

# DEPARTMENT - BIO CHEMISTRY

## Basics of Bioorganic chemistry for Biology graduates.

Introduction to Organic chemistry: Classification of organic compounds, unique characteristics, IUPAC nomenclature of organic compounds (including bifunctional).

Reaction mechanisms: Classification of organic reactions: substitution, addition, elimination and rearrangement with one example for each. Concepts of the following – carbon anions, carbon cations, free radicals, carbenes, nucleophiles and electrophiles.

Cycloalkanes: Reactivities and relative stability, Bayer's strain theory. Sachse-Mohr theory. Boat and chair form of cycloalkanes. Axial and equatorial bonds.

Arenes: Structure of Benzene—resonance and molecular orbital theories. Aromaticity. Mechanism of Nitration and Friedel-Craft's reaction. Electronic interpretation of the orienting influence of substituents in the electrophilic substitution of Toluene, Chlorobenzene, Nitrobenzene and Phenol. Polynuclear hydrocarbons—Resonance structures of Naphthalene, Anthracene and phenanthrene.

S<sub>N</sub>1 and S<sub>N</sub>2 reactions, mechanism with an example for each. Concept of elimination reactions. Example –n-butyl chloride.

Alcohols: Classification, monohydric, alcohols-distinguishing reactions for primary, secondary and tertiary alcohols.

Trihydric alcohols: Glycerol, Properties, (KHSO<sub>4</sub>, HNO<sub>3</sub>, Oxalic acid and HI)

Phenols: Acidity of phenols, Effect of substitution on acidity

Stereochemistry: Stereoisomerism, types, Fischer-projection formulae, asymmetric carbon atom, molecular dissymmetry, chirality, optical isomerism: ex. Glyceraldehyde, Lactic acid, Tartaric acid. Nomenclature of enantiomers. D- and L- system, Racemisation and resolution.

Heterogeneous and Homogenous hydrogenation of oils.

### Selected References:

1. Basic Principles of Organic Chemistry, Roberts and Caserio, W. A. Benjamin, Inc. (1964).
2. Organic Chemistry, Morrison and Boyd, Allyn and Bacon Inc (1992).
3. Principles of Inorganic chemistry by Cotton & Wilkinson, Wiley (1999).
4. Textbook of Organic chemistry by Ahluwalia V K & Madhuri G Narosa publications (2001).
5. Physical chemistry by Castellan G W, Narosa Publications (2004).
6. Physical chemistry by Chakraborty D K, Narosa Publications (2004).

# DEPARTMENT - BIOTECHNOLOGY

## **MBT EL-2 FUNDAMENTAL OF BIOTECHNOLOGY**

Scope and Introduction to Biotechnology History & Introduction to Biotechnology What is Biotechnology? Definition of Biotechnology, Traditional and Modern Biotechnology, Branches of Biotechnology

Plant, Animal Biotechnology, Marine Biotechnology, Agriculture, Healthcare, Industrial Biotechnology, Pharmaceutical Biotechnology, Environmental Biotechnology.

Applications Biotechnology Applications of Biotechnology in Agriculture : GM Food, GM Papaya, GM Tomato, Fungal and Insect Resistant Plants BT Crops, BT Cotton and BT Brinjal Pros and Cons Biotechnological applications in Crop and Livestock Improvements Modifications in Plant Quality Golden Rice, Molecular Pharming, Plant Based Vaccines Ethics in Biotechnology and IPR 15 lectures

Food and Fermentation Biotechnology Food Biotechnology Biotechnological applications in enhancement of Food Quality Unit Operation in Food Processing Quality Factors in Pre processed Food Deterioration and its Control Rheology of Food Products Microbial role in food products Yeast, Bacterial and other Microorganisms based process and products Fermentation Technology Definition, Applications of Fermentation Technology Microbial Fermentations Overview of Industrial Production of Chemicals (Acetic Acid, Citric Acid and Ethanol), Antibiotics, Enzymes and Beverages

Molecular Biology - Replication DNA Replication in Prokaryotes and Eukaryotes Semi-conservative DNA replication, DNA Polymerases and its role, E.coli Chromosome Replication, Bidirectional Replication of Circular DNA molecules. Rolling Circle Replication, DNA Replication in Eukaryotes DNA Recombination – Holliday Model for Recombination Transformation

Mutation and DNA Repair Definition and Types of Mutations. Mutagenesis and Mutagens. ( Examples of Physical, Chemical and Biological Mutagens) Types of Point Mutations, DNA REPAIR Photo reversal, Base Excision Repair, Nucleotide Excision Repair, Mismatch Repair, SOS Repair and Recombination Repair.

Genetic Engineering Experimental evidences for DNA and RNA as Genetic Material. Genetic Engineering in Ecoli and other Prokaryotes, Yeast, Fungi and Mammalian Cells Cloning Vectors-Plasmids ( pBR 322, pUC) Vectors for Plant and Animal Cells, Shuttle Vectors, YAC Vectors, Expression Vectors Enzymes- DNA Polymerases, Restriction Endonucleases, Ligases, Reverse Transcriptase's, Nucleases, Terminal Transferees, Phosphatases Isolation and Purification of DNA (Genomic, Plasmid) and RNA,, Identification of Recombinant Clones

**DEPARTMENT - CHEMISTRY**

<b>Block-1</b>	<b>Title: Physical parameters of molecules</b>
<b>Unit-1</b>	Thermodynamics: First and second laws of thermodynamics. Concept of entropy and free energy, entropy as a measure of unavailable energy. Entropy and free energy changes and spontaneity of process.
<b>Unit-2</b>	Chemical kinetics: Rate and order of reaction. Factor affecting the rate of reaction. And determination Order of reaction. Energy of activation and its determination. Brief account of collision and activated complex theories.
<b>Unit-3</b>	Ionic equilibria: pH scale, buffer solutions, calculation of pH of buffer solutions, buffer capacity and buffer index, buffer mixtures.
<b>Unit-4</b>	Electrochemistry: Electrolytic conductance, specific, equivalent and molar conductance, ionic mobility and transference number, factors affecting the electrolytic conductance, Arrhenius theory of strong and weak electrolytes, assumptions of DebyeHuckel theory of strong electrolytes.

<b>Block-2</b>	<b>Title: Organic molecules</b>
<b>Unit-5</b>	Introduction to organic chemistry, atomic orbitals, sigma and pi bond formation-molecular orbital (MO) method, sp, sp <sup>2</sup> and sp <sup>3</sup> hybridization, bond length, bond dissociation energies and bond angles
<b>Unit-6</b>	Electronegativity and polarity of the bonds. Classifications and reactions of organic compounds (with examples).
<b>Unit-7</b>	Biological importance of natural products: Amino acids, proteins, carbohydrates (cellulose, starch, glycogen), lipids (fats and oils, phospholipids), nucleic acids, steroids, alkaloids, vitamins, flavonoids.
<b>Unit-8</b>	Applications of synthetic products: Dyes, drugs, polymers (plastics), soaps and detergents, pesticides and pheromones.

## **DEPARTMENT – CLINICAL NUTRITION AND DIETETICS**

**OEL - 2: NUTRACEUTICALS AND HEALTH FOODS**

**2 Credits**

### **BLOCK 1. NUTRACEUTICALS:**

Unit - 1: Introduction to Nutraceutical

Unit - 2: Use of Nutraceuticals in Traditional Health Sciences

Unit – 3: Functional Foods

Unit – 4: Development of Nutraceutical and Functional Foods

## **BLOCK 2: FUNCTIONAL FOODS AND NUTRACEUTICALS OF PLANT, ANIMAL AND MIRCIBIAL ORIGIN**

Unit - 5: Prebiotics and Probiotics

Unit - 6: Bio Active Peptides and Phyto- Chemicals

Unit - 7: Fats and Oils- Omega 3 Fatty Acids:

Unit - 8: Sugar Substitutes / Sweeteners

### **REFERENCES:**

- Tai Hu Guan, (2018), text book of Nutraceuticals and Health, Scitus Academics Publisher, Wilmington DE 19804, United States of America.
- Wildman REC, (2016), Handbook of Nutraceuticals and Functional Foods, 2nd edition, CRC Press publishers, Boca Raton, Florida (USA).
- Athapol Noomhorm, Imran Ahmad, Anil Kumar Anal (2014), Functional Foods and Dietary Supplements Processing, Effects and Health Benefits, first edition, published by John Wiley & Sons, Ltd. UK 111 River Street, Hoboken, NJ 07030-5774, USA
- Wildman REC, (2001) Handbook of Nutraceutical and Functional Foods, CRC Press, USA. Ghosh D et al, (2012) Innovations in Healthy and Functional Foods, CRC Press, USA. Pathak YV (2011) Handbook of nutraceuticals Volume 2, CRC Press, USA.

## **DEPARTMENT - COMPUTER SCIENCE**

### **ELMCS- 02: E -Commerce**

#### **BLOCK-1**

**UNIT-1:** Overview of developments in Information Technology and Defining E-Commerce: The scope of E commerce, Electronic Market, Electronic Data Interchange, Internet Commerce, Benefits and limitations of E-Commerce, Produce a generic framework for E-Commerce,

**UNIT-2:** Architectural framework of Electronic Commerce, Web based E Commerce Architecture. Consumer Oriented E Commerce E-Retailing: Traditional retailing and e retailing, Benefits of e retailing,

**UNIT-3:** Key success factors, Models of e retailing, Features of e retailing. E services: Categories of e-services, Web-enabled services, matchmaking services,

**UNIT-4:** Information-selling on the web, e entertainment, Auctions and other specialized services. Business to Business Electronic Commerce

## **BLOCK-2**

**UNIT-5: Electronic Data Interchange:** Benefits of EDI, EDI technology, EDI standards, EDI communications, EDI Implementation, EDI Agreements, EDI Security. Electronic Payment Systems, Need of Electronic Payment System:

**UNIT-6:** Study and examine the use of Electronic Payment system and the protocols used, Study Electronic Fund Transfer and secure electronic transaction protocol for credit card payment. Digital economy: Identify the methods of payments on the net – Electronic Cash, cheques and credit cards on the Internet.

**UNIT-7: Security in E Commerce** Threats in Computer Systems: Virus, Cyber Crime Network Security: Encryption, Protecting Web server with a Firewall, Firewall and the Security Policy, Network Firewalls and Application Firewalls, Proxy Server. Issues in E Commerce Understanding Ethical,

**UNIT-8: Social and Political issues in E-Commerce:** A model for Organizing the issues, Basic Ethical Concepts, Analyzing Ethical Dilemmas, Candidate Ethical Principles Privacy and Information Rights: Information collected at E-Commerce Websites, The Concept of Privacy, Legal protections Intellectual Property Rights: Types of Intellectual Property protection, Governance.

### **References:**

1. Elias. M. Awad, " Electronic Commerce", Prentice-Hall of India Pvt Ltd.
2. RaviKalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley.
3. Efraim Turban, Jae Lee, David King, H.Michael Chung, "Electronic Commerce–A ManagerialPerspective", Addison-Wesley.
4. Elias M Award, "Electronic Commerce from Vision to Fulfilment", 3rd Edition, PHI, Judy Strauss, Adel
5. El-Ansary, Raymond Frost, "E-Marketing", 3RDEdition, Pearson Education.

## **DEPARTMENT - GEOGRAPHY**

### **ELMG –02 Regional Geography of Karnataka (Credits – 2)**

#### **Block-1**

Physical setting - Location, Administrative divisions, Geology, Physiographic divisions of the Karnataka; Climate and Rivers; Soils and Vegetation; Irrigation in Karnataka, Major Multipurpose River Valley Projects, Major water problems and Issues - Yetthinahole, Linganamakki, Mekedatu, Krishna-Cauvery valley-linking Rivers.

#### **Block-2**

Agriculture - Major of Crops: Rice, Jowar, Ragi, Wheat, Oil seeds, Sugarcane, Cotton, Tobacco and Coffee; Minerals Resources - Iron ore, Manganese, Bauxite, Copper, Gold; Major Power Projects - Hydrel, Thermal and Atomic Energy power

plants; Industries - Cotton Textile, Silk Textile, Sugar, Iron and Steel, Cement and Paper industries, Industrial Regions of Karnataka; Transportation - Roads, Railway, Water way, Ports/Harbors and Airways; Population - growth, distribution and density

**References:**

1. Directorate of Information and Tourism, Government of Karnataka Karnataka State Gazetteer
2. Mallappa, P., (2014) Geography of Karnataka, Chethana book publishers, Mysuru
3. N.B.K Reddy & G.S. Murthy, (1967) Regional Geography of Mysore State
4. R.P. Misra, (1973) Geography of Mysore
5. Ranganath, (2018) Geography of Karnataka, Mysore Book House, Mysuru

## DEPARTMENT - MATHEMATICS

### Combinatorics and Graph Theory (ELMM –02) 2 Credits

**Block-I:** Permutations and Combinations, Pigeon-hole principle, Principle of inclusion and exclusion.

**Block-II:** Graphs, Vertices of graphs, Walks and connectedness, Degrees, Operations on graphs, Blocks – Cutpoints, bridges, Block graphs and Cutpoint graphs. Trees - Elementary properties of trees,

**Books for Reference:**

1. C. L. Liu – Elements of Discrete Mathematics, McGraw-Hill, 1986.
2. Kenneth H. Rosen – Discrete Mathematics and its Applications, McGraw-Hill, 2002.
3. F. Harary – Graph Theory, Addition Wesley Reading Mass, 1969.
4. N. Deo – Graph Theory With Applications to Engineering and Computer Science, Prentice Hall of India, 1987.
5. K. R. Parthasarathy – Basic Graph Theory, Tata McGraw-Hill, New Delhi, 1994.
6. G. Chartand and L. Lesniak – Graphs and Diagraphs, wadsworth and Brooks, 2nd Ed.,
7. Clark and D. A. Holton – A First Look at Graph Theory, Allied publishers.
8. D. B. West – Introduction to Graph Theory, Pearson Education Inc.,2001, 2nd Ed.,
9. J. A. Bondy and U. S. R. Murthy – Graph Theory with applications, Elsevier, 1976.

## DEPARTMENT - MICROBIOLOGY

### Microbes in Sustainable Agriculture and Development

- i. Soil Microbiology: Soil as Microbial Habitat, Soil profile and properties,
- ii. Soil formation, Diversity and distribution of microorganisms in soil.
- iii. Microbial Activity in Soil and Green House Gases- Carbon dioxide, methane, nitrous oxide, nitric oxide – production and control

- i. Mineralization of Organic & Inorganic Matter in Soil: Mineralization of cellulose, hemicelluloses, lignocelluloses, lignin and humus, phosphate, nitrate, silica, potassium .
- ii. Microbial Control of Soil Borne Plant Pathogens: Biocontrol mechanisms and ways, Microorganisms used as biocontrol agents against Microbial plant pathogens, Insects, Weeds.
- iii. Biofertilization, Phytostimulation,
- iv. Bioinsecticides: Plant growth promoting bacteria, biofertilizers – symbiotic (Bradyrhizobium, Rhizobium, Frankia),
- v. Non Symbiotic (Azospirillum, Azotobacter, Mycorrhizae, MHBs, Phosphatesolubilizers,algae),
- vi. Novel combination of microbes as biofertilizers, PGPRs
- i. Secondary Agriculture Biotechnology: Biotech feed, Silage, Biomanure, biogas, biofuels – advantages and processing parameters.
- ii. GM crops: Advantages, social and environmental aspects, Bt crops, golden rice, transgenic animals.

### References:

1. Eldor A. Paul. Soil Microbiology. Ecology and Biochemistry. VI Edition: Academic Press, (2007).
2. Eugene L. Madsen. Environmental Microbiology: From Genome to Biogeochemistry. I Edition, Wiley-Blackwell Publishing. (2008).
3. Agrios, G.N. Plant pathology. Harcourt Asia Pvt. Ltd. (2000).
4. Buchanan. B.B., Gruissem, W. and Jones, R.L Biochemistry and Molecular Biology of Plants. I.K. International Pvt. Ltd. (2000).
5. Mehrotra R S and Ashok Agrawal. Plant Pathology. Tata Mc Graw Hill ,6th reprint (2006).
6. K. S. Bilgrami, H. C. Dube. A textbook of modern pathology. 6th Edition, Vani Educational Books, a division of Vikas, (1984).
7. K.R. Aneja .Experiments in Microbiology, Plant Pathology and Biotechnology . New Age

Publications.2017

## DEPARTMENT - PHYSICS

### MP-EL2: Waves and Optics

BLOCK-A:

**Unit-1: Superposition of Two Collinear Harmonic oscillations:** linearity & superposition principle. (i) Oscillations having equal frequencies and (ii) oscillations having different frequencies (Beats).

**Unit-2: Waves Motion- General:** Transverse waves on a string, travelling and standing waves on a string, normal modes of a string, group velocity, phase velocity, plane waves, Spherical waves, wave intensity.

**Unit-3: Fluids:** Surface tension: synclastic and anticlastic surface - excess of pressure - application to spherical and cylindrical drops and bubbles. viscosity - rate of flow of liquid in a capillary tube -

Poiseuille's formula - determination of coefficient of viscosity of a liquid.

**Unit-4: Sound:** Simple harmonic motion - forced vibrations and resonance intensity and loudness of sound, intensity levels, musical notes, musical scale, acoustics of buildings: reverberation and time of reverberation, absorption coefficient, Sabine's formula - measurement of reverberation time.

BLOCK-B:

**Unit-5: Wave Optics:** electromagnetic nature of light, definition and properties of wave front, Huygen's Principle.

**Unit-6: Interference:** Interference: division of amplitude and division of wavefront. Young's double slit experiment, interference in thin films: parallel and wedge-shaped films, Newton's Rings: measurement of wavelength and refractive index.

**Unit-7: Diffraction:** Fraunhofer diffraction- single slit and double Slit, multiple slits and diffraction grating, Fresnel diffraction: half-period zones, zone plate, Fresnel diffraction pattern of a straight edge, a slit and a wire using half-period zone analysis.

**Unit-8: Polarization:** Transverse nature of light waves, plane polarized light – production and analysis, circular and elliptical polarization.

## DEPARTMENT -PSYCHOLOGY

### EL-2 Psychology in Everyday Life 2 Credits

#### Block 1: Applications of Psychology-I

Unit 1: Psychology as a Profession

Unit 2: Memory Improving Techniques

Unit 3: Stress and Emotional Management

Unit 4: Personality Development

#### Block 2: Applications of Psychology-II

Unit 5: Psychology in Educational Settings

Unit 6: Psychology in Health Setting

Unit 7: Psychology in Organizational Setting

Unit 8: Adjustment to Family and Work Place

#### References:

1. Charles G.Morris. Albert A. Maisto Psychology an Introduction , Prentice Hall. New Jersey.
2. Feldman, A. R., Understanding Psychology IV th Ed, 1996, McGraw Hill, New Delhi.
3. Morgan, King, Weisz &Schopler, Introduction to Psychology-V11 Ed,1993, Tata McGraw Hill, New Delhi.
4. Ernest R Hilgard, Richard C Atkinson ,Rita L Atkinson Introduction to Psychology Oxford Publication, New Delhi.

## DEPARTMENT -INFORMATION TECHNOLOGY

## **ELMIT –02 E-Commerce (2 Credits)**

### **Block 1: Fundamentals of E-commerce**

#### **Unit 1 : Introduction to E-commerce**

What Is E-commerce? The Difference Between E-commerce and E-business, Technological Building Blocks Underlying E-commerce: the Internet, Web, and Mobile Platform, Major Trends in E-commerce, Unique Features of E-commerce Technology

#### **Unit 2 : Types of E-commerce:**

Business-to-Consumer (B2C) E-commerce, Business-to-Business (B2B) E-commerce. Consumer-to-Consumer (C2C) E-commerce, Mobile E-commerce (M-commerce), Social E-commerce, Local E-commerce E-commerce: A Brief History, Understanding E-commerce: Organizing Themes, Academic Disciplines Concerned with E-commerce

#### **Unit 3 : E-Commerce Infrastructure**

The Internet, Technology Background , Internet – Key Technology concepts, TCP/IP, IP addresses, Domain names, DNS and URLs, Client Server Computing, Cloud computing model, Mobile platform

#### **Unit 4 : Internet and Web**

Hypertext, HTML, XML, Web servers and clients, Web browsers, Communication tools – E mail, messaging apps, online message boards, Internet Telephony

### **Block 2: Construction of E-commerce presence**

**Unit 5: E-commerce presence** – Building an e-commerce idea, Systematic approach, Choosing software and hardware, E-commerce site tools

**Unit 6: E-commerce security** E-commerce System environment, Security threats, Technology solutions

**Unit 7: E-commerce payment systems** : Management policies, E-commerce payment systems, Electronic billing presentment and payment

**Unit 8: E-commerce Business Strategies** : E-commerce business models, Major B2C Business models, B2B Business models,

#### **References:**

1. Laudon, Kenneth C., and Carol Guercio Traver. *E-Commerce 2020-2021*. Pearson, 2020.
2. Laudon, Kenneth C., and Carol Guercio Traver. *E-commerce Essentials*. Pearson, 2014

## **DEPARTMENT - BOTANY**

### **Plant Diversity and Human Welfare**

Plant Diversity and its Scope Levels of biodiversity: Genetic, Species and Ecosystem; Agrobiodiversity and cultivated plant taxa and related wild taxa.

Values and uses of Biodiversity, Methodologies for valuation, Ethical and aesthetic values, Uses of plants; Ecosystem services.

Loss of Biodiversity Loss of biodiversity- causes and implications, Hot spots of biodiversity, extinction of species, projected scenario for biodiversity loss.

Management of Plant Biodiversity Organizations associated with biodiversity management, IUCN, UNEP, WWF, UNESCO, NBPGR; Methodology for execution;

Biodiversity legislation; Information management and communication.

Conservation of Biodiversity, Role of Plants in Relation to Human Welfare Conservation of genetic, species and ecosystem diversity,

In situ and ex situ conservation strategies, India's biodiversity and its conservation Social approaches to conservation,

Biodiversity awareness programmes, Sustainable development.

Importance of forestry their utilization and commercial aspects; Avenue trees; Ornamental plants of India; Alcoholic beverages; Fruits and nuts; Wood and its uses; their commercial importance.

## **References**

1. Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi
2. Singh, J.S., Singh, S.P. and Gupta, S. (2006). Ecology Environment and Resource Conservation. Anamaya Publications, New Delhi, India.
3. Reddy, K.V. and Veeraiah, S. (2010). Biodiversity and Plant Resources. Aavishkar publication, New Delhi.
4. Heywood, V. H. and Watson, R. T. (1995). Global biodiversity and Assessment. Cambridge University Press.

# **DEPARTMENT –FOOD AND NUTRITION SCIENCE**

## **OEL-2: NUTRITIONAL MANAGEMENT IN DISASTER CONDITIONS**

### **BLOCK- I: NATURAL / MANMADE DISASTERS**

Unit-1: Emergency Situations-Famine, Drought, Flood, Earthquake, Cyclone, War, Civil and Political Emergencies.

Unit-2: Nutrition in Emergencies, Nutritional Problems and Communicable Diseases.

Unit-3: Feeding Programs during Emergencies.

Unit-4: Assessment and monitoring of Nutritional Status and relief measures during emergencies.

## **BLOCK- I: NUTRITIONAL RELIEF AND REHABILITATION**

Unit-5: Assessment of Food needs in emergency situations, Food Distribution Strategy, Local food rehabilitation.

Unit-6: Special Foods/ Rations for Nutritional Relief, Organizations for Mass Feeding/ Food Distribution, and Supplementary Feeding.

Unit-7: Transportation, Storage, Feeding Centres, Sanitation, Hygiene and Identifying Reaching the Vulnerable Group.

Unit-8: Public Nutrition Approach to Tackle Nutritional and Health Problems in Emergencies, food security.

### **REFERENCES:**

Jaspars, S. & Young, H. (1996), General Food Distribution in Emergencies: from Nutritional Needs to Political Priorities. Good Practice Review 3. 1996. Relief and Rehabilitation Network, Overseas Development Institute. London.

Young H., Jaspars S., Brown R., Frize J. & Khogali H (2001), Food Security and Assessments in Emergencies: A Livelihoods Approach. Humanitarian Practice Network, Overseas Development Institute. London