Details of Curriculum for Second Year Diploma in Optometry Technician

PAPER 2nd Theory	Topics	Hours.
2.Instruments and equipments used in eye.	1.Refractrometer	10Hrs
	2.Lensometer	05Hrs
	3.Keratometer	05Hrs
	4.Ophthalmoscope	10Hrs
	5.Slit Lamp	10Hrs
	6.Corneal Loupe	05Hrs
	7.Operating Microscope	05Hrs
	8.Perimeter	03Hrs
	9..Tonometer	05Hrs
	10.Gonioscope	03Hrs
	11.Pachymeter	02Hrs
	12.Exophthalmometer	02Hrs
	13.ERG, EOG, VER	05Hrs
	14.Orthoptic instruments like synoptophore etc	15Hrs
	15.A and B scan	05Hrs
	16.Retinoscopes	05Hrs
	17.Ishihra Chart	05Hrs

PAPER 2nd Theory	Topics	Hours.
3.Community ophthalmology.	Introduction	03Hrs
	National Programme for Control of Blindness	17Hrs
	National Immunization Programme	10Hrs
	Blindness : Causes and its Prevention	20Hrs

PAPER 2nd Theory	Topics	Hours.
4.Drugs used in Optometry.	1. Topical NSAIDS.	05Hrs
	2. Topical Steroids.	05Hrs
	3. Anti Glancoma drugs.	10Hrs
	4. Anti VEGF drugs.	05Hrs
	5. Cycloplegics & Mydriatics.	10Hrs
	6. Drugs used in dry eye.	10Hrs
	7. Dyes used in ophthalomology.	05Hrs
	8. Topical Antimicrobials.	10Hrs

Curriculum
for
Practical :- Second Year
Diploma in Optometry Technician

	Topics
Practical	• Hands on training of slit lamp biomicroscope examination.
	• Hands on training of Gonioscopy.
	• Hands on training of Applanation tonometry.
	• Hands on training of Syringing.
	• Hands on training of Perimetry.
	• Hands on training of Keratometry, A scan.
	• Hands on training of B Scan.
	• Hands on training of Direct ophthalmoscopy.
	• Hands on training of Indirect Ophthalomoscopy.
	• Hands on training of assistance in Common Ocular surgeries.
	• Hands on training of Fundus Camera & FFA.

Era University

CURRICULUM & EVALUATION SCHEME

OF

BACHELOR OF OPTOMETRY (B.OPTOM) OLD

SYLLABUS

[APPLICABLE W.E.F. ACADEMIC SESSION 2019-23**]**

ERA UNIVERSITY
Hardoi Road, Lucknow, Uttar Pradesh Website:
www.erauniversity.in

About Optometry:

The Ministry of Health and Family Welfare, accepted in its entirety the definition of an allied and healthcare professional based on the afore-mentioned report, though the same has evolved after multiple consultations and the recommended definition is now as follows-

> 'Allied and healthcare professionals (AHPs) includes individuals involved with the delivery of health or healthcare related services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person('s) physical, mental, social, emotional, environmental health and holistic well-being.'

Since the past few years, many professional groups have been interacting and seeking guidance on all those who would qualify under the purview of "allied and healthcare professionals". In the healthcare system, statutory bodies exist for clinicians, nurses, pharmacists and dental practitioners; but a regulatory structure for around 50 professions is absent in India. Currently, the Government is considering these professions (as listed Annex-1) under the ambit of the allied and healthcare system. However, this number is subject to changes and modifications over time, particularly considering how quickly new technologies and new clinical avenues are expanding globally, creating newer cadres of such professionals.

Scope and Need for Allied and Healthcare Professionals in the Indian Healthcare System

The quality of medical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses.1Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that allied and healthcare professionals (AHPs) are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team. For instance in the UK, more than 84,000 AHPs, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care. Australia's health system is managed not just by their doctors and nurses, but also by the 90,000 university-trained, autonomous AHPs vital to the system.

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, though the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied and healthcare professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long term treatment ensures return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being. Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:
Across the age span of human development from neonate to old age;

With patients having complex and challenging problems resulting from systemic illnesses such as, in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;

Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;

In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and

With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society.

Learning Goals And Objectives For Allied And Healthcare Professionals

The handbook has been designed with a focus on performance-based outcomes pertaining to different levels. The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various levels of qualification and professional cadres:

1. Clinical care
2. Communication
3. Membership of a multidisciplinary health team
4. Ethics and accountability at all levels (clinical, professional, personal and social)
5. Commitment to professional excellence
6. Leadership and mentorship
7. Social accountability and responsibility
8. Scientific attitude and scholarship (only at higher level- PhD)
9. Lifelong learning

ERA UNIVERSITY

Study of Evaluation Scheme
Of
Bachelor of Optometry (B.Optom)

Programme : **Bachelor of Optometry(**B.optom)

Duration : Four years Full time(Eight semesters)
Including one year compulsory Internship

Medium : English

Minimum Required Attendance : 75%

Total Credits **: 207**

Assessment :

Internal	External	Total
30	70	100

Internal Evaluation (Theory Papers):

Class Test I	Class Test II	Class Test III	Attendance	Assignment	Total
Best two out of the three					
10	**10**	10	05	5	**30**

Evaluation of Practical/Dissertations & Project Reports:

Internal	External	Total
50	50	100

Duration of Examination:

Internal	External
1.5 Hrs	03 hrs

To qualify a course/subject the student is required to secure a minimum of 40% marks in aggregate including the semester examination and teachers continuous evaluation. (i.e. both internal and external). A candidate who secures less than 40% of marks in a course shall be deemed to have failed in that course. The student should have secured at least 50% marks in aggregate to clear the semester. The subject marked with asterisk (*) in Semester-I &II are noncore papers.

Eligibility for admission:

Selection procedure:

1. He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks in Physics, Chemistry, Biology

OR

Diploma in Optometry after completing 12th class/ 10 +2 of CBSE or equivalent with minimum aggregate of 50% marks in physics chemistry and biology provided the candidate has passed in each subject separately.

2. Candidates who have studied abroad and have passed the equivalent qualification as determined by the Association of Indian Universities will form the guideline to determine the eligibility and must have passed in the subjects: Physics, Chemistry, Biology and English up to 12th Standard level.
3. Candidates who have passed the Senior Secondary school Examination of National Open School with a minimum of 5 subjects with any of the following group subjects.

A. English, Physics, Chemistry, Botany, Zoology

B. English, Physics, Chemistry, Biology and any other language

4. He/she has attained the age of 17 years as on - (current year) & maximum age limit is 30 years.
5. He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.
6. Admission to B.Opto course shall be made on the basis of eligibility and an entrance test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.

A. Entrance test, to be conducted by the university as per the syllabus under 10 +2 scheme of CBSE, subject-wise distribution of questions will be as 30% in Physics, 30% in biology, 30% in Chemistry, 5% in English (Language & Comprehension) and 5% in General Awareness about health related methods.

B. . Successful candidates on the basis of written Test will be called for the interview & shall have face an interview board. The interview board will include the Head of the Department of medical imaging (Chairman of the Board) along with the Principal / chief faculty as well

as Chief of MRIT apart from other nominees, whose recommendations shall be final for the selection of the students..

C. During subsequent counseling (s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.

D. Candidate who fails to attend the Medical Examination on the notified date(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.

E. The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course will be struck off from the college rolls without giving any notice.

Provision of Lateral Entry:

Lateral entry to second year for allied and healthcare science courses for candidates who have passed diploma program from the Government Boards and recognized by State/Central University, fulfilling the conditions specified and these students are eligible to take admission on lateral entry system only if the same subject have been studied at diploma level.

Duration of the course

Duration of the course: 4 years or 8 semesters including1440 hours of internship.

Medium of instruction:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

General information:

1. Attendance:

A candidate has to secure minimum 80% attendance in overall with at least-

A. 75% attendance in theoretical

B. 75% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

2. Assessment:

Assessments should be completed by the academic staff, based on the compilation of the student's theoretical & clinical performance throughout the training programme. To achieve this, all assessment forms and feedback should be included and evaluated. Student must

attain at least 40% marks in each Theory, Internal assessment and Practical independently / separately for each individual subject.

>70% Distinction

60%-First Division

50-59% Second Division

40-49% Third Division

3. Aggregate passing marks 40%.
4. Practical exam must be completed within 15 days after the theory exam.
5. 15 Days summer vacation and 7 days winter vacation.
6. A candidate who is fails in all subject will be termed as year back and if candidate passes in 50% of subject then he will be promoted in next semester and if candidate passes his/her in all subject then it will be termed as all clear.
7. Abbreviation used:

   L- Lecture

   P-Practical

   T-Tutorial

   H-Hospital posting

INTERNSHIP

Internship is a phase of training where a student is expected to conduct actual practice of clinical optometry and acquire skills under supervision so that he/she may become capable of functioning independently.

INTERNSHIP DURATION: ONE YEAR

Every candidate will be required after successfully completing the final Bachelor in Optometry Examination, to undergo compulsory rotator internship to satisfaction of the University for a period of 6 months so as to be eligible for the award of the degree.

The University shall issue a provisional degree of Bachelor in Optometry on passing the final examination after the completion of internship on demand by the candidate.

The internee shall be entrusted with optometry responsibilities under direct supervision of Senior Optometrist. They shall not be working independently.

Internee will not issue certified copy of investigation reports or other related documents under their signature.

ASSESMENT OF INTERNSHIP

The Internee shall maintain the record of work, which is to be verified and certified by the senior Optometrist under whom he/she works. Apart from scrutiny of record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during at the end of training. Based on the record of work and date of evaluation The Director/Principal shall issue certificate for satisfactory completion of training following which the university shall award the degree of Bachelor in Optometry to the candidate.

- Satisfactory completion shall be determined on the basis of the following.
- Proficiency of knowledge required for each Optometry techniques.
- The competency and skills expected to manage each optometry technique.
- Responsibility, punctuality works up of optometry techniques, involvement in special procedures and preparation of reports.
- Capacity to work in a team (behavior with colleagues, nursing staff and relationship with medical and paramedical).
- Initiating, **participating** in discussions and developing research aptitude.

- Only 12 leaves are allowed to an internee during the period of his/her internship. If he/she extend his/her leave in the duration of internship, the period the internship shall be extended by double the days for which the student was absent.

Leave Rule

Summer Vacation: - 15 Days

Winter Vacation: - 7 Days

Preparation Leave: - 7 Days

Internship Log Book

The Log Book Submitted by the candidate will be duly verified & a viva voce shall be conducted on the same at the time of Practical Examination of final year.

S.N.	TOPIC	NO. OF CASES
1	Clinical Observation and Report writing	5
2	Visual Acuity – Distance + Near	5
3	History taking General Specific Conditions	5
4	Visual Acuity – Distance + Near (log MAR) Pinhole acuity	5
5	Extra ocular Motility	5
6	Cover test	5
7	Push up test (Amplitude of Accommodation)	5
8	Push up test (Near point of Convergence)	5
9	Stereopsis test	5
10	Tear Break up time	5
11	Amsler's Grid test	5
12	Color vision test	5
13	Schirmer's test	5
14	Confrontation visual field test	5
15	Slit lamp examination	5
16	Digital tonometry	5
17	Schiotz Tonometry	5
18	Von Herick Grading of Anterior chamber depth	5
19	Accommodative facility(+ 2.00 D)	5
20	Corneal Sensitivity test	5
21	IPD measurement	5
22	Proptosis evaluation	5
23	Ptosis evaluation	5
24	Pupillary evaluation Direct Consensual RAPD	5
25	Maddox rod (Phoria)	5

26	Retinoscopy- Static, Dynamic and Cycloplegic Retinoscopy	5
27	Keratometry	5
28	Subjective Refraction JCC Duo chrome	5
29	Visual Field chart interpretation	5
30	B scan observation	5
31	A scan chart Interpretation	5
32	Case Analysis	5
33	Contact Lens	5
34	Low Vision care Clinic	5
35	Binocular Vision clinic	5
36	Ophthalmology clinic (Common eye conditions)	10

Programme Structure 2018

Bachelor of Optometry (Total Credits - 207)

B.Optom Semester- I (First Year)

S.No	Course code	Subject	Periods			Actual Hours	Credit	Evaluation Scheme		
			L	T	P			Internal	External	Total
1	BOPT101	General Anatomy	3	-	2	5	4	30	70	100
2	BOPT102	General Physiology	3	-	2	5	4	30	70	100
3	BOPT103	General Bio Chemistry	2	-	2	4	3	30	70	100
4	BOPT104	Geometrical Optics I	3	-	2	5	4	30	70	100
5	BOPT105	Nutrition	2	-	-	2	2	30	70	100
6	BOPT106	* English Communication & Soft Skills -1	3	-	2	5	4	30	70	100
7	BOPT107	Computer Fundamentals, Internet, & Ms-Office	2		2	4	3	30	70	100
		Total	**18**		**12**	**30**	**24**	**210**	**490**	**700**

B.Optom Semester- II (First Year)

S.No	Course code	Subject	Periods			Actual Hours	Credit	Evaluation Scheme		
			L	T	P			Internal	External	Total
1	BOPT201	Ocular Anatomy	3	-		3	3	30	70	100
2	BOPT202	Ocular Physiology	3	-		3	3	30	70	100
3	BOPT203	Ocular biochemistry	2	-	2	4	3	30	70	100
4	BOPT204	Physical Optics	2	-	2	4	3	30	70	100
5	BOPT205	Geometrical Optics II	2	-	2	4	3	30	70	100
6	BOPT206	Computer Fundamentals, Internet, & Ms-Office	2	-	2	4	3	30	70	100
7	BOPT207	*English Communication & Soft Skills – II	3	-	-	3	3	30	70	100
8	BOPT208	Clinical Optometry I	-	-	6	6	3	50	50	100
9	BOPT209	Summer Internship	-	-	-		2	50	50	100
		Total Credit	**17**		**14**	**31**	**26**	**310**	**590**	**900**

B.Optom Semester- III (Second Year)

S.No	Course code	Subject	Periods			Actual Hours	Credit	Evaluation Scheme		
			L	T	P			Internal	External	Total
1	BOPT301	Ocular Microbiology	2	-	-	2	2	30	70	100
2	BOPT302	Visual Optics- I	2	-	-	2	2	30	70	100
3	BOPT303	Optometric Optics – I	2	-	2	4	3	30	70	100
4	BOPT304	Optometric Instruments	2	-	2	4	3	30	70	100
5	BOPT305	Ocular Diseases – I	3	-		3	3	30	70	100
6	BOPT306	Clinical Examination Of Visual System	2	-	-	2	2	30	70	100
7	BOPT307	Indian Medicine and Telemedicine	2	-	-	2	2	30	70	100
8	BOPT308	Environmental Sciences	3	-	-	3	3	30	70	100
9	BOPT309	Clinical Optometry II			6	6	3	50	50	100
		TOTAL	18		10	28	23	290	610	900

B.Optom Semester- IV (Second Year)

S.No	Course code	Subject	Periods			Actual Hours	Credit	Evaluation Scheme		
			L	T	P			Internal	External	Total
1	BOPT401	Optometric Optics –II &Dispensing Optics	2	-	2	4	3	30	70	100
2	BOPT402	Visual Optics II	3		-	3	3	30	70	100
3	BOPT403	Ocular Disease – II	3	-	-	3	3	30	70	100
4	BOPT404	Pathology	2	-	-	2	2	30	70	100
5	BOPT405	Basic And Ocular Pharmacology	3			3	3	30	70	100
6	BOPT406	Introduction To Quality And Patient Safety	2	-	-	2	2	30	70	100
7	BOPT407	Medical Psychology	2	-	-	2	2	30	70	100
8	BOPT48	Clinical Optometry III	-	-	8	8	4	50	50	100
9	BOPT419	Summer Internship	-	-			2	50	50	100
		TOTAL	17		10	27	24	310	590	900

B.Optom Semester- V (Third Year)

S.No	Course code	Subject	Periods			Actual Hours	Credit	Evaluation Scheme		
			L	T	P			Internal	External	Total
1	BOPT501	Contact Lens – I	3	-	2	5	4	30	70	100
2	BOPT502	Low Vision Care	2	-	2	4	3	30	70	100
3	BOPT503	Geriatric Optometry & Pediatric Optometry	3	-	2	5	4	30	70	100
4	BOPT504	Binocular Vision – I	3	-	-	3	3	30	70	100
5	BOPT505	Systemic Disease	3	-	-		3	30	70	100
6	BOPT506	Research Methodology & Biostatistics	3	-	4	4	4	30	70	100
7	BOPT507	Clinical Optometry IV	-	-	8	8	4	50	50	100
		Total	**17**		**18**	**29**	**25**	**230**	**470**	**700**

B.Optom Semester- VI (Third Year)

S.No	Course code	Subject	Periods			Actual Hours	Credit	Evaluation Scheme		
			L	T	P			Internal	External	Total
1	BOPT601	Contact Lens – II	3	-	2	5	4	30	70	100
2	BOPT602	Binocular Vision – II	3	-	2	5	4	30	70	100
3	BOPT603	Public Health And Community Optometry	2	-	-	2	2	30	70	100
4	BOPT604	Practice Management	2	-	-	2	2	30	70	100
5	BOPT605	Occupational Optometry	2	-	-	2	2	30	70	100
6	BOPT606	Medical Law And Ethics	2	-	-	2	2	30	70	100
7	BOPT607	Research Project 1	3	-		3	3	50	50	100
8	BOPT608	Clinical Optometry V	-	-	8	8	4	50	50	100
9	BOPT609	Summer Internship	-	-	-		2	50	50	100
		TOTAL	**14**		**16**	**29**	**24**	**390**	**510**	**900**

B.Optom Semester- VII (Fourth Year)

S.NO	CODE	COURSE	L	T	P	C
1	BOPT701	INTERNSHIP I	0	0	25	25
2	BOPT702	RESEARCH MID TERM REVIEW	5	0	0	05
		TOTAL	**0**	**0**	**30**	**30**

B.Optom Semester- VIII (Fourth Year)

S.NO	CODE	COURSE	L	T	P	C
1	BOPT801	INTERNSHIP-2	0	0	30	15
2	BOPT802	Desertation	0	0	0	15
		TOTAL	**0**	**0**	**30**	**30**

FIRST SEMESTER

COURSE/PAPER -GENERAL ANATOMY

PAPER CODE: BOPT101

L	T	P	C
3	-	2	4

Learning Objective- To enable the students to develop the basic concept of gross, functional and applied anatomy of various structures as well as identification of microscopic structures of various tissues and organs of the human body.

UNIT -1

Organization and general plan of the body: Levels of Organization, Metabolism and Homeostasis, Terminology and General Plan of the Body, Body Parts and Areas, Terms of Location and Position, Body Cavities and Their Membranes, Dorsal cavity, Ventral cavity, Planes and Sections

UNIT -2

Cells: Structure, function and location, Prokaryotic and eukaryotic cells, Cell organelles, Cell division, Tissue, Types, Structure, Location and Function of Epithelial Tissue, Connective Tissue, Muscle Tissue, Nerve Tissue, Membranes, Glandular tissue, The Integumentary System: structure and function of The Skin, Subcutaneous Tissue

UNIT –3

The Skeletal System: Functions of the Skeleton, Types of Bone Tissue, Classification of Bones, Embryonic Growth of Bone, Factors That Affect Bone Growth and Maintenance, The Skeleton, types of joints and movement

The Muscular System: Muscle Structure, Energy Sources for Muscle Contraction, Muscle Fiber

Muscle Contraction—the Sliding Filament Mechanism, Major Muscles of the Body.

UNIT –4

The Nervous System -Nervous System Divisions, Nerve Tissue, Types of Neurons, Nerves and Nerve Tracts, The Nerve Impulse, The Spinal Cord, The Brain, Meninges and Cerebrospinal Fluid, Cranial Nerves, The Autonomic Nervous System and its function

The Senses Sensory Pathway, Characteristics of Sensations, Cutaneous Senses, Muscle Sense, Sense of Taste, Sense of Smell, Hunger and Thirst, the Eye, the Ear

UNIT-5

The Endocrine System -Chemistry of Hormones, Regulation of Hormone Secretion, The Pituitary Gland, Thyroid Gland, Parathyroid Glands, Pancreas, Adrenal Glands, Ovaries, Testes, Other endocrine glands
Embryology: Spermatogenesis, Oogenesis, Gametogenesis, Ovulation and fertilization.

PRACTICAL: Practical demonstration of each organ using specimen. If specimen for certain organs are not available, then videos can be shown to make the student understand the anatomic structures
Course/Paper: General Anatomy Practical

Learning Outcome- At the end of the course the student will develop the sense of co-relation between different anatomical structures on the basis of its location and functional aspects.

Course Contents:

Demonstration of -

1. Major organs through models and permanent slides.
2. Parts of circulatory system from models.
3. Parts of respiratory system from models.
4. Digestive system from models.
5. Excretory system from models.
6. Nervous system from models.
7. Structure of eye and ear
8. Structural differences between skeletal, smooth and cardiac muscles.
9. Various bones
10. Various joints
11. Various parts of male & female reproductive system from models

TEXT BOOKS:-

1. Mariano S.H. Difiore: Atlas of Human Histology, 5th Ed. 1981, Lea and Feliger.
2. G.J. Tortora & N.P Anagnostakos: Principles of Anatomy and Physiology. (recent edition)
3. B.D. Chaurasia: Handbook of General Anatomy, 2nd Ed., CBS

Publishers and Distributors, New Delhi - 110 032.

REFERENCE BOOKS:-

1. Peter L. Williams And Roger Warwick: - Gray's Anatomy - Descriptive and Applied, 36th Ed., 1980, Churchill Livingstone.

2. T.S. Ranganathan: Text book of Human Anatomy, 1982, S. Chand & Co., New Delhi 110 055.

3. Inderbir Singh: Human Embryology, 3rd Ed., Macmillan India, 1981.

4. R. Kanagasuntharam, P. Sivananda-Singham & A. Krishnamurti:

5. Anatomy- Regional, Functional, & Clinical, P.G. Publisher, Singapore 1987.

FIRST SEMESTER

COURSE/PAPER- GENERAL PHYSIOLOGY-I

COURSE CODE: BOPT102

L	T	P	C
3	-	2	4

Learning Objective- To enable the students to understand the normal functioning of various organ systems of the body and their interactions.

UNIT-1

Cell physiology: Organization of the Body, Body Composition, Measurement of Body Fluid Volumes, Plasma Volume, Total Blood Volume, & Red Cell Volume, Diffusion, Osmosis, Tonicity

UNIT-2

Gastrointestinal physiology: Organs of GIT and their structure & function, secretion, digestion, absorption and assimilation, gastrointestinal hormones, physiology of digestion of carbohydrates, proteins & lipids, Structure & function of liver, spleen, gall bladder & pancreas, Jaundice, Cirrhosis & Pancreatitis

Respiratory system: parts of respiratory system, mechanism of respiration, pulmonary function, pulmonary circulation, lungs volume, and gas transport between lungs and tissues, respiratory adjustments in health and diseases.

UNIT-3

Cardiovascular and lymphatic system: heart structure and function, blood vessels and valves, mechanism of circulation, cardiac cycle, heart sounds, heart rate, pulse rate, blood pressure. Blood, its composition and function, function of RBC, WBC & platelets, Lymphatic system: lymph, its composition and function, lymphatic tissue

Organs of Excretory System: kidneys, nephron, Mechanism of Excretion Urine formation (glomerular filtration and tubular reabsorption) Electrolytes: their balances and imbalances. Acid-base balance. Acidosis and Alkalosis

UNIT- 4

Musculo-skeletal system: Muscles structure, types of muscles, mechanism of contraction, major muscles of the body,, classification of bones , structure of bones, hormones involved in bone growth, types of joints, Arthritis, Gout, Osteoporosis

Nervous system and special senses: organization of the nervous system, Structure & Properties of Neuron ,Cell bodies, Axons, Dendrites, Nerve Impulse, Type of Nerves, Central Nervous System including Brain & Spinal Cord. Peripheral Nervous System & autonomic nervous system.

Structure and function of eye, ear, tongue and nose.

Endocrine System: Structure, function, regulation & secretion of the following glands, hypothalamus, pituitary, pineal, thyroid, parathyroid, adrenal, thymus, pancreas, testes and ovary. Basic concepts about hypo and hyper secretion of hormones and their diseases

UNIT-5

Structure and function of male and female reproductive organ, function of testicular and ovarian hormones. Gametogenesis (oogenesis and spermatogenesis), menstrual cycle, implantation, pregnancy, menopause and various contraceptive measures

Body fluids and their significance: Important terms, types of body fluid, total body water, general principles for fluid balance, cardinal principle, Homeostasis through fluid maintenance, Electrolytes & ions, Function of electrolytes.

Practical

Learning Outcome- At the end of the course the student will be able to explain the physiological aspects of normal growth and development describe the physiological response and adaptations to environmental stresses and know the physiological principles underlying pathogenesis of disease.

1. To measure pulse rate
2. To measure blood pressure
3. Demonstration of ECG
4. To perform Hemoglobin by CMG method.
5. To perform Total RBC count.
6. To perform total leucocyte count.
7. To perform differential leucocyte count.
8. To perform PCV
9. To calculate Red cell indices

TEXT BOOKS:-

1. L Prakasam reddy, Fundamentals of Medical Physiology, 4th Edition, Paras medical Publisher, Hyderabad, 2008

2. Sujit K. Chaudhuri, Concise Medical Physiology, 6th edition, New Central Book Agency, Kolkata, 2008

REFERENCE BOOKS:-

1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition,CBS Publishers, New Delhi, 2006

2. A C Guyton: Text book of Medical Physiology, 8th edition, saunders company, Japan,

3. G J Tortora, B Derrickson: Principles of anatomy & physiology,11th edition, Harper & Row Publishers, New York

4. John Wiley & Sons Inc, New Jersey, 2007

FIRST SEMESTER

COURSE/PAPER - GENERAL BIOCHEMISTRY

PAPER CODE: BOPT103

L	T	P	C
3	-	2	4

Learning Objective- To enable the students to understand the Structure, function and inter-relationship of bimolecules and consequences of deviation from normal.

UNIT 1

Carbohydrates-

Glucose; fructose; galactose; lactose; sucrose; starch and glycogen (properties and tests, Structure and function)

UNIT 2

Proteins –

Amino acids, peptides, and proteins (general properties & tests with a few examples like glycine, trytophan, glutathione, albumin, hemoglobin, collagen)

UNIT 3

Lipids-

Fatty acids, saturated and unsaturated, cholesterol and triacyglycerol, phospholipids and plasma membrane

UNIT 4

Vitamins

General with emphasis on A,B2, C, E and inositol (requirements, assimilation and properties)

UNIT 5

Minerals--Na, K, Ca, P, Fe, Cu and Se.(requirements, availability and properties)

Practical

Learning outcome- At the end of the course, the students should be able to demonstrate his knowledge and understanding on various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data.

1. Reactions of monosaccharides, disaccharides and starch:

i.Glucose Fructose
ii .Galactose Maltose, lactose
iii.Sucrose Starch

2. Analysis of Unknown Sugars

Estimation:

i.Photometry Biofluid of choice – blood, plasma, serum

ii.Standard graphs Glucose

iii. Proteins Urea

iv.Creatinine Bilirubin

TEXT BOOK:

1. S. Ramakrishnan: Essentials of biochemistry and ocular biochemistry, Annamalai University Publications, Chidambaram, India, 1992

REFERENCE BOOKS:

1. S. Ramakrishnan, K G Prasannan and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990

2. D.R. Whikehart: Biochemistry of the Eye, 2ndedition, Butterworth Heinemann, Pennsylvania, 2003

FIRST SEMESTER

COURSE/PAPER - GEOMETRICAL OPTICS I

PAPER CODE: BOPT104

L	T	P	C
3	-	2	4

Learning Objective- The objective of this course is to equip the students with a thorough knowledge nature of light, and properties of mirrors and lenses.

UNIT 1

Nature of light- light as electromagnetic oscillation; speed of light in vacuum and other media;.Wavefronts spherical, elliptical and plane.

Reflection and refraction of light- laws of reflection and refraction. Total internal reflection.

Refractive index -Its relation with wavelength, Fermat's and Huygen's Principle, Derivation of laws of reflection and refraction (Snell's law) from these principles

UNIT 2

- Plane mirror and spherical mirror- convex and concave mirror
- Reflection by a spherical mirror
- paraxial approximation; sign convention
- Imaging by concave mirror and convex mirror
- Reflectivity; transmissivity ; Snell's Law, Refraction at a plane surface Glass slab

UNIT 3

Definition of crown and flint glasses; materials of high refractive index

Prism- Angle of prism; deviation produced by a prism; refractive index of the prism , definition of Prism dioptre and application of prism.

Dispersion - Angular dispersion; dispersive power

UNIT 4

- Vergence of light – convergence and divergence

- Vergence at a distance formula ; effectivity of a refracting surface Image formation by a lens by application of vergence at a distance formula ,definitions of front and back vertex powers; equivalent power; first and second principal planes/points; primary and secondary focal planes/points; primary and Secondary focal lengths. Newton's formula linear magnification; angular magnification

UNIT 5

- Imaging by a thin convex lens and thin concave lens; image properties (real/virtual; erect/inverted magnified/minified) for various object positions
- System of two thin lenses; review of front and back vertex powers and equivalent Power, review of six cardinal points.
- System of more than two thin lenses; calculation of equivalent power using magnification formula

Practical

Learning Outcome- At the end of the course, the students will be able to differentiate between

Different types of the lenses and different lens system with their application.

1. Thick Prism – determination of prism angle and dispersive power; calculation of the refractive index
2. Thin Prism – measurement of deviation; calculation of the prism diopter
3. Image formation by spherical mirrors
4. Convex lens - power determination using lens gauge, power determination using distant object method; power determination using the Vergence formula
5. Concave lens – in combination with a convex lens – power determination

TEXT BOOK:

1. Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

REFERENCE BOOKS:

1. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
2. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

FIRST SEMESTER

COURSE/PAPER - NUTRITION

PAPER CODE : BOPT105

L	T	P	C
2	-	-	2

Learning Objective- To enable the students to understand the basic aspects of Nutrition for good health. It also includes nutrients & nutrient derivatives relevant to health, nutrition deficiency and disease. At the end of this course, the student will gain the knowledge of Balanced Diet, Protein, Carbohydrates, Vitamins, minerals, etc.

UNIT 1

Introduction- History of Nutrition as a science Food groups, RDA Balanced diet, diet planning. Assessment of nutritional , status

Energy-Units of energy and value of food Measurements Energy expenditure, Total en energy/calorie requirement for different age groups and diseases. Limitations of the daily food guide. Satiety value

UNIT 2

Proteins - Sources and functions, Essential and non- essential amino- acids Incomplete and complete proteins, Supplementary foods. PEM and the eye, Nitrogen balance, Changes in protein requirement

Fat- Sources and function, Essential fat, Excess and deficiency, Lipids and the eye. Hyperlipidemia, heart diseases, atherosclerosis.

UNIT 3

Minerals-General functions and sources, Macro and micro minerals associated with the eye. Deficiencies and excess –ophthalmic complications (e.g. iron, calcium, iodine etc.)

UNIT 4

Vitamin, General functions, and food sources, Vitamin deficiencies and associated eye

disorders with particular emphasis to Vitamin A, Promoting sound habits in pregnancy, lactation and infancy. Nutrient with antioxidant.

Properties-Digestion of Proteins, carbohydrates & lipids

UNIT 5

Essential amino acids and Miscellaneous

Measles and associated eye disorders, low birth weight

TEXT BOOK:

1. M Swaminathan: Hand book of Food and Nutrition, fifth edition, Bangalore printing & publishing Co.Ltd, Bangalore, 2004
2. C Gopalan, BV Rama Sastri, SC Balasubramanian: Nutritive Value of Indian Foods,National Institute of Nutrition, ICMR, Hyderabad,2004
3. Frank Eperjesi & Stephen Beatty: Nutrition and the Eye A practical Approach, Elsevier Butterworth- Heinemann, USA, 2006

REFERENCE BOOKS:

1. No recommendation. It is left to the faculty.

FIRST SEMESTER

* COURSE/PAPER- ENGLISH COMMUNICATION & SOFT SKILLS – I

PAPER CODE: BOPT106

L	T	P	C
3	-	2	4

Objective: To comprehend and communicate in simple English.
Learning Outcome:

1. Students will realise the significance of English for their career progression
2. Benchmarking the students in the first semester to observe their progression in terms of LSRW
3. Students will be able to understand distinct sounds and improve pronunciation
4. Students will improve their English vocabulary of daily usage
5. Students will be able to form simple sentences to talk about themselves, friends and relatives.
6. Students will be able to imbibe the pre-requisites of personality development.

Module 1: Introduction to English language (4 Lectures)

a) Role and significance of English language in the present scenario

b) English Language: Its relevance for the Indian industry

c) Introduction to Listening, Speaking, Reading, Writing (LSRW) and benchmarking of the class

[Note: As part of classroom activity, a guest lecture from an industry representative/Director (CRC) and maintaining progress card for each student on LSRW for future reference]

Module -2: Phonetics& Functional Grammar (14 Lectures)

a) Pronunciation and daily usage correction (speak with differences between p/b, s/sh, f/ph, t/d, v/w sounds)

b) Parts of speech, articles, tenses, verbs and modals

c) Practice of daily use words, numerals and tongue twisters

d) Vocabulary building, Construction of simple sentences: Basic sentence pattern, subject and Predicate

[Note: As part of classroom activity, language games, tongue & jaw exercises, simple passages from the newspapers for oral drills in the classroom and practice tests (written and oral)]

Module -3: English Communication- About Myself (14 Lectures)

a) Let's talk, making conversation, meeting and greeting

b) Introducing myself, my family and my friends

c) My opinions, my likes and dislikes
d) Life at college, hostel and workplace

[Note: As part of classroom activity, use the Work book for reference for classroom and home assignments, carry out practice tests (written and oral)]

Module -4: Personality Development-I (8 Lectures)

a) First impression: Dressing sense, good manners, speaking well and respectably

b) Positive Attitude: Being happy and alert, a good listener and a good friend

c) Consultation among peers: Soliciting advice and giving advice

d) Goal setting, confidence building& handling rejection

[Note: As part of classroom activity, refer Work book for classroom and home assignments, carry out practice tests (written and oral)]

Reference Books:

ILFS Bi-lingual Course in Basic English, ILFS Skill Development Corporation English Grammar Composition & Usage by J.C. Nesfield, Macmillan Publishers The Business letters by Madan Sood, Goodwill Publishing House, New Delhi Communication Skills by Sanjay Kumar &PushpLata, Oxford University Press