FACULTY OF CHEMICAL SCIENCES

SYLLABUS

FOR

B.Sc. in Optometry

(SEMESTER – I & II)

(Under Choice based Credit System)

Examinations: 2021 Onwards

I K GUJRAL PUNJAB TECHNICAL UNIVERSITY KAPURTHALA

Note:

(i) Subject to change in the syllabi at any time. Please visit the University website time to time.

IK Gujral Punjab Technical University

VISION

To be an institution of excellence in the domain of higher technical education that serves as the fountainhead for nurturing the future leaders of technology and techno- innovation responsible for the techno-economic, social, cultural and environmental prosperity of the people of the State of Punjab, the Nation and the World.

MISSION

To provide seamless education through the pioneering use of technology, in partnership with industry and society with a view to promote research, discovery and entrepreneurship and
To prepare its students to be responsible citizens of the world and the leaders of technology and techno-innovation of the 21st Century by developing in them the desirable knowledge, skill and attitudes base for the world of work and by instilling in them a culture for seamlessness in all facets of life.

OBJECTIVES

To offer globally-relevant, industry-linked, research-focused, technology- enabled seamless education at the graduate, postgraduate and research levels in various areas of engineering & technology and applied sciences keeping in mind that the manpower so spawned is excellent in quality, is relevant to the global technological needs, is motivated to give its best and is committed to the growth of the Nation;

To foster the creation of new and relevant technologies and to transfer them to industry for effective utilization;

To participate in the planning and solving of engineering and managerial problems of relevance to global industry and to society at large by conducting basic and applied research in the areas of technologies. To develop and conduct continuing education programmes for practicing engineers and managers with a view to update their fundamental knowledge base and problem-solving capabilities in the various areas of core competence of the University;

To develop strong collaborative and cooperative links with private and public sector industries and government user departments through various avenues such as undertaking

of consultancy projects, conducting of collaborative applied research projects, manpower development programmes in cutting-edge areas of technology, etc;

To develop comprehensive linkages with premier academic and research institutions within the country and abroad for mutual benefit;

To provide leadership in laboratory planning and in the development of instructional resource material in the conventional as well as in the audio- visual, the video and computer-based modes;

To develop programmes for faculty growth and development both for its own faculty as well as for the faculty of other engineering and technology institutions;

To anticipate the global technological needs and to plan and prepare to cater to them;

To interact and participate with the community/society at large with a view to inculcate in them a feel for scientific and technological thought and endeavour; and

To actively participate in the technological development of the State of Punjab through the undertaking of community development programmes including training and education programmes catering to the needs of the unorganized sector as well as that of the economically and socially weaker sections of society.

ACADEMIC PHILOSOPHY

The philosophy of the education to be imparted at the University is to awaken the **"deepest potential"** of its students as holistic human beings by nurturing qualities of self-confidence, courage, integrity, maturity, versatility of mind as well as a capacity to face the challenges of tomorrow so as to enable them to serve humanity and its highest values in the best possible way.

TITLE OF THE PROGRAM: B.Sc. OPTOMETRY

YEAR OF IMPLEMENTATION: New Syllabus will be implemented from June 2021 onwards.

DURATION: The course shall be three years, with semester system (6 semesters, with two semesters in a year). The Choice based credit system will be applicable to all the semesters.

ELGIBILITY FOR ADMISSION: Candidates with 50% marks (5% relaxation for SC/ST) in aggregate in 10+2 with Medical (Physics, Chemistry & Biology)/ Diploma in Optometry with minimum aggregate of 50% marks.

INTAKE CAPACITY: 30 (Thirty)

MEDIUM OF INSTRUCTION: English.

SCHEME OF THE PROGRAM:

Semester-I

Sr. No.	Course Code	Course Type	Course Title	L-T-P*	Credits	Marks Distribution		Marks
						Internal	External	
1.	BOPT 101-21	Core Theory	Basics of Anatomy-I	3-1-0	4	40	60	100
2.	BOPT 102-21	Core Theory	Basics of Physiology-I	3-1-0	4	40	60	100
3.	BOPT 103-21	Core Theory	Basics of Biochemistry-I	3-1-0	4	40	60	100
4.	BOPT 104-21	Core Practical/Lab	Basics of Anatomy-I Practical	0-0-4	2	60	40	100
5.	BOPT 105-21	Core Practical/Lab	Basics of Physiology-I Practical	0-0-4	2	60	40	100
6.	BOPT 106-21	Core Practical/Lab	Basics of Biochemistry-I Practical	0-0-4	2	60	40	100
7.	BTHU 103-18	Ability Enhancement Compulsory Course (AECC)-I	English	1-0-0	1	40	60	100
8.	BTHU 104-18	Ability Enhancement Compulsory Course-(AECC)	English Practical/Laboratory	0-0-2	1	30	20	50
9.	HVPE-101-18	Ability Enhancement Compulsory Course-(AECC)	Human Values, De-addiction & Traffic Rules	3-0-0	3	40	60	100
10.	HVPE-102-18	Ability Enhancement Compulsory Course-(AECC)	Human Values, De-addiction & Traffic Rules (Lab/Seminar)	0-0-1	1	25	--**	25
11.	BMPD 102-18		Mentoring & Professional Development	0-0-1	1	25	--**	25
		Total		13-3-16	25	460	440	900

Semester-II

Sr. No.	Course Code	Course Type	Course Title	L-T-P*	Credits	Marks Distribution		Marks
						Internal	External	
1.	BOPT 201-21	Core Theory	Basics of Anatomy-I	3-1-0	4	40	60	100
2.	BOPT 202-21	Core Theory	Basics of Physiology-I	3-1-0	4	40	60	100
3.	BOPT 203-21	Core Theory	Basics of Biochemistry-I	3-1-0	4	40	60	100
4.	BOPT 204-21	Core Practical/Lab	Basics of Anatomy-I Practical	0-0-4	2	60	40	100
5.	BOPT 205-21	Core Practical/Lab	Basics of Physiology-I Practical	0-0-4	2	60	40	100
6.	BOPT 206-21	Core Practical/Lab	Basics of Biochemistry-I Practical	0-0-4	2	60	40	100
7.	EVS 102-18	Ability Enhancement Compulsory Course (AECC)	Environmental Studies	2-0-0	2	40	60	100
8.	BMPD 102-18		Mentoring & Professional Development	0-0-1	1	25	--**	25
		Total		11-3-13	21	365	360	725

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

**The Human Values, De-addiction and Traffic Rules (Lab/ Seminar) and Mentoring and Professional Development course will have internal evaluation only.

EXAMINATION AND EVALUATION

THEORY					
S.No.			Weightage in Marks		Remarks
1	Internal Evaluation	Mid-Semester Examination	30	10	MSTs, Quizzes, assignments, attendance, etc. Constitute internal evaluation. Best of two mid-semester exams will be considered for evaluation
2		Attendance	5	5	
3		Assignments	5	5	
4	External Evaluation	End-Semester Examination	60	30	Conduct and checking of the answer sheets will be at the university level.
	Total		**100**	**50**	
PRACTICAL					
1	Internal Evaluation	Daily evaluation of practical performance/ record/ viva voce	15		
2		Attendance	5		
3		Internal Practical Examination	10		
4	External Evaluation	Final Practical Examination	20		
		Total	**50**		

PATTERN OF END-SEMESTER EXAMINATION

I. **Part A** will be One Compulsory question consisting of short answer type questions [Q No. 1(a-h)] covering whole syllabus. There will be no choice in this question. It will be of 16 marks comprising of **8 questions of 2 marks each**.

II. **Part B** will be comprising of eight questions [2-9]. Student will have to attempt any six questions from this part. It will be of 24 marks with **6 questions of 4 marks each**.

III. **Part C** will be comprising of two compulsory questions with internal choice in both these questions [10-11]. It will be of 20 marks with **2 questions of 10 marks each**.

SYLLABUS OF THE PROGRAM

The syllabus has been upgraded as per provision of the UGC module and demand of the academic environment. The contents of the syllabus have been duly arranged unit wise and included in such a manner so that due importance is given to requisite intellectual and laboratory skills. The application part of the respective contents has been appropriately emphasized.

SEMESTER-I

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 101-21**			
Subject Title:	**Basics of Anatomy-I**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	To teach the fundamental concepts of Human Anatomy			

Details of the Course (Human Anatomy)

Unit	Contents	Contact Hours
I	Introduction: Definition of anatomy and its divisions, Terms of location, positions and planes. Embryology of Eye. General Anatomy of Eye: Eye Orbit, Sclera, Cornea, Choroid, Ciliary Body, Iris & Retina. Refractory media: Aqueous Humor, Anterior Chamber, Posterior Chamber, Lens, Vitreous Body, Eyelids, Conjunctiva.	12
II	Cardiovascular System: Arteries & veins, Capillaries & arterioles, Heart- size, location, chambers, blood supply of heart, pericardium, Systemic & pulmonary circulation, Major blood vessels of Heart- Aorta, pulmonary artery, common carotid artery, subclavian artery, axillary artery, brachial artery, common iliac artery, femoral artery, Inferior vena cava, portal circulation, great saphenous vein.	12
III	Central Nervous System: Brain, regions of brain, Cerebrum, Cerebellum, Brainstem, Cerebral Cortex and Diencephalon. Brain ventricles, Cranial Nerves. Types of Nerve Cells, Nerve Impulse: Conduction & Transmission.	12
IV	Musculoskeletal system: Structure of Bone & its types, Joints- Classification of joints with examples; details of synovial joint, Bones & joints of upper limb, lower limb and their movements, Axial skeleton & appendicular skeleton, Skull, spine & its movements, intervertebral disc, Muscles & its types, Muscles of the upper limb, lower limb, trunk and neck.	10

Reference Books

S.No.	Author(s)	Title of the Book	Publisher/Year
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY
3	Kathleen J.W. Wilson	Anatomy and Physiology in Health and Illness	Churchill Livingstone, New York
4	Arthur C,Guyton and John.E	Text book of Medical Physiology	Hall. Miamisburg, OH, U.S.A

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 102-21**			
Subject Title:	**Basics of Physiology-I**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	To teach the fundamental concepts of Human Physiology			

Details of the Course (Human Physiology)

Unit	Contents	Contact Hours
I	Gastrointestinal System: Physiological Anatomy, functions of GIT, Salivary Gland-functions of saliva, Stomach- structure and functions, Gastric secretions-composition, functions, Mechanism, Pancreas-structure, functions, composition of Pancreatic juice, Liver-Functions of liver, Bile-Composition, functions, Jaundice-Types and its causes, Gall Bladder- Functions, Intestine- Movements of small and large intestine, Digestion and Absorption of Carbohydrates, Proteins, Fats, Hormones of GIT- Functions of Gastrin, Secretin, CCK-PZ.	12
II	Respiratory System: Physiological Anatomy, Functions of the respiratory system, Types of respiration, respiratory membrane, Lung volumes and capacities, vital capacity and factors affecting it, Transport of Oxygen-Forms of transportation, Oxy-hemoglobin dissociation curve and factors affecting it, Transport of Carbon-Dioxide- Forms of transportation, Hypoxia-Definition, types, effects of hypoxia, Cyanosis-Definition and types, Artificial Respiration- CPR	12
III	Cardiovascular System: Heart-Physiological Anatomy, Nerve supply, Properties of cardiac muscle, Cardiac Cycle-Events –systole, diastole, Cardiac Output-Definition and factors affecting it, Heart sounds-normal heart sounds, its causes, areas of auscultations, Blood Pressure-Definition, normal value, Physiological variations, its measurement, ECG- normal waves, Shock-Definition, Types.	10
IV	Blood: Red Blood Cells- Functions, count, Physiological variations. Erythropoisis-stages, Hemoglobin-Functions, Physiological variations, White Blood cells-Functions, count, morphology, Platelets-count, morphology, functions. Hemostasis-Definition, Mechanism, clotting factors, Blood groups-ABO system, Rh system, Blood transfusion-Indication, transfusion reactions, Anaemias-classification, morphological and Etiological, effects of anaemia on body.	10

Reference Books

S.No.	Author(s)	Title of the Book	Publisher/Year
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY
3	Kathleen J.W. Wilson	Anatomy and Physiology in Health and Illness	Churchill Livingstone, New York
4	Arthur C,Guyton and John.E	Text book of Medical Physiology	Hall. Miamisburg, OH, U.S.A

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 103-21**			
Subject Title:	**Basics of Biochemistry-I**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	**To teach the fundamental concepts of cell biology & biochemistry.**			

Unit	**Contents**	**Contact Hours**
I	Cell: Morphology, structure & functions of cell, cell membrane, Nucleus, chromatin, Mitochondria, Endoplasmic Reticulum, Ribosomes. Carbohydrates: Definition, chemical structure, functions, sources, classifications, Monosaccharides, Disaccharides, Polysaccharides, mucopoloysaccharide and its importance, glycoproteins Lipids: Definition, function, sources, classification, simple lipid, compound lipid, derived lipid, unsaturated and saturated fatty acid. Essential fatty acids and their importance, Blood lipids and their implications, cholesterol with its importance.	12
II	Proteins :Definition, sources, amino acids, structure of protein, their classification, simple protein, conjugated protein, derived proteins and their properties. Enzymes: Definitions, mechanism of action, factors affecting enzyme action, enzyme of clinical importance.	14
III	Nutrition 1) Vitamins: Types, functions and role. 2) Principal minerals and their functions(Ca, P, Mg, Na, K, Cl) 3) Balanced diet, Diet for Chronically and terminally ill patients, post operative patients Bioenergetics: Energy rich compounds, Respiratory chain and Biological oxidation.	10
IV	Carbohydrate Metabolism: Glycolysis, TCA cycle, Glycogen metabolism, Gluconeogenesis, Maintenance of Blood Glucose. Diabetes Mellitus and its complications.	16

Reference Books

S.No.	Author(s)	Title of the Book	Publisher/Year
1	Lehninger	Principles of Biochemistry	W.H. Freeman & Company, New York
2	Berg, J.M., Tymoczko, J.L. and Stryer L	Biochemistry	W.H. Freeman & Company, New York
3	Voet, D.J., Voet, J.G. and Pratt, C.W	Principles of Biochemistry	John Wiley & Sons, New York
4	Murray, R.K., Granner, D.K., Mayes and P.A., Rodwell, V.W	Harper's Biochemistry	Lange Medical Books/McGraw Hill

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 104-21**			
Subject Title:	**Basics of Anatomy-I Practical**			
Contact Hours:	**L:0**	**T:0**	**P:4**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	To make the students learn practical aspects of Human Anatomy			

Sr. No.	**Contents**	**Contact Hours**
I	**Histology: • Epithelium: Simple (squamous, cuboidal, columnar, ciliated), Stratified, Transitional • Bone, muscles (skeletal, smooth, cardiac) • Cartilage (hyaline, elastic, fibro cartilage). • Connective Tissue (loose and dense). • Arteries (large & medium sized), Veins.** • **Demonstration of various parts of Eye** • **Demonstration of tissues of body** • **Demonstration of parts of digestive system** • **Demonstration of parts of Nervous system : Brain & Spinal Cord** • **Demonstration of parts of respiratory system** • **Demonstration of various parts of circulatory system (Demonstration from models)** • **Demonstration of structural differences between skeletal, smooth and cardiac muscles (permanent mounts)** • **Demonstration of various bones and joints** • **To study circulatory system from charts and transverse section (TS) of artery and vein from permanent slides.** • **To study digestive system from charts and TS of liver, spleen and pancreas from permanent slides.** • **To study various body fluids.** **Note: Demonstrations can be done with the help of models, charts and histological slides**	

Reference Books

S.No.	**Author(s)**	**Title of the Book**	**Publisher/Year**
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY
3	Kathleen J.W. Wilson	Anatomy and Physiology in Health and Illness	Churchill Livingstone, New York
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I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 105-21**			
Subject Title:	**Basics of Physiology-I Practical**			
Contact Hours:	**L:0**	**T:0**	**P:4**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	To make the students learn practical aspects of Human Physiology			

Sr. No.	**Contents**	**Contact Hours**
I	**Examination of blood film for various blood cells from stained slides.** **Blood pressure estimation** **Estimation of Hemoglobin Concentration** **- Determination of Bleeding Time and Clotting Time** **- Determination of Blood Groups** **- Recording of normal Blood Pressure** **- Clinical Examination of Arterial Pulse** **- Determination of Vital Capacity**	

Reference Books

S.No.	**Author(s)**	**Title of the Book**	**Publisher/Year**
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY
3	Kathleen J.W. Wilson	Anatomy and Physiology in Health and Illness	Churchill Livingstone, New York
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I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 106-21**			
Subject Title:	**Basics of Biochemistry-I Practical**			
Contact Hours:	**L:0**	**T:0**	**P:4**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	To make the students learn practical aspects of Biochemistry			

Sr. No.	**Contents**
I	1. Safety measures in laboratories. 2. Preparation of normal and molar solutions. 3. Preparation of buffers. 4. Determination of pKa of acetic acid and glycine. 5. Qualitative tests for carbohydrates, lipids, amino acids, proteins and nucleic acids. 6. Separation of amino acids/ sugars/ bases by thin layer chromatography. 7. Estimation of vitamin C.

Reference Books

S.No.	**Author(s)**	**Title of the Book**	**Publisher/Year**
1	D. Shaheen	Physical Biochemistry	Wiley Blackwell Publishers
2	T. G. Coopers	The Tools of Biochemistry	Wiley India Pvt. Ltd.
3	Voet, D.J., Voet, J.G. and Pratt, C.W	Principles of Biochemistry	John Wiley & Sons, New York
4	Murray, R.K., Granner, D.K., Mayes and P.A., Rodwell, V.W	Harper's Biochemistry	Lange Medical Books/McGraw Hill

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BTHU101-18**			
Subject Title:	**English**			
Contact Hours:	**L:1**	**T:0**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	**To learn effective communication both oral & written.**			

Unit	**Contents**	**Contact Hours**
I	Theory of Communication Types and modes of Communication	4
II	Language of Communication Verbal and Non-verbal (Spoken & verbal), Personal, Social and Business Barriers and Strategies, Intra-personal, Inter-personal and Group communication	6
III	**Reading and Understanding** Close Reading, Comprehension, Summary Paraphrasing, Analysis and Interpretation, Translation(from Hindi/Punjabi to English and vice-versa), Literary/Knowledge Texts	10
IV	Documenting, Report Writing, Making Notes, Letter Writing	10

Reference Books

1. *Fluency in English* - Part II, Oxford University Press, 2006.
2. *Business English*, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. *Language through Literature* (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas

5. *On Writing Well*. William Zinsser. Harper Resource Book. 2001
6. *Study Writing.* Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BTHU102-18**			
Subject Title:	**English Practical**			
Contact Hours:	**L:0**	**T:0**	**P:4**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	**To learn effective communication both oral & written.**			

Sr. No.	**Contents**
I	**Interactive practice sessions in Language Lab on Oral Communication** Listening Comprehension Self Introduction, Group Discussion and Role Play Common Everyday Situations: Conversations and Dialogues Communication at Workplace Interviews Formal Presentations, Effective Communication/ Mis-communication Public Speaking

Reference Books

1. *Fluency in English* - Part II, Oxford University Press, 2006.
2. *Business English*, Pearson, 2008.
3. Practical English Usage. Michael Swan. OUP. 1995.
4. *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
5. *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**HVPE-101-18**			
Subject Title:	**Human Values, De-addiction & Traffic Rules**			
Contact Hours:	**L:3**	**T:0**	**P:0**	**Credits:3**
Examination Duration (hours)	**3**			
Objective(s):	**To develop a sense of social responsibility, traffic rules and about menace of drugs.**			

Unit	Contents	Contact Hours
I	**Course Introduction – Need, Basic Guidelines, Content and Process for Value Education** Understanding the need, basic guidelines, content and process for Value Education Self Exploration–what is it? – its content and process; 'Natural Acceptance' and Experiential Validation-as the mechanism for self exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic requirements for 18ulfilment of aspirations of every human being with their correct priority Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario Method to 18ulfil the above human aspirations: understanding and living in harmony at various levels	6
II	**Understanding Harmony in the Human Being – Harmony in Myself!** Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' – *Sukh* and *Suvidha* Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail Programs to ensure *Sanyam* and *Swasthya* Practice Exercises and Case Studies will be taken up in Practice Sessions.	6
III	**Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship** Understanding harmony in the Family- the basic unit of human interaction Understanding values in human-human relationship; meaning of *Nyaya* and program for its 18ulfilment to ensure *Ubhay-tripti*; Trust (*Vishwas)* and Respect (*Samman)* as the foundational values of relationship Understanding the meaning of *Vishwas*; Difference between intention and competence Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship Understanding the harmony in the society (society being an extension of family): *Samadhan, Samridhi, Abhay, Sah-astitva* as comprehensive Human Goals	6

	Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj),* Universal Order (*SarvabhaumVyawastha)*- from family to world family! Practice Exercises and Case Studies will be taken up in Practice Sessions	
IV	**Understanding Harmony in the Nature and Existence – Whole existence as Co-existence** Understanding the harmony in the Nature Interconnectedness and mutual 19ulfilment among the four orders of nature-recyclability and self-regulation in nature Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space Holistic perception of harmony at all levels of existence Practice Exercises and Case Studies will be taken up in Practice Sessions.	4
V	**Implications of the above Holistic Understanding of Harmony on Professional** Natural acceptance of human values Definitiveness of Ethical Human Conduct Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order Competence in professional ethics: Ability to utilize the professional competence for augmenting universal human order, Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems Strategy for transition from the present state to Universal Human Order: At the level of individual: as socially and ecologically responsible engineers, technologists and managers b) At the level of society: as mutually enriching institutions and organizations	6

Reference Books

Text Book

R R Gaur, R Sangal, G P Bagaria, 2009, *A Foundation Course in Value Education*.

Reference Books

1. Ivan Illich, 1974, *Energy & Equity*, The Trinity Press, Worcester, and HarperCollins, USA
2. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
3. A Nagraj, 1998, *Jeevan Vidya ek Parichay*, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986, 1991

5. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Purblishers.
6. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.

7. Subhas Palekar, 2000, *How to practice Natural Farming,* Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *Limits to Growth*
– *Club of Rome's report*, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, *Fundamentals of Ethics for Scientists & Engineers* , Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, *Engineering Ethics (including Human Values)*, Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, *Foundations of Ethics and Management*, Excel Books.
12. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, *http://uhv.ac.in*

2. Story of Stuff, *http://www.storyofstuff.com*

3. Al Gore, *An Inconvenient Truth*, Paramount Classics, USA

4. Charlie Chaplin, *Modern Times*, United Artists, USA

5. IIT Delhi, *Modern Technology – the Untold Story*

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**HVPE102-18**			
Subject Title:	**Human Values, De-addiction & Traffic Rules Lab/Seminar**			
Contact Hours:	**L:0**	**T:0**	**P:4**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	**To develop a sense of social responsibility, traffic rules and about menace of drugs.**			

Sr. No.	**Contents**
I	One each seminar will be organized on Drug De-addiction and Traffic Rules. Eminent scholar and experts of the subject will be called for the Seminar atleast once during the semester. It will be binding for all the students to attend the seminar

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BMPD 102-18**			
Subject Title:	**Mentoring & Professional Development**			
Contact Hours:	**L:0**	**T:0**	**P:1**	**Credits:1**
Examination Duration (hours)	**3**			
Objective(s):	**To learn the life long learning skills.**			

Sr. No.	**Contents**
I	**Part-A (Class Activities)** 1. Expert and video lectures 2. Aptitude Test 3. Group Discussion 4. Quiz (General/Technical) 5. Presentations by the students 6. Team building Exercises 7* A part of above six points practicals on Fundamentals of Computers are also added as per Annexure-I
II	**Part-B (Outdoor Activities)** 1. Sports/NSS/NCC 2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.

Evaluation shall be based on rubrics for Part – A & B

Mentors/Faculty incharges shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.

SEMESTER-II

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 201-21**			
Subject Title:	**Basics of Anatomy-II**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	To teach the fundamental concepts of Human Anatomy			

Details of the Course (Human Anatomy)

Unit	Contents	Contact Hours
I	Introduction: Ocular Muscles, Visual Pathways, Sympathetic & Para-sympathetic nervous system, Vascular supply of eye, Lacrimal apparatus, , Aqueous Humor, Vitreous Humor.	8
II	Excretory System: Morphology and Anatomy of Human Kidney, Ureters, Urinary Bladder, Urethra. Structure of Nephron: Bowman's Capsule, Proximal Convoluted Tubule, Distal Convoluted Tubule, Collecting Tubule, Loop of Henle, Collecting Duct.	8
III	Nervous System: Spinal Cord and Cranial Nerves, Sympathetic and Para-sympathetic Nervous System. Reflex Action and its types, Reflex Arc. Sensory Organs: Morphology and Anatomy of Ear, Tongue and Skin and their receptors.	12
IV	Endocrine System: Endocrine Glands and their types-Pituitary, Hpothalamus, Pineal, Thyroid, Parathyroids, Thymus, Adrenals, Kidneys, Pancreas, Gonads (Testes & Ovaries) and Alimentary Canal.	8

Reference Books

S.No.	Author(s)	Title of the Book	Publisher/Year
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY
3	Kathleen J.W. Wilson	Anatomy and Physiology in Health and Illness	Churchill Livingstone, New York
4	Arthur C,Guyton and John.E	Text book of Medical Physiology	Hall. Miamisburg, OH, U.S.A

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 202-21**			
Subject Title:	**Basics of Physiology-II**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	To teach the fundamental concepts of Human Physiology			

Details of the Course (Human Physiology)

Unit	Contents	Contact Hours
I	Ocular Physiology: Introduction of General Physiology of the eye, Extrinsic eye muscles and their actions (Ocular movements), Vision and its general aspects, Pigments of eye and its photochemistry, Electrophysiology of the eye, Visual acuity, Vernier acuity and its measurement, Visual Perception: Binocular vision, Stereoscopic vision, Scotopic and Photopic vision. Colour vision, Colour defects and Colour mixing. Mechanism of Accommodation.	10
II	Excretory System: Physiological functions of Kidneys and Osmoregulation. Mechanism of Urine formation, Counter-current mechanism, Urea Cycle, Various types of Kidney disorders. Kidney failure and its causes. Haemodialysis.	10
III	Nervous System: Functions of Spinal cord and Cranial nerves. Reflex action and its mechanism, Conditioned and Unconditioned Reflex action, Reflex arc. Mechanism of Nerve impulse generation and its transmission. Transmission of Nerve Impulsa along the nerve fibre and at Synapse. The physiology of various receptors in tongue, nose and skin. Mechanism of hearing in ear.	12
IV	Endocrine System: Hormones and its types, Mechanism of Hormone action, Various hormones secreted by endocrine glands and their functions, Disorders of Endocrine Glands.	8

Reference Books

S.No.	Author(s)	Title of the Book	Publisher/Year
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY
3	Kathleen J.W. Wilson	Anatomy and Physiology in Health and Illness	Churchill Livingstone, New York
4	Arthur C,Guyton and John.E	Text book of Medical Physiology	Hall. Miamisburg, OH, U.S.A

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 203-21**			
Subject Title:	**Basics of Biochemistry-II**			
Contact Hours:	**L:3**	**T:1**	**P:0**	**Credits:4**
Examination Duration (hours)	**3**			
Objective(s):	**To teach the fundamental concepts of cell biology & biochemistry.**			

Unit	Contents	Contact Hours
I	**Nucleic Acids & its metabolism:** Nucleosides, Nucleotides, Purines, Pyrimidines, Structure of DNA & its types (A, B & Z DNA's), RNA & its types, Metabolism of Purines & Pyrimidines and their disorders.	8
II	**Metabolism of Fatty Acids:** Digestion, absorption of lipids. Chylomicrons, Oxidation of Fatty Acids. Disorders of Fat metabolism, Fatty Liver & its causes. Ketosis & its salient features, causes and diagnosis of Ketosis. Lipoproteins, classification & types of Lipoproteins, LDL & HDL, their functions & clinical applications. Hyperlipidemias and Cardiovascular Diseases.	10
III	**Metabolism of Amino Acids:** Formation of ammonia, Transamination, Biological significance & clinical significance of Transamination. Transdeamination: oxidative & non-oxidative deamination, Urea Cycle, disorders of urea cycle.	8
IV	**Clinical Biochemistry:** Water and Electrolyte, Fluid compartment, daily intake and output sodium and potassium balance Hormones: Actions of Hormone Insulin, Glucagon, Thyroid and Parathyroid hormones, Cortical hormones. Acid Base Balance , role of lungs and kidneys,– Regulation of blood pH, acidosis, Alkalosis, Physical Chemistry: Osmosis, Dialysis, Donann membrane equilibirium Liver, Gastric, Pancreatic and Kidney functions tests.	12

Reference Books

S.No.	Author(s)	Title of the Book	Publisher/Year
1	Lehninger	Principles of Biochemistry	W.H. Freeman & Company, New York
2	Berg, J.M., Tymoczko, J.L. and Stryer L	Biochemistry	W.H. Freeman & Company, New York
3	Voet, D.J., Voet, J.G. and Pratt, C.W	Principles of Biochemistry	John Wiley & Sons, New York
4	Murray, R.K., Granner, D.K., Mayes and P.A., Rodwell, V.W	Harper's Biochemistry	Lange Medical Books/McGraw Hill

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 204-21**			
Subject Title:	**Basics of Anatomy-II Practical**			
Contact Hours:	**L:0**	**T:0**	**P:4**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	To make the students learn practical aspects of Human Anatomy			

Sr. No.	**Contents**	**Contact Hours**
I	• **Study the Cross Section of Human Eye using Eye model.** • **Study of the Eye receptor Cells: Rods & Cones through charts.** • **Demonstration of parts of Human Excretory System using model: Kidneys, Ureter, Urethera.** • **Study the Structure of Nephron.** • **Demonstration of parts of Nervous system : Spinal Cord and Cranial Nerves along with Sympathetic & Para-sympathetic Nervous System.** • **Demonstration of Morphology & Anatomy of Ear, Skin and Tongue using various models.** • **Demonstration various Endocrine Glands using Charts and Models.** **Note: Demonstrations can be done with the help of models, charts and histological slides**	

Reference Books

S.No.	**Author(s)**	**Title of the Book**	**Publisher/Year**
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY
3	Kathleen J.W. Wilson	Anatomy and Physiology in Health and Illness	Churchill Livingstone, New York
4	Arthur C,GuytonandJohn.E	Text book of Medical Physiology	Hall. Miamisburg, OH, U.S.A

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 105-21**			
Subject Title:	**Basics of Physiology-I Practical**			
Contact Hours:	**L:0**	**T:0**	**P:4**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	To make the students learn practical aspects of Human Physiology			

Sr. No.	**Contents**	**Contact Hours**
I	• Determine the Field of Vision using Students Perimeter. • Determine the Physiological Blind Spot by Mariotte's Experiment. • Test the distant and close vision using Snellen's chart and Jaeger's chart. • Determine the Color Vision using Ishihara's chart. • Conduct the Rinne's test, Schwabach's test and Weber's test for hearing. • Determine the taste sensation using Strong solutions of sucrose (10 %), sodium chlo ride (15 %) and weak solutions of acetic acid (1 %), and quinine sulphate (0.1 %). • Calculate the Effective filtration pressure from the given data. • Calculate the Glomerulus Filtration Rate (GFR) using the given data.	

Reference Books

S.No.	**Author(s)**	**Title of the Book**	**Publisher/Year**
1	Ross & Wilson Anatomy and Physiology	Anne Waugh, Allison Grant	Churchill Livingstone
2	Principles of Anatomy & Physiology	Tortora & Bryan	WILEY
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4	Arthur C,GuytonandJohn.E	Text book of Medical Physiology	Hall. Miamisburg, OH, U.S.A

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BOPT 206-21**			
Subject Title:	**Basics of Biochemistry-II Practical**			
Contact Hours:	**L:0**	**T:0**	**P:4**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	To make the students learn practical aspects of Biochemistry			

Sr. No.	**Contents**
I	• Kidney function tests • Renal function tests • Analysis of Normal Urine • Composition of urine • Procedure for routine screening • Common renal disease • Urinary calculus • Urine examination for detection of abnormal constituents • Sugar and Protein levels in Urine

Reference Books

S.No.	**Author(s)**	**Title of the Book**	**Publisher/Year**
1	D. Shaheen	Physical Biochemistry	Wiley Blackwell Publishers
2	T. G. Coopers	The Tools of Biochemistry	Wiley India Pvt. Ltd.
3	Voet, D.J., Voet, J.G. and Pratt, C.W	Principles of Biochemistry	John Wiley & Sons, New York
4	Murray, R.K., Granner, D.K., Mayes and P.A., Rodwell, V.W	Harper's Biochemistry	Lange Medical Books/McGraw Hill

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Forensic Sciences**			
Subject Code:	**EVS102-18**			
Subject Title:	**Environmental Studies**			
Contact Hours:	**L:2**	**T:0**	**P:0**	**Credits:2**
Examination Duration (hours)	**3**			
Objective(s):	**To learn the basics of Environmental issues.**			

Details of Syllabus

Unit	Contents	Contact Hours
I	Introduction to Environmental Studies Multidisciplinary nature of Environmental Studies: Scope & Importance Need for Public Awareness Ecosystems Concept of an Ecosystem: Structure & functions of an ecosystem (Producers, Consumers & Decomposers) Energy Flow in an ecosystem: Food Chain, Food web and Ecological Pyramids Characteristic features, structure & functions of following Ecosystems: • Forest Ecosystem • Aquatic Ecosystem (Ponds, Lakes, River & Ocean)	4
II	Natural Resources Renewable & Non-renewable resources Forest Resources: Their uses, functions & values (Biodiversity conservation, role in climate change, medicines) & threats (Overexploitation, Deforestation, Timber extraction, Agriculture Pressure), Forest Conservation Act Water Resources: Their uses (Agriculture, Domestic & Industrial), functions & values, Overexploitation and Pollution of Ground & Surface water resources (Case study of Punjab), Water Conservation, Rainwater Harvesting, Land Resources: Land as a resource; Land degradation, soil erosion and desertification. Energy Resources: Renewable & non-renewable energy resources, use of alternate energy resources (Solar, Wind, Biomass, Thermal), Urban problems related to Energy	8
III	Biodiversity & its conservation Types of Biodiversity: Species, Genetic & Ecosystem India as a mega biodiversity nation, Biodiversity hot spots and biogeographic regions of India Examples of Endangered & Endemic species of India, Red data book Environmental Pollution & Social Issues Types, Causes, Effects & Control of Air, Water, Soil & Noise Pollution Nuclear hazards and accidents & Health risks Global Climate Change: Global warming, Ozone depletion, Acid rain, Melting of Glaciers & Ice caps, Rising sea levels Environmental disasters: Earthquakes, Floods, Cyclones, Landslides	8
IV	Field Work Visit to a National Park, Biosphere Reserve, Wildlife Sanctuary Documentation & preparation of a Biodiversity (flora & fauna) register of campus/river/forest Visit to a local polluted site : Urban/Rural/Industrial/Agricultural Identification & Photography of resident or migratory birds, insects (butterflies) Public hearing on environmental issues in a village	16

Reference Books

1. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R.1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999.*Global Ethics and Environment*, London, Routledge.
4. Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll.*Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. *Science*, 339: 36--- 37.
7. McCully, P. 1996. *Rivers no more: the environmental effects of dams*(pp. 29---64). Zed Books.
8. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971.*Fundamentals of Ecology*. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012.*Environment*. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India*. *Tripathi 1992*.
14. Sengupta, R. 2003. *Ecology and economics*: An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology*: *Voices from the Tropics*. John Wiley & Sons.
17. Thapar, V. 1998. *Land of the Tiger*: *A Natural History of the Indian Subcontinent*.
18. Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E. O. 2006.*The Creation: An appeal to save life on earth*. New York: Norton.
20. World Commission on Environment and Development. 1987.*Our Common Future*. Oxford University Press.

I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY				
Course Name	**B.Sc. in Optometry**			
Subject Code:	**BMPD 102-18**			
Subject Title:	**Mentoring & Professional Development**			
Contact Hours:	**L:0**	**T:0**	**P:1**	**Credits:1**
Examination Duration (hours)	**3**			
Objective(s):	**To learn the life long learning skills.**			

Sr. No.	**Contents**
I	**Part-A (Class Activities)** 1. Expert and video lectures 2. Aptitude Test 3. Group Discussion 4. Quiz (General/Technical) 5. Presentations by the students 6. Team building Exercises 7* A part of above six points practicals on Fundamentals of Computers are also added as per Annexure-I
II	**Part-B (Outdoor Activities)** 1. Sports/NSS/NCC 2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.

Evaluation shall be based on rubrics for Part – A & B

Mentors/Faculty incharges shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.

Study Scheme & Syllabus of

Bachelor of Optometry

Batch 2021 onwards

By

Board of Studies

PTU

Signature of Convenor (BOS) Signature of Chairman (BOS)

INDEX

Program Educational Objectives:	
PEO1	The graduates will interpret the results of common ophthalmic procedures, develop differential and conclusive diagnoses, including the skillful use of Vision Care Instruments and material and management of Eye and Vision conditions.
PEO2	The graduates will have successful careers as optometric health leaders and entrepreneurs (vision therapist, contact lens practitioner, low vision specialist, ocularist, occupational optometrist, academics, and research).
PEO3	Graduates will possess considerable leadership skills in a broad and multidisciplinary team and be able to work and communicate effectively in an inter-disciplinary context either solo or in a team
PEO4	Graduates' professional and ethical qualities will enable them to meaningfully contribute to teams.
Program Outcomes:	
PO1	**OPTOMETRIC PROBLEM SOLVING AND MANAGEMENT**: To create, produce, and prescribe a variety of optical aids, such as eyeglasses, sunglasses, contact lenses, and ophthalmic lenses.
PO2	**OPTOMETRY KNOWLEDGE**: To deliver care to patients under a range of different situations, efficiently, and affordably, while putting each patient's needs first. POLLUTION ANALYSIS: To illustrate the statistical and scientific concepts that underlie the practice of optometry
PO3	**FORMULATE/DESIGN A SOLUTION**: using research-based knowledge and research techniques, such as data collection, analysis, and interpretation designs, and combining the data to provide a reliable result
PO4	**DESIGN AND DEVELOP COMPLEX PROBLEM**: To develop systems that meet the necessary needs while taking into account the public's health and safety, as well as cultural, societal, and environmental factors, and to design solutions for complex optometry problems.
PO5	**DESIGN AND DEVELOP COMPLEX PROBLEM:** To design solutions for complex optometry problems and develop systems that meet the required needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.
PO6	**PROFESSIONAL DISCIPLINE:** To undertake Public Health Optometry projects and vision screening eye camps for educating on ocular hygiene and related counseling
PO7	**ETHICAL LEARNING:** To apply ethical principles and to commit professional ethics and responsibilities and norms of the optometric practice.
PO8	**COMMUNICATION:** To communicate effectively on complex optometric activities with optometry Body and with society as such in eye screening and being able to comprehend and write effective reports, provide effective presentations and propose solutions
PO9	**LIFE LONG LEARNING:** To recognize the need for and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.
PO10	**ENVIRONMENT AND SUSTAINABILITY:** Understand the impact of professional optometry solution in society as well as on environmental basis and display the

	knowledge of need of productive and sustainable development.

Program Specific Outcomes: At the end of the Program, the student will be able to: -	
PSO1	Incremental development of students learning and clinical skills development through the stages of the programme.
PSO2	Integration of theoretical, practical and clinical aspects of the curriculum
PSO3	Knowledge and skills acquired during study will help the graduates to solve the wide range of ocular problems encountered in optometric clinical practice
PSO4	Ability to develop a professional attitude towards the patients, colleagues and communities

Semester		**Third (3rd)**									
Course Code	**Group**	**Course Type**	**Course Name / Title**	**Load Allocation**				**Marks Distribution**		**Total Marks**	**Credit**
				Lecture	**Tutorial**	**Practical**	**Studio (If Applicable)**	**Internal**	**External**		
BOPT-301-21	Allied Health Sciences	Core Theory	Ocular Microbiology	3	1	0	-	25	75	100	4
BOPT-302-21	Allied Health Sciences	Core Theory	Visual optics –I	3	1	0	-	25	75	100	4
BOPT-303-21	Allied Health Sciences	Core Theory	Optometric optics-I	3	1	0	-	25	75	100	4
BOPT-304-21	Allied Health Sciences	Core Theory	Optometric Instruments	3	1	0	-	25	75	100	4
BOPT-305-21	Allied Health Sciences	Core Theory	Ocular Disease –I	3	1	0	-	25	75	100	4
BOPT-306-21	Allied Health Sciences	Core Theory	Clinical examination of visual system	3	1	0	-	20	60	80	3
BOPT-307-21	Allied Health Sciences	Core Theory	Indian Medicine and Telemedicine	2	0	0	-	20	60	80	3
BOPT-308-21	Allied Health Sciences	Practical	Clinical Optometry-II	0	0	6	-	-	-	-	3

List of Elective

Elective-I (if applicable)

Elective-II (if applicable)

Elective-III (if applicable)

Open Elective (if applicable)

Semester		**Fourth (4th)**									
Course Code	**Group**	**Course Type**	**Course Name / Title**	**Load Allocation**				**Marks Distribution**		**Total Marks**	**Credit**
				Lecture	**Tutorial**	**Practical**	**Studio (If Applicable)**	**Internal**	**External**		
BOPT-401-21	Allied Health Sciences	Core Theory	Optometric optics – II & Dispensing Optics	3	1	0	-	25	75	100	4
BOPT-402-21	Allied Health Sciences	Core Theory	Visual Optics- II	2	1	0	-	25	75	100	4
BOPT-403-21	Allied Health Sciences	Core Theory	Ocular Disease –II and glaucoma	3	1	0	-	25	75	100	4
BOPT-404-21	Allied Health Sciences	Core Theory	Pathology	3	1		-	25	75	100	
BOPT-405-21	Allied Health Sciences	Core Theory	Basic and Ocular Pharmacology	3	1	0	-	25	75	100	4
BOPT-406-21	Allied Health Sciences	Core Theory	Introduction to Quality & Patient safety	2	1	0	-	25	75	100	4
BOPT-	Allied	Practica	Clinical	0	0	6	-	-	-	-	2

Signature of Convenor (BOS) Signature of Chairman (BOS)

407-21	Health Sciences	I	optometry-III								

Examination and Evaluation

Theory			
Sr. No.	**Evaluation Criteria**	**Weightage in Marks**	**Remarks**
1.	Mid Term / Sessional Tests	20	Internal Evaluation (25Marks) MSTs, Quizzes, Assignments, Attendance etc., constitute internal evaluation. Average of two mid semester test will be considered for evaluation.
2.	Attendance	2	
3.	Assignments	3	
4.	End Semester Examination	75	External Evaluation
5.	**Total**	**100**	Marks May be rounded off to nearest integer

Practical		
Evaluation Criteria	**Weightage in Marks**	**Remarks**
Evaluation of Practical Record / Viva Voce / Attendance / Seminar / Presentation	80	Internal Evaluation
Final Practical Performance + Viva Voce	20	External Evaluation
Total	**100**	Marks May be rounded off to nearest integer

Question Paper Pattern for MST:

Roll No: **No. of Pages**

I. K. Gujral Punjab Technical University, Jalandhar

Department of Optometry

Mid-Semester Test (I / II / III) (Regular / Reappear): -	**1st**	Date: -	**DD/MM/YYYY**
Programme: -		Semester: -	**1st Semester**
Course Code: -		Course: -	**Optometry**
Maximum Marks: -	**30**	Time: -	**1 HH 30 MM**

* Note: - Section A is Compulsory; Attempt any two questions from Section B and One Question from Section C.

Section: A		**Marks**	**Cos**
1.		02	
2.		02	
3.		02	
4.		02	
5.		02	
Section: B		**Marks**	**Cos**
6.		5	
7.		5	
8.		5	
Section: C		**Marks**	**Cos**
9.		10	
10.		10	

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Details of Course Objectives

CO1	The course's objectives are to teach students about the general anatomical structures of the human body, evaluate those issues, and apply that knowledge to various diagnostic procedures and health problems.
CO2	The course aims to teach students about structural and functional anomalies of the visual system, how to investigate and treat them, the role of optometry in healthcare, and what is expected of and expected of healthcare professionals.
CO3	The course's objective is to increase students' understanding by teaching them about numerous transport mechanisms, biological oxidation, the nitrogen-sulfur cycle, and the biosynthesis of nucleic acids, as well as how to maintain these processes' normal values in day-to-day situations.
CO4	The purpose of the course is to provide in-depth knowledge of the physiological processes that occur within human organs and to correlate systemic and ocular disorders
CO5	The course's objectives are to teach students about the general anatomical structures of the human body, evaluate those issues, and apply that knowledge to various diagnostic procedures and health problems.

Detailed syllabus of 3rd semester

Semester		First (3rd)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-301-21	Allied health science	Core Theory	Ocular Microbiology	3	1	0	-	25	75	100	4

Course Objective

This course covers the basic biological, biochemical and pathogenic characteristics of pathogenic organisms.

Course Outcomes

CO1	The student would be able to produce knowledge of bacteria with diagrams
CO2	Student will be able to tell the distinguishing features of prokaryotes and eukaryotes
CO3	Students would have knowledge of different sterilization techniques and microbial preservation.
CO4	Students will understand the structure and its working action of the microbes in the day to day living.

Unit-1	**Introduction to microbes and microscopes**	**12 Hours**
Chapter 1.1	**History of Microbiology and Microscopy**	
	History of Microbiology and Microscopy- Meaning, definition and history of Microbiology, Importance and applications of Microbiology.	
Chapter 1.2	**Principles and mechanisms of different microscopy**	
	Principles and mechanisms of different microscopy – bright field, dark field, phase-contrast, fluorescent and electron microscopy (SEM and TEM). Ocular and stage micrometers. Size determination of microorganisms.	

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Chapter 1.3	**Principles and types of stains**	
	Principles and types of stains -Simple stain, differential stain, negative stain, structural stains - spore, capsule, flagella. Hanging-drop method, wet mount method Ocular bacterial, Fungal Infections	
Unit-2	**Bacteria and Virus**	**12 Hours**
Chapter 2.1	**Biology of Prokaryotic and Eukaryotic Microorganisms**	
	Biology of Prokaryotic and Eukaryotic Microorganisms- Outline classification of living organisms: Prokaryotes - General characteristics of bacteria, archaebacteria, rickettsias, mycoplasmas, cyanobacteria and actinomycetes., Outline classification for bacteria as per the second edition of Bergey's Manual of Systematic Bacteriology (up to order level Structure and multiplication of lambda bacteriophage. Eukaryotes - General characteristics and classification (up to the order level) of eukaryotic microorganisms - Protozoa, microalgae, molds and yeasts. Hospital Infections- causative agents, transmission methods, investigation prevention and control, principles and practice of biomedical waste management	
Chapter 2.2	**Bacteria**	
	Cell structure, elementary idea about classification and morphological basis. Staining reactions: Gram staining, spore staining, acid fast staining. Bacterial growth: nutritional requirements, physical factor affecting, culture media, and growth curve. Elementary idea about bactericidal agents: Phenol, alcohol. Sterilization (principles, types & methods). Pasteurization. Antibiotics: Bacteriostatic and bactericidal effects	
Chapter 2.3	**Virus**	
	Elementary knowledge of viral-morphology, viral genome and classification, viral replication. Herpes viruses, hepatitis viruses, miscellaneous viruses, human immunodeficiency viruses.	
Unit-3	**Disinfections, Sterilizations and Fungi and Immunity**	**14 Hours**
Chapter 3.1	**Microbiological Techniques**	
	Sterilization and disinfection techniques, Principles and methods of sterilization., Physical methods -autoclave, hot-air oven, pressure cooker, laminar air flow, filter sterilization., Radiation methods – UV rays, gamma rays, ultrasonic methods., Chemical methods - Use of alcohols, aldehydes, fumigants, phenols, halogens and hypochlorite's	
Chapter 3.2	**Disinfectants**	
	Mode of action, use of various disinfectants, testing efficiency of various disinfectants. Preservation of microbial cultures - sub culturing, overlaying cultures with mineral oils, lyophilization, sand cultures, storage at low temperature. Microbial growth & death, Laboratory culture, host pathogen interactions, antimicrobial chemotherapy, pathogenic mechanisms common to external ocular infections process – clinical pathology. Physiology, pathology, treatment & epidemiology of infectious diseases caused by bacteria, virus, fungi & parasitic organisms with emphasis to disease with ocular manifestations & infectious eye diseases in hot climate as in India. AIDS & eye.	
Chapter 3.3	**Structure & function of immune system**	

	Structure & function of immune system – Structure and function of thymus, spleen & red Bone narrow- Immunity& its types, plasma proteins & immune reaction, cells involved in immune system. Humoral immunity theories of antibody formation. Structure & function of lymph nodes. Structure & function of thymus, spleen & red Bone narrow. Nonspecific immunity, Antibody mediated immunity, specific immunity, cell modified immunity, Active immunity, Passive immunity. Disorder of growth – metaplasia, dysplasia, neoplasia. Circulatory disturbances – thrombosis, infarction, ischemia, embolism. Degeneration (calcification).

Suggested Books

1. General Microbiology by Hans Günter Schlegel, C. ZaOMrosch, M. Kogut
2. General Microbiology by Roger Y. Stanier
3. General Microbiology by Robert F. OMyd

Reference Books

1. Text OMok of Microbiology by Ananthanereyan
2. Medical Microbiology by Paniker& Satish Gupte
3. Practical Medic.al Microbiology by Mackie &MacCartney Volume 1 and volume

Semester		First (3rd)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-302-21	Allied health science	Core Theory	Visual optics –I	3	1	0	-	25	75	100	4

Course Description

This course deals with the concept of eye as an optical instrument and thereby covers various optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.

Course Objectives

The course aims to develop the insight of the basic visual techniques and their optimization and to develop an understanding of the structure of eye and defects of the eye and an understanding of the diffraction and their relation to the correctness of various vision defects

Course Outcomes

CO1	Student will come to know about the vision related defects and their correction measures.
CO2	Student will come to know about the focus of the eye and change in power according to change in vertex distance
CO3	Student will come to know the spectacle distance
CO4	Students will know about the effects of convergence and accommodation in eye

Unit-1		**12 Hours**
Chapter 1.1	**Review of Geometrical Optics**	
	Review of Geometrical Optics: Geometrical Optics, their properties. Optical constants of the eye and their measurement. Purkinje images. Corneal curvature and thickness.	
Chapter 1.2	**Optical Defects of the Eye**	
	Optical Defects of the Eye- Shape of Cornea, Shape & RI of the lens, Optical axis, Visual axis (angle alpha, Fixation axis (angle gamma), Aberration of the Optical system of eye, Depth of focus, Diffraction & resolving power	
Unit-2		**12 Hours**
Chapter 2.1	**Refractive errors**	
	Emmetropia and ametropia, Axial versus spherical ametropia, Myopia	

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	Hypermetropia (Hyperopial) Astigmatism.	
Chapter 2.2	**Accommodation**	
	Accommodation- possible mechanism of accommodation- Schiener disc experiment- theories of accommodation- modern theory- changes in the lens during accommodation- the amplitude of accommodation- the measurement of the amplitude of accommodation	
Chapter 2.3	**Presbyopia**	
	Depth of field, luminance and blur tolerance- amplitude of accommodation versus age. Presbyopia-near vision addition- estimate of addition-unequal near vision addition- effect of changing the spectacle distance – hypermetropia and accommodation.	
Unit-3		**14 Hours**
Chapter 3.1	**Spectro radiometric curve**	
	Spectro radiometric curve- Vλ -λ curve- photopic and scotopic vision CIE standard observes. Photometric quantities and units- Luminous Flux, Lumen- Illuminance, lux Luminous intensity, Candela – Luminance, Candela/m2. Inverse square law and Cosine law of illumination (Illuminance)	
Chapter 3.2	**Photometry**	
	Photometry- Lumer Brodhum photometer, Guild Flicker photometer- Photocells photo multipliers – photodiodes-noise in physical photometers. Determination lighting of Polar curve of lamps. Glare and glare index- disability glare- discomfort glare- control of glare- contrast Light sources- Special energy distribution- luminous efficacy- color rendering properties- Flicker contracts- Daylight, its properties- color lamp – Incandescent. lamps - low pressure Hg-lamps- High pressure Hg-lamps- Low-pressure NA-lamp- High pressure NA-lamps- Typical applications	

Suggested Books

1. Principles & Practice of Refraction, Duke Elder
2. Ophthalmic Optics & Refraction (System of Opthalmology-Vol. 5), Duke Elder
3. Visual Optics & Refraction- A clinical approach, David D. Michaels
4. OMrish's-Clinical Refraction.

Reference Books

1. Anatomy and physiology of the eye- A.K. Khurrana
2. Ocular Diseases- A.k.Khurrana
3. Will's Eye Manual- Will's

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Semester		First (3rd)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-303-21	Allied health science	Core Theory	Optometric optics-I	3	1	0	-	25	75	100	4

Course Description

This course deals with understanding the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe. It will impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect.

Course Objectives

Skills/knowledge to be acquired at the end of this course: -

- Measurement of lens power, lens centration using conventional techniques
- Transposition of various types of lenses
- Measurement of surface powers using lens measure.
- Method of laying off the lens for glazing process

Course Outcomes

CO1	Knowledge to select the tool power for grinding process.
CO2	Knowledge of prism and decent ration in ophthalmic lenses. Knowledge of different types of materials used to make lenses and its characteristics.
CO3	Knowledge lens designs –single vision, bifocals, progressive lens. Knowledge on tinted and protective lenses.
CO4	Knowledge on special lenses like iseikonic, spectacle magnifiers. Knowledge on spectacle frames –manufacture, materials

Unit-1		**12 Hours**
Chapter 1.1	Introduction –Light, Mirror, Reflection, Refraction and Absorption	
Chapter 1.2	Prisms –Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units, Sign Conventions, Fresnel's prisms, rotary prisms	
Chapter 1.3	Lenses –Definition, units, terminology used to describe, form of lenses	
Chapter 1.4	Vertex distance and vertex power, effectively calculations	
Unit-2		**12 Hours**
Chapter 2.1	Lens shape, size and types i.e., Spherical, cylindrical and Sphero-cylindrical	

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	Transpositions –Simple, Toric and Spherical equivalent	
Chapter 2.2	Prismatic effect, centration, decentration and Prentice rule, Prismatic effect of Planocylinder and Spherocylindrical lenses	
Chapter 2.3	Spherometer & Sag formula, Edge thickness calculations	
Unit-3		**14 Hours**
Chapter 3.1	Magnification in high plus lenses, Minification in high minus lenses	
Chapter 3.2	Tilt induced power in spectacles	
Chapter 3.3	Aberration in Ophthalmic Lenses	

Suggested Books

1.Jalie M: The principles of Ophthalmic Lenses, The Association of Dispensing Opticians, London, 1994.

Reference Books

1.David Wilson: Practical Optical Dispensing, OTEN- DE, NSW TAFE Commission,1999 2. C V Brooks, IM OMrish: System for Ophthalmic Dispensing, Second edition, Butterworth Heinemann, USA, 1996

Semester	**First (3rd)**

Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-304-21	Allied health science	Core Theory	Optometric Instruments	3	1	0	-	25	75	100	4

Course Description

This course covers commonly used optometric instruments, its basic principle, description and usage in clinical practice.

Course Objectives

Upon completion of the course, the student should be able to gain theoretical knowledge and basic practical skill in handling the following instruments

1. Visual Acuity chart/drum
2. Retinoscope
3. Trail OMx
4. Jackson Cross cylinder
5. Direct ophthalmoscope
6. Slit lamp Bio microscope
7. Slit lamp Ophthalmoscopy (+90, 78 D)
8. Gonioscope
9. Tonometer: Applanation Tonometer
10. Keratometer
11. Perimeter
12. Electro diagnostic instrument (ERG, VEP, EOG)
13. A –Scan Ultrasound
14. Lens meter

Course Outcomes

CO1	Students will come to know about the various instruments used in the optometry
CO2	Student will be able to make a correct choice between the instruments used in the current day practice
CO3	Student will be able to demonstrate the working of the various instruments used in the optometry
CO4	Students will learn about the principle of working of various instruments and also will know to examine the various eye structures

Unit-1		**12 Hours**
Chapter 1.1	Optotypes and MTF, Spatial Frequency	

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Refractive instruments	Test charts standards. Choice of test charts Trial case lenses Refractor (phoropter) head units Optical considerations of refractor units Trial frame design	
Chapter 1.2	Near vision difficulties with units and trial frames	
	Retinoscope – types available Adjustment of Retinoscopes- special features Objective optometry. Infrared optometric devices. Projection charts	
Chapter 1.3		
	Illumination of the consulting room. Brightness acuity test Vision analyzer Pupil meter Potential Acuity Meter Aberrometer	
Unit-2	**Ophthalmoscopes and related devices**	**12 Hours**
Chapter 2.1		
	Design of ophthalmoscopes – illumination Design of ophthalmoscopes- viewing	
Chapter 2.2		
	Ophthalmoscope disc Filters for ophthalmoscopy	
Chapter 2.3		
	Indirect ophthalmoscope	
Unit-3		**14 Hours**
Chapter 3.1		
	Design of ophthalmoscopes – illumination Design of ophthalmoscopes- viewing	
Chapter 3.2		
	Refractometer, Orthoptic Instruments (Synaptophore Only) Color Vision Testing Devices. Fields of Vision and Screening Devices	
Chapter 3.3		
	Scans , ERG , New Instruments	

Suggested Books

1. David Henson: Optometric Instrumentations, Butterworth- Heinnemann, UK, Instrumentation 1991

Reference Books

1. P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002

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2. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997

Semester		First (3rd)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-305-21	Allied health science	Core Theory	**Ocular Disease-I**	3	1	0	-	25	75	100	4

Course Description

This course deals with various ocular diseases affecting various parts of the eyes. It covers clinical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.

Course Objectives

In this course the student will learn general idea of the fundamental aspect of the topic regarding infectious disease of eye and the steps for diagnosing and prevention and management of the infection

Course Outcomes

CO1	At the end of the course, the candidate will have sound knowledge of the agents responsible for causing human infections.
CO2	Recall the etio-pathogenesis, the pathological effects & the clinico-pathological correlation of common infections & non-infectious diseases
CO3	Correlate normal & altered morphology of eye in different diseases needed for understanding disease process & their clinical significance.
CO4	Acquire knowledge of common immunological disorders & their resultant effects on the human Body.

Unit-1		**12 Hours**
Chapter 1.1	**Anterior segment ocular diseases**	
	Anterior segment ocular diseases involving orbit, eyelids, adnexa, conjunctiva, cornea, urea, sclera, anterior chamber, iris and lens. Symptomatology, clinical signs, diagnosis, pathogenesis, pathophysiology, systemic disease relationships and treatment of degenerative, infections and inflammatory conditions affecting these structures Disease of the	
Chapter 1.2	**Lids**	
	Lids – Congenital Deformities of the Lids.	
Chapter 1.3	**Inflammatory Conditions of the Lids**	
	Oedema of the Lids. Inflammatory Conditions of the Lids. Deformities of the Lid Margins. Deranged Movement of the Eyelids. Neoplasm's of the Lids. Injuries of the Lids.	
Unit-2		**12 Hours**
Chapter 2.1	**Diseases of the Lachrymal Apparatus**	
	Diseases of the Lachrymal Apparatus-. Dry Eye. Disease of the Lachrymal Gland. Disease of the Lachrymal Passages. Operations for Chronic Dacryocystitis.	
Chapter 2.2	**Disease of the Conjunctiva**	
	Disease of the Conjunctiva- Subconjunctival Haemorrhage Infective Conjunctivitis. Follicular Conjunctivitis. Granulomatous Conjunctivitis. Allergic Conjunctivitis. Conjunctivitis Associated with Skin conditions. Degenerative conditions of the Conjunctiva. Vitamin- A Deficiency.	
Chapter 2.3	**Cysts and Tumours**	
	Cysts and Tumours of the Conjunctiva. Conjunctival Pigmentation. Injuries of the Conjunctiva.	
Unit-3		**14 Hours**
Chapter 3.1	**Disease of the Cornea**	
	Disease of the Cornea –Congenital Anomalies. Inflammation of the Cornea (Keratitis). Superficial Keratitis. Deep Keratitis. Vascularisation of Cornea. Opacities of the Cornea. Keratoplasty. Corneal Degenerations. Corneal Dystrophy's. Corneal Pigmentation. Corneal Injuries. Refractive Corneal Surgery. Corneal Ulcer (Bacterial, Viral, Fungal)	
Chapter 3.2	**Disease of the Ciliary Body**	
	Disease of the Ciliary Body- Inflammations of the Ciliary Body. Purulent Iriodocyclitis Panophthalmitis). Evisceration.	
Chapter 3.3	**Sympathetic Opthalmia**	
	Sympathetic Opthalmia. Vogt- Koyanagi – Harada Syndrome. Tumours of the Celery Body. Injuries of the Celery Body. Glaucoma-. Formation of Aqueous Humor. Drainage of Aqueous. Intraocular Pressure (IOP). Ocular Rigidity.	

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Suggested Books

1.Adrian bruce, Michael Loughnan: Anterior Eye Disease and Therapeutics A-Z 2nd Edition

2. Ashok Garg: Anterior & Posterior Segment OCT: Current Technology & Future Applications

Reference Books

1. Arturo Perez Arteaga: Anterior Segment Diseases, edition- 2010

2. Roger F. Steinert: Anterior segment optical coherence tomography.

Semester		First (3rd)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-306-21	Allied health science	Core Theory	Clinical examination of visual system	3	1	0	-	25	75	100	4

Course Description

This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment examination, neuroophthalmic examination, pediatric optometry examination, and Glaucoma evaluation.

Course Objectives

Knowing the purpose, setup and devices required for the test, indications and contraindications of the test, step-by-step procedures, documentation of the findings, and interpretation of the findings of the various clinical optometry procedures

Course Outcomes

CO1	Students will be able to understand the purpose, setup and devices required for the test
CO2	Student will be able to differentiate the various types of infections and their origin.
CO3	Student will develop the knowledge of chemotherapy and culture preparation.
CO4	Students will able to understand the various microbial mechanism of action towards eye infections

d. Syllabus

Unit-1		**12 Hours**
Chapter 1.1	History taking	
Chapter 1.2	Visual acuity estimation	
Chapter 1.3	Extraocular motility, Cover teat, Alternating cover test	
Chapter 1.4	Hirschberg test, Modified Krimsky	
Chapter 1.5	Pupils Examination	
Chapter 1.6	Maddox Rod	

Chapter 1.7	Van Herrick. External examination of the eye, Lid Eversion	
Unit-2		**12 Hours**
Chapter 2.1	Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer),	
Chapter 2.2	Color Vision	
Chapter 2.3	Stereopsis	
Chapter 2.4	Confrontation test	
Chapter 2.5	Photo stress test	
Unit-3		**14 Hours**
Chapter 3.1	Slit lamp bio microscopy. Ophthalmoscopy	
Chapter 3.2	Tonometry, ROPLAS	
Chapter 3.3	Amsler test 19, Contrast sensitivity function test	
Chapter 3.4	Contrast sensitivity function test 20. Saccades and pursuit test	

Suggested Books

1.Devlin, Thomas M., ed. "TextOMok of biochemistry: with clinical correlations." (2006)

2.Ananthanarayan, R "TextOMok Of Microbiology" Orient Longman 6th Edition

3.Ball, A.S." Bacterial Cell Culture" Wiley Pub. 1st Edition

Reference Books

1. Greenwoodd. "Medicalmicrobiology" Churchill Livingstone 17th Edition

2. Panjarathinam, R. "Medical Microbiology" New Age Pub.1st Edition

Semester		First (3rd)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-307-21	Allied health science	Core Theory	**Indian Medicine and Telemedicine**	3	1	0	-	25	75	100	4

Course Description

1. This course gives insight into existing healthcare system in India.

b. Course Objectives

At the end of the course student will be aware of the traditional and the latest healthcare system. The student also will get basic knowledge about the telemedicine practices in India especially in eye care.

c. Course Outcomes

CO1	Students will come to know about, Introduction to healthcare delivery system
CO2	Student will be able to learn Need for integration of various system of medicine
CO3	Student will be able to know about AYUSH system of medicine.
CO4	Student also will get basic knowledge about the telemedicine practices in India especially in eye care.

d. Syllabus

Unit-1		**12 Hours**
Chapter 1.1	Introduction to healthcare delivery system	
Chapter 1.2	Healthcare delivery system in India at primary, secondary and tertiary care	
Chapter 1.3	Community participation in healthcare delivery system	
Chapter 1.4	Health system in developed countries.	
Chapter 1.5	Private Sector in healthcare	
Chapter 1.6	National Health Mission	
Chapter 1.7	National Health Policy	
Chapter 1.8	Issues in Health Care Delivery System in India	
Chapter 1.9	National Health Program-Background objectives, action plan, targets, operations, achievements and constraints in various National Heath	

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	Programme.	
Chapter 1.10	**Introduction to AYUSH system of medicine**	
Introduction to	Ayurveda. Yoga and Naturopathy Unani Siddha Homeopathy Need for integration of various system of medicine	
Unit-2	**Health scenario of India- past, present and future**	**12 Hours**
Chapter 2.1	**Demography & Vital Statistics**	
	Demography – its concept Vital events of life & its impact on demography	
Chapter 2.2	Significance and recording of vital statistics	
Chapter 2.3	. Census & its impact on health policy	
Unit-3	**Epidemiology**	**14 Hours**
Chapter 3.1	Principles of Epidemiology	
	Natural History of disease.	
Chapter 3.2	Methods of Epidemiological studies	
Chapter 3.3	Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance	

Text Books

Margie Lovett Scott, Faith Prather. Global health systems comparing strategies for delivering health services. Joney& Bartlett learning, 2014 (page 167 -178)

Semester		First (3rd)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-308-21	Allied health science	Practical	Clinical optometry Ⅱ	3	0	1	-	25	75	100	4

Course Objectives

The resident will efficiently develop diagnosis differentials and diagnosis plans based on history intake

Course Outcomes

CO1	Student will understand the basic and advanced principles of Clinical Optometry.
CO2	Students will familiar with basic and advanced diagnostic procedures in Optometry.
CO3	Students apply knowledge from previous clinical learning experience under the supervision of a registered optometrist.
CO4	To do a thorough comprehensive eye examination.

d. Syllabus

Unit-1		**12 Hours**
Chapter 1.1	Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students will apply knowledge from previous clinical learning experience under the supervision of a registered optometrist. Students are tested on intermediate clinical optometry skills. The practical aspects of the dispensing optics (hand-on in optical), optometric instruments, clinical examination of visual system (Hands-on under supervision) and ocular diseases (Slides and case discussion) will be given to the students during their clinical training.	
Unit-2		**12 Hours**
Chapter 2.1	Practice of Streak Retinoscopy • Direct Opthalmoscopy-Normal Fundus • Subjective refraction – fogging, clockdial, fan, JCC, prism balance, TIB, duochrome, cyclodeimia, Slit refraction • Measurement of amplitude of accommodation. • Assessment of children Vision & Paediatric evaluation, diagnosis & management • Writing prescription.	
Unit-3		**14 Hours**

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Chapter 3.1	The students will perform vision examination, refraction and related measurements under the guidance of working clinical optometrist. Evaluation, Diagnosis & Optometric management of children with mental retardation C.P. Dyslexia, Multiple Sensory Motor Haudicap. Visual Disorders in senior citizens, evaluation, diagnosis+ management

Detailed Syllabus of 4th semester

Semester		(4th)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If [illegible])	Internal	External		
BOPT-401-21	Allied health science	Core Theory	**Optometric Optics-II & Dispensing Optics**	3	1	0	-	25	75	100	4

Course Description

This course deals with understanding the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe. It will impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect. In addition, deals with role of optometrists in optical set-up.

Course Objectives

Skills/knowledge to be acquired at the end of this course:

1. To select the tool power for grinding process
2. Different types of materials used to make lenses and its characteristics
3. Lens designs–Bifocals, progressive lens
4. Tinted, Protective & Special lenses
5. Spectacle frames –manufacture process & materials
6. Art and science of dispensing spectacle lens and frames based on the glass prescription.
7. Reading of spectacle prescription. Counselling the patient
8. Lens edge thickness calculation
9. Frame & lens measurements and selection
10. Writing spectacle lens order
11. Facial measurements - Interpupillary distance measurement and measuring heights (single vision, multifocal, progressives)
12. Lens verification and axis marking and fitting of all lens types

13. Final checking of finished spectacle with frame adjustments
14. Delivery and follow-up
15. Troubleshooting complaints and handling patient's questions

Course Outcomes

CO1	The candidate has clear understanding in terms and by calculation, various characteristics of advanced single vision and multifocal spectacle lenses and bifocal lenses
CO2	The candidate must have fundamental knowledge of spectacle lenses, so as to understand new technology as it arises and to appreciate what is fit for a given purpose
CO3	Student must be able troubleshoot the spectacle related issues.
CO4	Students must be able to help the subjects to find the best suitable spectacle frames as per their professional and personal needs

d. Syllabus

Unit-1		**12 Hours**
Chapter 1.1	**Spectacle Lenses – II**	
	Manufacture of glass • Lens materials • Lens surfacing • Principle of surface generation and glass cements • Terminology used in Lens workshop • Lens properties • Lens quality • Faults in lens material • Faults on lens surface • Methods of Inspecting the quality of lenses • Safety standards for ophthalmic lenses (FDA, ANSI, ISI, Others)	
Chapter 1.2	**Spectacle Frames**	
	• Types and parts • Classification of spectacle frames-material, weight, temple position, Coloration • Frame construction • Frame selection • Size, shape, mounting and field of view of ophthalmic lenses	
Chapter 1.3	**Tinted & Protective Lenses**	
	• Characteristics of tinted lenses Absorptive Glasses • Polarizing Filters, Photochromic & Reflecting filters • Safety lenses-Toughened lenses, Laminated Lenses, CR 39, PolycarOMnate	
Chapter 1.4	**Multifocal Lenses**	
	• Introduction, history and development, types • Bifocal lenses, Trifocal & Progressive addition lenses	
Unit-2		**12 Hours**
Chapter 2.1	**Reflection from spectacle lens surface & lens coatings:**	
	• Reflection from spectacle lenses - ghost images -Reflections in bifocals at the dividing line • Antireflection coating, Mirror coating, Hard Multi Coating [HMC],	

	Hydrophobic coating	
Chapter 2.2	**Miscellaneous Spectacle**	
	• Iseikonic lenses • Spectacle magnifiers • Recumbent prisms • Fresnel prism and lenses • Lenticular &A spherical lenses • High Refractive index glasses	
Unit-3	**Dispensing Optics**	**14 Hours**
Chapter 3.1	Components of spectacle prescription & interpretation, transposition, Add and near power relation	
Chapter 3.2	Frame selection –based on spectacle prescription, professional requirements, age group, face shape	
Chapter 3.3	Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height	
Chapter 3.4	Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments –facial wrap, pantoscopic tilt	
Chapter 3.5	Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements)	
Chapter 3.6	Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction)	
Chapter 3.7	Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories –Bands, chains, OMxes, slevets, cleaners, screwdriver kit	
Chapter 3.8	Spectacle repairs –tools, methods, soldering, riveting, frame adjustments	
Chapter 3.9	**Special types of spectacle frames**	
	• Monocles • Ptosis crutches • Industrial safety glasses • Welding glasses	
Chapter 3.10	Frame availability in Indian market FAQ's by customers and their ideal answers	

Suggested Books

1. Jalie MO: Ophthalmic lens and Dispensing, 3rd edition, Butterworth –Heinemann, 2008

2. Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth – Heinemann, 1996

Reference Books

1.C W Brooks, IM OMrish: System for Ophthalmic Dispensing, 3rdedition, Butterworth - Heinemann, 2007

2. Michael P Keating: Geometric, Phisical & Visual Optics, 2nd edition, Butterworth Heinemann, 2002.

Semester		(4th)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If)	Internal	External		
BOPT-402-21	Allied health science	Core Theory	**Visual Optics-II**	3	1	0	-	25	75	100	4

Course Objectives

The course aims to develop the insight of the basic visual techniques and their optimization and to develop an understanding of the diffraction and their relation to the correctness of various vision defects

Course Outcomes

CO1	Overview of the visual system and its optical system
CO2	Imaging using optic measures and the abnormalities in the optical measurements
CO3	Physical optics of the human eye
CO4	Correction of various visual defects

d. Syllabus

Unit-1		**12 Hours**
Chapter 1.1	**Spectacle refraction (F) &ocular refraction(K)**	
	Correction of myopia- spectacle refraction (F) – ocular refraction(K) – Relationship between F and K. correction of hypermetropia- the effect of vertex distance change. Correction of ametropia with thick lenses. Some problems involving K.	
Chapter 1.2	**Blurred images in the reduced and simplified schematic eyes**	
	Clear and blurred images in the reduced and simplified schematic eyes. The visual axis. Pupil size and blur disc diameter. Depth of field. retinal image size in uncorrected reduced eye. Spectacle magnification in reduced and corrected eyes. Nodal points and clear image size. Retinal images with a near object.	

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Chapter 1.3	**Magnification**	
	Spectacle magnification in near vision. The simple magnifier. Relative spectacle magnification. Correction of spherical ametropia with contact lens. Spectacle magnification with a contact lens.	
Unit-2		**12 Hours**
Chapter 2.1	**Ammetropia**	
	Ammetropia in the actual human eye. The growth of the human eye in emmetropia. Spherical ametropia in adult eye. Genetic aspects of refractive error. Summary of the causative factors involved in ametropia.	
Chapter 2.2	**Progressive myopia**	
	Progressive myopia. Juvenile stress myopia.	
Chapter 2.3	**Aphakia**	
	Aphakia. Reflective error in aphakia. The retinal image size in aphakia. Correction of aphkia by a contact lens. Use of an intraocular implant. Power of the implant and retinal image size. Clinical aspects of aphakia.	
Unit-3		**14 Hours**
Chapter 3.1	**Astigmatism**	
	Astigmatism. → Oblique astigmatism. Astigmatism in the reduced eye. The retinal images of point and extended objects.	
Chapter 3.2	**Correction of astigmatism**	
	Classification of astigmatism. Correction of astigmatism by sphero- cylindrical, toric and contact lenses Retinoscopy – principle and use. Clinical recording of standard of vision-visual acuity. Review of subjective refractive methods.	
Chapter 3.3	**Review of objective refractive methods**	
	Problem of review of objective refractive methods Cross cylindrical method of detecting astigmatism	

Suggested Books

1. William Davis (P): Understanding Human Anatomy and Physiology MC Graw Hill

2.Chaurasia: A Text OMok of Anatomy

3. Steven H. Schwartz: Geometrical and Visual Optics, Second Edition

Reference Books

1. Ronald B. Rabbetts: Bennett and Rabbett's Clinical Visual Optics, 4th Edition

2.Alan H. Tunnacliffe: Introduction to Visual Optics.

Semester		(4th)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-403-21	Allied health science	Core Theory	**Ocular Disease-II and Glaucoma**	3	1	0		25	75	100	4

Course Description

This course deals with various ocular diseases affecting various parts of the eyes. It covers clinical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.

Course Objectives

At the end of the course the students will be knowledgeable in the following aspects of ocular diseases: knowledge on

Course Outcomes

CO1	Students will be knowledgeable in Etiology. Epidemiology of the ocular diseases.
CO2	Student will able to learn about Symptoms and Signs of the ocular diseases.
CO3	Students will know about Diagnostic approach of the ocular diseases.
CO4	Student will learn Management of the ocular diseases.

Detailed Syllabus

Unit-1		**12 Hours**
Chapter 1.1	**Retina and Vitreous**	
	• Applied Anatomy • Congenital and Developmental Disorders (Optic Disc: ColoOMma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery) • Inflammatory disorders (Retinitis: Acute purulent, Bacterial, Virus, mycotic	

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	• Retinal Vasculitis (Eales's) • Retinal Artery Occlusion (Central retinal Artery occlusion) • Retinal Vein occlusion (Ischaemic, Non-Ischaemic, Branch retinal vein occlusion) • Retinal degenerations: Retinitis Pigmentosa, Lattice degenerations • Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular edema, Age related macular degeneration. • Retinal Detachment: Rhegmatogenous, Tractional, Exudative) • Retina blastoma • Diabetic retinopathy	
Chapter 1.2	Ocu**lar Injuries: Terminology**	
	Closed globe injury (Contusion, lamellar laceration) Open globe injury (Rupture, laceration, penetrating injury, perforating injury) • Mechanical injuries (Extraocular foreign Body, blunt trauma, perforating injury, sympathetic ophthalmitis) • Non-Mechanical Injuries (Chemical injuries, Thermal, Electrical, Radiational) • Clinical approach towards ocular injury patients	
Unit-2		**12 Hours**
Chapter 2.1	**Lens**	
	• Applied Anatomy and Physiology • Clinical examination • Classification of cataract • Congenital and Developmental cataract • Acquired (Senile, Traumatic, Complicated, MetaOMlic, Electric, Radiational, Toxic) • Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar. • Management of cataract (non-surgical and surgical measures; preoperative evaluation, Types of surgeries,) • Complications of cataract surgery • Displacement of lens: Subluxation, Displacement • Lens coloOMma, Lenticonus, Microsperophakia.	
Chapter 2.2	**Clinical Neuro-ophthalmology**	
	• Anatomy of visual pathway • Lesions of the visual pathway • Pupillary reflexes and abnormalities (Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopic pupil, Marcus gunn pupil. Argyll Robetson pupil, Adie's tonic pupil) • Optic neuritis, Anterior Ischemic optic neuropathy, Papilledema, optic atrophy • Cortical blindness • Malingering • Nystagmus • Clinical examination	
Unit-3		**14 Hours**
Chapter 3.1	**Glaucoma**	
	• Applied anatomy and physiology of anterior segment	

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	• Clinical Examination • Definitions and classification of glaucoma • Pathogenesis of glaucomatous ocular damage • Congenital glaucoma's • Primary open angle glaucoma • Ocular hypertension • Normal Tension Glaucoma • Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure) • Secondary Glaucoma's • Management: common medications, laser intervention and surgical techniques

Suggested Books

1.A K Khurana: Comprehensive Ophthalmology, 4th edition, new age international (p) Ltd. Publishers, New Delhi, 2007

Reference Books

1. Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990

2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth Heinemann, 200

Semester		(4th)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-404-21	Allied health science	Core Theory	**Pathology**	3	1	0		25	75	100	4

Course Description

This course describes basic aspects of disease processes with to specific entities relevant in optometry/ophthalmology.

Course Objectives

At the end of the course students will acquire knowledge in the following aspects:

1. Inflammation and repair aspects.
2. Pathology of various eye parts and adnexa.

Course Outcomes

CO1	Students will be able to understand the pathological states of the eye and their etiology
CO2	Student will be able to differentiate the various types of infections and their origin.
CO3	Student will develop the knowledge of chemotherapy and culture preparation.
CO4	Students will able to understand the various microbial mechanism of action towards eye infections

Detailed Syllabus

Unit-1		**12 Hours**
Chapter 1.1	Inflammation and repair	
Chapter 1.2	Infection in general	
Chapter 1.3	Specific infections	
	• Tuberculosis • Leprosy	

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	• Syphilis • Fungal infection • Viral chlamydial infection	
Chapter 1.4	Neoplasia	
Unit-2		**12 Hours**
Chapter 2.1	**Hematology**	
	• Anemia • Leukemia • Bleeding disorders	
Chapter 2.2	**Circulatory disturbances**	
	• ThromOMsis • Infarction EmOMlism	
Chapter 2.3	**Clinical pathology**	
	• Interpretation of urine report • Interpretation of blood smears.	
Unit-3		**14 Hours**
Chapter 3.1	Immune system	
Chapter 3.2	Shock, Anaphylaxis	
Chapter 3.3	Allergy	

Suggested Books

1. K S Ratnagar: Pathology of the eye & orbit, Jaypee brothers Medical Publishers, 1997

Reference Books

1. Corton Kumar and Robins: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004.

2. S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease, 1993.

Semester		(4th)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If)	Internal	External		
BOPT-405-21	Allied health science	Core Theory	**Basic and Ocular Pharmacology**	3	1	0		25	75	100	4

Course Description

This course covers the actions, uses, adverse effects and mode of administration of drugs, especially related to eyes.

Course Objectives

At the end of the course the students will acquire knowledge in the following aspects

1. Basic principle of pharmacokinetics & Pharmacodynamics.

2. Commonly used ocular drugs, mechanism, indications, contraindications, drug dosage and adverse effects.

Course Outcomes

CO1	Students will be able to make the correct choice of drug for a particular condition.
CO2	Student will be able to report an adverse drug reaction related to drug.
CO3	Student will be suggesting the pharmacotherapy.
CO4	Students will learn about the drugs mechanism of action and the routes of drugs for administration of ocular as well as systemic

Detailed Syllabus

Unit-1	General Pharmacology	12 Hours
Chapter 1.1	Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics (emphasis on ocular pharmacokinetics), Pharmacodynamics & factors modifying drug actions	

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Chapter 1.2	**Systemic Pharmacology**	
	Autonomic nervous system: Drugs affecting papillary size and light reflex, Intraocular tension, Accommodation; Cardiovascular system: Antihypertensive sand drugs useful in Angina; Diuretics: Drugs used in ocular disorders; Central Nervous System: Alcohol, sedative hypnotics, General & local anesthetics, Opioids & non-opioids; Chemotherapy : Introduction on general chemotherapy, Specific chemotherapy –Antiviral, antifungal, antibiotics; Hormones : Corticosteroids, Antidiabetics; Blood Coagulants	
Unit-2		**12 Hours**
Chapter 2.1	**Ocular Pharmacology**	
	Ocular preparations, formulations and requirements of an ideal agent; Ocular Pharmacokinetics, methods of drug administration & Special drug delivery system; Ocular Toxicology	
Unit-3		**14 Hours**
Chapter 3.1	Diagnostic & Therapeutic applications of drugs used in Ophthalmology: Diagnostic Drugs & biological agents used in ocular surgery, Anesthetics used in ophthalmic procedures, Anti-glaucoma drugs; Pharmacotherapy of ocular infections –Bacterial, viral, fungal & chlamydial; Drugs used in allergic, inflammatory& degenerative conditions of the eye; Immune modulators in Ophthalmic practice, Wetting agents & tear substitutes, Antioxidants	

Suggested Books

1. K D Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004

2. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996

Reference Books

1. T J Zimmerman, K S Kooner : Text OMok of Ocular Pharmacology, Lippincott-Raven, 1997

Semester		(4th)									
Course Code	Group	Course Type	Course Name / Title	Load Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-406-21	Allied health science	Core Theory	**Introduction to Quality & Patient safety**	2	1	0	-	25	75	100	4

Course Description

This course deals with various aspects of quality and safety issues in health care services.

Course Objectives

At the end of the course, students will gain introductory knowledge about quality and patient safety aspects from Indian perspectives

Course Outcomes

CO1	Student will identify instances of national patient safety goal non-compliance
CO2	Students will Identifies hazards/risks and opportunities for unsafe inpatient care through tracers and mapping of key patient care processes in inpatient setting
CO3	Student will actively participate in hospital committees and safety initiatives
CO4	Students will identify and demonstrates critical actions that contribute to error reduction and patient safety.

Detailed Syllabus

Unit-1		**12 Hours**
Chapter 1.1	Quality assurance and management	
Chapter 1.2	Basics of emergency care and life support skills	
Unit-2		**12 Hours**
Chapter 2.1	Biomedical waste management and environment safety	
Chapter 2.2	Infection and prevention control	
Unit-3		**14 Hours**
Chapter 3.1	Antibiotic resistance	
Chapter 3.2	Disaster preparedness and management	

Suggested Books

1. Patricia Barkway. Psychology for health professionals, 2nd edition, Elsevier, 2013

Semester		(4th)									
Course Code	Group	Course Type	Course Name / Title	Lord Allocation				Marks Distribution		Total Marks	Credit
				Lecture	Tutorial	Practical	Studio (If	Internal	External		
BOPT-407-21	Allied health science	Core Practical	**Clinical optometry**	0	0	6		-	-		2

Course Objectives

The resident will efficiently develop diagnosis differentials and diagnosis plans based on history intake.

Course Outcomes

CO1	Students will understand the basic and advanced principles of Clinical Optometry.
CO2	Students will be familiar with basic and advanced diagnostic procedures in Optometry.
CO3	Students will learn to apply knowledge from previous clinical learning experience under the supervision of a registered optometrist.
CO4	Students will learn to do a thorough comprehensive eye examination.

Detailed Syllabus

Unit-1		**12 Hours**
Chapter 1.1	Students will improve their skills in clinical procedures, and then progressive interactions with patients and professional personal are monitored as students practice optometry in supervised setting. Additional area includes problem solving and complications of various managements will be inculcated. Students should have exposure to eye bank facilities and must be made aware of eye donation, collection of eyes, preservation, pre and post-operative instructions and latest techniques for preservation of donor cornea. The students will get clinical training on the practical aspects of the following courses namely optometric optic-–II & dispensing optics, visual optics – II and ocular disease -II.	
Unit-2		**12 Hours**
Chapter 2.1	Sports vision. Refraction in special cases (pseudophakia, aphakia, irregular corneal astigmatism, coloboma of iris, choroids, retina, nystagmus, post R.K., PRK, LASIK) Congenital cataract, glaucoma. Patient with low vision. Patient with anisometropia (Anisokonia)	

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	Monocular & binocular subjective refraction	
Unit-3		**14 Hours**
Chapter 3.1	Non- Strabismic Biuoculan Disorders. Neuro- Optometric Rehabilitation. Strabismus & Aniblyopia. Evaluation, Diagnosis & Optometric management of children with mental retardation C.P. Dyslexia, Multiple Sensory Motor Haudicap. Refraction in special cases (pseudophakia, aphakia, irregular corneal astigmatism, coloboma of iris, choroids, retina, nystagmus, post R.K., PRK, LASIK)	