

Course Structure : Bachelor's in Optometry

Semester No	Paper Code	Paper Name	Total Marks ESE	Pass marks (40%)	Total Marks CCE	Pass marks (40%)	Total Marks	Pass marks (40%)
Semester 1	BOPT 101	General Anatomy & Physiology	70	28	30	12	100	40
	BOPT 102	Physical Optics & Lighting	70	28	30	12	100	40
	BOPT 103	Geometrical Optics	70	28	30	12	100	40
	BOPT 104	Biochemistry	70	28	30	12	100	40
	BENG 105	Communicative English I	35	14	15	06	50	20
	BENV 106	Environmental Sciences	35	14	15	06	50	20
	BMICP 107	Microbiology	35	14	15	06	50	20
Semester 2	BBIOP 108	Biochemistry	35	14	15	06	50	20
		Total	420		180		600	
	BOPT 201	Ocular Anatomy	70	28	30	12	100	40
	BOPT 202	Ocular Physiology	70	28	30	12	100	40
	BOPT 203	Ocular Biochemistry and basic pharmacology	70	28	30	12	100	40
	BOPT 204	Microbiology and pathology	70	28	30	12	100	40
	BENG 205	Communicative English II	35	14	15	06	50	20
	BENV 206	Basic of Computer/Math for Biologists	35	14	15	06	50	20
	BMICP 207	Practical Basic Lab Technology	35	14	15	06	50	20
	BBIOP 208	Practical Optometry	35	14	15	06	50	20
	Total	420		180		600		
Semester 3	BOPT 301	Optometric optics I	70	28	30	12	100	40
	BOPT 302	Optometric instrumentation	70	28	30	12	100	40
	BOPT 303	Clinical examination of the visual system	70	28	30	12	100	40
	BOPT 304	Geometrical optics II	70	28	30	12	100	40
	BENG 305	Communicative	35	14	15	06	50	20

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		English III						
	BARI 306	Analytical reasoning I	35	14	15	06	50	20
	BOPTP 307	Geometrical optics Practical	35	14	15	06	50	20
	BOPTP 308	Optometric Instrumentation Practical	35	14	15	06	50	20
		Total	420		180		600	
Semester 4								
	BOPT 401	Optometric optics II	70	28	30	12	100	40
	BOPT 402	Ocular diseases I	70	28	30	12	100	40
	BOPT 403	Nutrition and medical psychology	70	28	30	12	100	40
	BOPT 404	Dispensing optics I	70	28	30	12	100	40
	BENG 405	Communicative English IV	35	14	15	06	50	20
	BARII 406	Analytical reasoning II	35	14	15	06	50	20
	BOPTP 407	Dispersion Optics I Practical	35	14	15	06	50	20
	BOPTP 408	Practical Optometric Optics	35	14	15	06	50	20
		Total	420		180		600	
Semester 5								
	BOPT 501	Biostatistics	70	28	30	12	100	40
	BOPT 502	Ocular diseases II	70	28	30	12	100	40
	BOPT 503	Visual Rehabilitation & Vision training & Sports vision	70	28	30	12	100	40
	BOPT 504	Visual Optics (I) & (II)	70	28	30	12	100	40
	BOPTP 505	Visual Optics I Practical	35	14	15	06	50	20
	BOPTP 506	Visual Optics II Practical	35	14	15	06	50	20
		Total	350		150		500	
Semester 6								
	BOPT 601	Binocular vision I	70	28	30	12	100	40
	BOPT 602	Major eye diseases	70	28	30	12	100	40
	BOPT 603	Contact lenses I	70	28	30	12	100	40
	BOPT 604	Public-health, Community optometry & Occupational optometry	70	28	30	12	100	40

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	BOPTP 605	Practical Gluacoma	35	14	15	06	50	20
	BOPTP 606	Practical Contact lenses I	35	14	15	06	50	20
		Total	350		150		500	
Semester 7								
	BOPT 701	Low vision aid	70	28	30	12	100	40
	BOPT 702	Binocular vision II	70	28	30	12	100	40
	BOPT 703	Pediatric Optometry & Geriatric Optometry	70	28	30	12	100	40
	BOPT 704	Contact lenes II	70	28	30	12	100	40
	BOPTP 705	Practical Low vision aid	35	14	15	06	50	20
	BOPTP 706	Contact lenes II	35	14	15	06	50	20
		Total	350		150		500	
Semester 8								
	BOPT 801	Law, Basic Accountancy & Public relations	70	28	30	12	100	40
	BOPT 802	Dissertation	100	40	-	-	100	40
		Total	170	-	30		200	

OPTOMETRY

S.No	Paper Code	Paper Name	ESE	CCE	Total Marks
1	BOPT 101	General Anatomy & Physiology	70	30	100
2	BOPT 102	Physical Optics & Lighting	70	30	100
3	BOPT 103	Geometrical Optics	70	30	100
4	BOPT 104	Biochemistry	70	30	100
5	BENG 105	Communicative English I	35	15	50
6	BENV 106	Environmental Sciences	35	15	50
7	BOPT 107	Microbiology	35	15	50
8	BBIOCP 108	Biochemistry	35	15	50
			420	180	600

BOPT101 General Anatomy & Physiology

Objective:

This subject gives an insight of the parts of the human body their structure and function in detail.

Organs of the body will be studied to understand their structure, location in the body, their function and how they interact with other parts of the body. Students will acquire the knowledge necessary to understand what the body is doing and how they can help the body cope with many different

situations. A total of 66 hours is dedicated to this subject where teaching methods will include Lectures, demonstrations & Practicals and the mode of assessment shall be in the form of Written Paper.

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	INTRODUCTION- Anatomy and its subdivision, planes of the body, terms in relationship of structures, regional anatomy and organ systems	2 hours	Lecture/ power point	Written
2	TISSUES OF THE BODY: (Histology of body tissues) 2.1 Epithelium 2.2 Connective tissue 2.3 Bone and cartilage 2.4 Muscles: skeletal, plain, heart muscle 2.5 Blood vessels 2.6 Neuron, neuralgia 2.7 Glands, exocrine and endocrine 2.8 Skin and appendages 2.9 Lymphoid tissues	10 hours	Lecture/ power point	Written
3	ORGAN SYSTEMS: Locomotor system: bones, muscles, joint . Cardiovascular system: Heart, regional blood vessels, -arteries, veins. Lymphatic system including immune system Digestive system Respiratory system Reproductive system Endocrine Gland Nervous system: Cerebrum, cerebellum	9 hours	Lecture/ power point	Written
	Total	21 hours		

GENERAL PHYSIOLOGY

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	CELL Cell structure and organization Gene action Tissue organization: Epithelium. Connective tissue: - collagen fibers, elastic fibers, areola fiber cartilage and bone.	5 hours	Lecture/ power point	Written

	<p>Contractile tissue: - striated skeletal cardiac, nonstriated- Plain- myoepithelial. General principals of cell physiology Electro physiology of cells Physiology of skeletal muscle</p>			
2	<p>BLOOD Composition Volume measurement and variations Plasma proteins- classification and functions Red blood cells- development, morphology and measurements- functions and dysfunctions White blood cells- development, -classification, morphology and measurements, functions and dysfunctions Platelets - development, morphology - functions and dysfunctions Clotting- factors, mechanism anticoagulants- dysfunctions Blood grouping classification- importance in transfusion, Rh factor and Incompatibility Suspensions Osmotic fragility Reticulo-endothelial system: spleen, thymus, immune system, lymphatic tissue, and bone marrow, cellular, humoral and autoimmune.</p>	10 hours	Lecture/ power point	Written
3	<p>DIGESTION General arrangement Salivary digestion- functions and regulations Gastric digestion- functions and regulations Pancreatic digestion- functions and regulations Intestinal digestion- functions and regulations Liver and bile. Absorption Motility: Deglutition, Gastric, Intestinal, vomiting and defecation. Functions of the large intestine Neuro-humoral regulations of</p>	2 hours	Lecture/ power point	Written

	alimentary functions, summary.			
4	EXCRETION Body fluids- distribution, measurement and exchange. Kidney structure: Structure of nephron, mechanism of urine formations- composition of the urine and abnormal constituents- urinary bladder and micturation	2	Lecture/ power point	Written
5	ENDOCRINES Hormone mechanism- negative feed backs- tropic action Permissive action –cellular action Hypothalamic regulation Hypophysis: hormones, actions, and regulations. Thyroid: hormones, actions, and regulations. Adrenal cortex: hormones, actions, and regulations. Parathyroid: hormones, actions, and regulations. Islets of pancreas: hormones, actions, and regulations. Miscellaneous: hormones, actions, and regulations. Common clinical disorders	4	Lecture/ power point	Written
6	REPRODUCTION Male reproduction system – control and regulation – semen analysis Female reproduction system- uterus- ovaries – menstrual cycle – regulation pregnancy and delivery – breast –family planning	1	Lecture/ power point	Written
7	RESPIRATION Mechanics of respiration- pulmonary function tests- transport of respiratory gasesneural and chemical regulation of respiration –hypoxia, cyanosis, dyspnoea-asphyxia	1	Lecture/ power point	Written
8	CIRCULATION General principals Heart: myocardium- innervations – transmission of cardiac impulse- events	8	Lecture/ power point	Written

	during cardiac cycle- cardiac output. Peripheral circulation: peripheral resistance- arterial blood pressure measurement factors regulating variations- capillary circulation venous circulation. Special circulation: coronary cerebral -miscellaneous			
9	ENVIRONMENTAL PHYSIOLOGY Body temperature regulation (including skin physiology). Exposure to low and high atmospheric pressures	2	Lecture/ power point	Written
10	NERVOUS SYSTEM Neuron – Conduction of impulse–synapse- receptor. Sensory organizations - pathways and perception. Reflexes – cerebral cortex - functions. Thalamus – basal ganglia Cerebellum Hypothalamus	5	Lecture/ power point	Written
11	Autonomic nervous system – motor control of movements, posture and equilibrium- conditioned reflex, eye hand co-ordination. Sleep consciousness; behaviour, memory		Lecture/ power point	Written
12	SPECIAL SENSES- (Elementary) Olfaction- taste hearing vision	2	Lecture/ power point	Written
	Total	42 hours		

Reference:

1. Handbook of General Anatomy: Chaurasia, latest editions
2. Textbook of Physiology: Tortora
3. Gray's Anatomy, latest editions

BOPT 102 Physical Optics & Lighting

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	NATURE OF LIGHT Wave theory of light short comings of wave theory Quantum theory –dual nature of light Mathematical representation of wave-S.H.M.-energy composition of S.H.M. in a	7 hours	Lecture/ power point	Written

	<p>straight line & at right angles Huygen's principal- Laws of reflection and refraction at spherical surfaces & lenses Fermat's principal The paraxial region Ray and wave theory</p>			
2	<p>INTERFERENCE Description of phenomena- Young's experiment, coherent sources, phase and path difference, intensity. Theory of interference fringes Interference in thin films- interference due to reflected and transmitted light- Lloyd's single mirror Colors of thin films- wedge shaped thin films testing of planeness of surface Newton's rings experiment- refractive index of liquid Non-reflecting films Visibility of fringes</p>	6 hours	Lecture/ power point	Written
3	<p>Diffraction Single slit, qualitative and quantitative Circular aperture Double slit pattern and Kirchoff's integral Multiple slits grating Reflection grating and the zone plate</p>	4 hours	Lecture/ power point	Written
4	<p>POLARISATION Polarization Polarization of transverse waves- light as transverse waves Double refraction, principal plane, nicol prism- plane polarization Circular, elliptical polarization production, detection and behavior Polarization by selective absorption- dichroism Optical activity- Fresnel's half shade polarimeter Basic principals of holography Brewster's Law</p>	5	Lecture/ power point	Written
	<p>SPECTRUM</p>	2	Lecture/ power point	Written

Spectrum Sources of spectrum, Bunsen- carbon, mercury, sodium Emission and absorption spectra- classification – visible- ultraviolet and infra red spectra- electromagnetic spectrum Radiometry and spectroscopic instruments			
SCATTERING Scattering Rayleigh's scattering Raman Scattering Elements of EM theory in vector rotation and propagation of a wave in anisometric medium Surface Tension Viscosity	4	Lecture/ power point	Written
INTERFEROMETER – DEMONSTRATION	1	Lecture/ power point	Written
HIGHER ORDER ABERRATION AND ZERNIKE POLYMERS	2	Lecture/ power point	Written
BASICS OF LASERS	2	Lecture/ power point	Written
Total	33 hours	Lecture/ power point	Written

1. Textbook of Optics: Brij Lal and Subraminiam, latest editions

2. S. Chand, New Delhi, latest editions

BOPT 103 Geometrical Optics

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Visual tasks. Factors affecting visual tasks.	1 hours	Lecture/ power point	Written
2	Modern theory on light and color: synthesis of light	1 hours	Lecture/ power point	Written
3	Additive and subtractive synthesis of colors	1 hours	Lecture/ power point	Written
4	Light sources: Modern sources of light, spectral energy distribution- luminous efficiency- color temperature- color rendering	2	Lecture/ power point	Written
5	Illumination: Luminous flux, candela, solid angle, illumination, utilization factor, depreciation factor, and illumination	2	Lecture/ power point	Written

	laws			
6	Lighting installation: glare, luminaries, lighting fixtures, types of lighting	2	Lecture/ power point	Written
7	Photometry: measurement of illumination, photometers and filters	1	Lecture/ power point	Written
8	Eye care and lighting –special care with VDU	1	Lecture/ power point	Written
	Total	11 hours		

Reference

1. Textbook of Optics: Brij Lal and Subraminiam, latest editions
2. S. Chand, New Delhi, latest editions

BOPT 104 BASIC BIOCHEMISTRY

S.no	Topic/Sub-Topic	No. of hours	Mode/s of Teaching	Mode of Evaluation
1	Bioenergetic	6 hours	Lectures Demonstration	Written
	1.1 First and second laws of Thermodynamics. Definitions of Gibb's Free Energy, enthalpy and Entropy and mathematical relationship among them	2 hours	Lectures Demonstration	Written
	1.2 Standard free energy change and equilibrium constant	1 hour	Lectures Demonstration	Written
	1.3 Coupled reactions and additive nature of standard free energy change 1.4 Energy rich compounds: Phosphoenolpyruvate, 1,3-Bisphosphoglycerate, Thioesters, ATP	3 hours	Lectures Demonstration	Written

References (Chapter 14, *Lehninger Principles of Biochemistry* by Nelson DL and Cox MM, 5th Ed., W.H. Freeman and Company, 2008, Pages: 490-509)

S.no	Topic/Sub-Topic	No. of	Mode/s of	Mode of
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		hours	Teaching	Evaluation
2	Carbohydrates	10 hours	Lectures Demonstration	Written
	2.1 Families of monosaccharides: aldoses and ketoses, trioses, tetroses, pentoses, and hexoses.	2 hours	Lectures Demonstration	Written
	2.2 Stereo isomerism of monosaccharides, epimers	1 hour	Lectures Demonstration	Written
	2.3 Mutarotation and anomers of glucose. Furanose and pyranose forms of glucose and fructose. Haworth projection formulae for glucose; chair and boat forms of glucose	2 hours	Lectures Demonstration	Written
	2.4 Sugar derivatives, glucosamine, galactosamine, muramic acid, N- acetyl neuraminic acid	2 hours	Lectures Demonstration	Written
	2.5 Disaccharides; concept of reducing and non-reducing sugars, occurrence and Haworth projections of maltose, lactose, and sucrose	2 hours	Lectures Demonstration	Written
	2.6 Polysaccharides, storage polysaccharides, starch and glycogen. Structural Polysaccharides, cellulose, peptidoglycan and chitin	2 hours	Lectures Demonstration	Written

References (Chapter 9, Lehninger Principles of Biochemistry by Nelson DL and Cox MM, 5th Ed., W.H. Freeman and Company, 2008, Pages: 293-321)

S.no	Topic/Sub-Topic	No. of hours	Mode/s of Teaching	Mode of Evaluation
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3	Lipids	10 hours	Lectures Demonstration	Written
	3.1 Definition and major classes of storage and structural lipids.	2 hours	Lectures Demonstration	Written
	3.2 Storage lipids. Fatty acids structure and functions. Essential fatty acids. Triacyl glycerols structure, functions and properties. Saponification	2 hours	Lectures Demonstration	Written
	3.3 Structural lipids. Phosphoglycerides: Building blocks, General structure, functions and properties. Structure of phosphatidylethanolamine and phosphatidylcholine. Sphingolipids: building blocks, structure of sphingosine, ceramide. Special mention of sphingomyelins, cerebroside and gangliosides	3 hours	Lectures Demonstration	Written
	3.4 Lipid functions: cell signals, cofactors, prostaglandins	1 hours	Lectures Demonstration	Written
	3.5 Introduction of lipid micelles, monolayers, bilayers	2 hours	Lectures Demonstration	Written

Reference: (Chapters 11&12, Lehninger Principles of Biochemistry by Nelson DL and Cox MM, 5th Ed., W.H. Freeman and Company, 2008, Pages: 363-379 &389-393).

S.no	Topic/Sub-Topic	No. of hours	Mode/s of Teaching	Mode of Evaluation
4	Proteins	10 hours	Lectures Demonstration	Written
	4.1 Functions of proteins	1 hour	Lectures Demonstration	Written

	4.2 Primary structures of proteins: Amino acids, the building blocks of proteins. General formula of amino acid and concept of zwitterion. Titration curve of amino acid and its significance	2 hours	Lectures Demonstration	Written
	4.3 Classification, biochemical structure and notation of standard protein amino acids Ninhydrin reaction. Natural modifications of amino acids in proteins hydrolysine, cystine and hydroxyproline	2 hours	Lectures Demonstration	Written
	4.4 Non protein amino acids: Gramicidin, beta-alanine, D-alanine and D- glutamic acid	1 hour	Lectures Demonstration	Written
	4.5 Oligopeptides: Structure and functions of naturally occurring glutathione and insulin and synthetic aspartame	1 hour	Lectures Demonstration	Written
	4.6 Secondary structure of proteins: Peptide unit and its salient features. The alpha helix, the beta pleated sheet and their occurrence in proteins	1 hour		
	4.7 Tertiary and quaternary structures of proteins. Forces holding the polypeptide together. Human haemoglobin structure	1 hour		

	4.8 Quaternary structures of proteins	1 hour		

Reference: Chapter 4, Biochemistry by Voet, D. and Voet J.G., 3rd Ed., John Wiley and Sons, 2004: Pages: 65-78); Chapter 8, Biochemistry by Voet, D. and Voet J.G., 3rd Ed., John Wiley and Sons, 2004, Pages: 219-240; 265-266)

S.no	Topic/Sub-Topic	No. of hours	Mode/s of Teaching	Mode of Evaluation
5	Enzymes	10 hours	Lectures Demonstration	Written
	5.1 Structure of enzyme: Apoenzyme and cofactors, prosthetic group-TPP, coenzyme NAD, metal cofactors	2 hours	Lectures Demonstration	Written
	5.2 Classification of enzymes	1	Lectures Demonstration	Written
	5.3 Mechanism of action of enzymes: active site, transition state complex and activation energy. Lock and key hypothesis, and Induced Fit hypothesis. Significance of hyperbolic, double reciprocal plots of enzyme activity, K_m , and allosteric mechanism Definitions of terms – enzyme unit, specific activity and turnover number	2	Lectures Demonstration	Written
	5.4 Multienzyme complex : pyruvate dehydrogenase; isozyme: lactate dehydrogenase	2	Lectures Demonstration	Written
	5.5 Effect of pH and temperature	2	Lectures	Written

	on enzyme activity. Enzyme inhibition: competitive- sulfa drugs; non-competitive-heavy metal salts		Demonstration	
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Reference : (Chapter 8, Prescott, Harley and Klein’s Microbiology by Willey MJ, Sherwood, LM & Woolverton C J. 7th Ed., McGrawHill, 2008, Pages: 117-182;Chapter 13, Biochemistry by Voet,D. and Voet J.G., 3rdEd., John Wiley and Sons, 2004: Pages:459-471).

SUGGESTED READING

- 1.Campbell, MK (2012) Biochemistry, 7th ed., Published by Cengage Learning
- 2.Campbell, PN and Smith AD (2011) Biochemistry Illustrated, 4th ed., Published by Churchill Livingstone
- 3.Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd ed., W.H.Freeman
- 4.Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H.Freeman and Company
- 5.Basic Biochemistry by Chatterjee

ONLINE READING MATERIAL

1. Chapter on Structures and Functions of Biomolecules URL--<http://nsdl.niscair.res.in/handle/123456789/59>
2. Chapter on Enzymes in Microbial Physiology and Biochemistry URL-<http://nsdl.niscair.res.in/handle/123456789/392>

ITM-U/BENG 105 Communicative English

Parts of speech: Noun, Pronoun, verb, adverb, adjective, preposition, conjunction, interjection.

Exercises for all parts of speech

Past tense, present tense

Positive, Comparative and superlative form of adjectives.

Make sentences

Vocabulary building: synonyms, antonyms

Use of older, elder, near, next, farther, further

Letter writing:

Apology letter

Request for leave

Acknowledgement letter

Request for permission

Request for information

Friendly letters

REFERENCE:

Wren & Martin

ITM-U/BENV 106 ENVIRONMENTAL SCIENCES**Definition, Scope and Importance****Natural Resources: Renewable and Nonrenewable Resources**

Unit I – Forest, Water and Mineral resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people and relevant forest Act. Use and over-utilization of surface and ground water, floods drought, conflicts over water, dams benefits and problems and relevant Act. Use and exploitation, environmental effects of extracting and using mineral resources.

Unit II- food, Energy and Land resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging , salinity. Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Land as a resource, land degradation, man induced landslides soil erosion and desertification.

UNIT III- ECOSYSTEM**Concept, Structure and Function of and ecosystem**

Producers, consumers and decomposers. Energy flow in the ecosystem, Ecological succession

Food chains, food webs and ecological pyramids. Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and Aquatic Ecosystem.

Unit IV- Biodiversity and its Conservation

Introduction - Definition: genetic. species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use. productive use, social ethics, aesthetic and option values, Biodiversity at global, National and local levels, India as mega-diversity nation, Hot spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wild life, conflict,dangered and endemic species of India, Conservation of biodiversity: In situ and Ex-situ conservation of biodiversity.

UNIT V- Causes, effect and control measures of

Air water, soil, marine, noise, nuclear pollution and Human population, Solid waste management: Causes, effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution, Disaster Management: floods, earthquake, cyclone and landslides.

REFERENCE:

Textbook of environmental studies- Erach Bharucha, University PRESS

PRACTICALS

BOPTP 107 : MICROBIOLOGY

S.No	Name of Practical	Hours	Method
1	Basic Lab glassware: Test tubes, screw capped tubes, pipette, Pasteur pipettes, Erlenmeyer flask, Eppendorf tubes, pipette tips, cover slip and slides.	10 hours	Practical
2	Basic Lab instrumentation: Autoclave, incubator, Hot air oven, pH meter, Centrifuge, Laminar air flow. Separatory funnel, centrifuge, pH meter, Electric balance, hot plate	5 hours	Practical
3	Serial dilution with methyl orange indicator	3 hours	Practical
4	Principles & Working of the pH meter	3 hours	Practical
5	Determination of pH of water samples from different sources.	3 hours	Practical
6	Determination of pH of various solutions using a pH meter – NaOH, sulphuric acid, distilled water	3 hours	Practical

BBIACP 108: BIOCHEMISTRY

S.No	Name of Practical	Hours	Method
1	Basic Lab requirements Volumetric flask, falcons, mortar and pestle, watch glass, wash bottle, beaker, measuring cylinder, dropper, burette, spatula, reagent bottle, test tube stand, pipette stand, tripod stand, Bunsen burner, wire gauze, crucible, funnel, centrifuge tubes	5 hours	Practical
2	Instruments Separatory funnel, centrifuge, pH meter, Electric balance, hot plate	4 hours	Practical
3	Determination of pH of various solutions using a pH meter – NaOH, sulphuric acid, distilled water	3 hours	Practical
4	Preparation of Normal solution- NaOH	3 hours	Practical
5	Preparation of percentage/ vov-vol solutions- Sulphuric acid	3 hours	Practical
6	Paper Chromatography- Isolation of the pigments from leaves of Raddish		

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S.No	Paper Code	Paper Name	ESE	CCE	Total Marks
1	BOPT 201	Ocular Anatomy	70	30	100
2	BOPT 202	Ocular Physiology	70	30	100
3	BOPT 203	Ocular Biochemistry and basic pharmacology	70	30	100
4	BOPT 204	Microbiology and pathology	70	30	100
5	BENG 205	Communicative English II	35	15	50
6	BCBM 206	Basic of Computer/Math for Biologists	35	15	50
7	BBLTP207	Practical Basic Lab Technology	35	15	50
8	BOPTP 208	Practical Optometry	35	15	50
			420	180	600

Course Details -Semester 2ITM-BOPT- 201- Ocular Anatomy

Learning Objective: To provide the essential background in Eye anatomy. The subject will provide the essential background to the anatomy of the human visual system, including eye and brain with emphasis on Anatomy of first to seventh cranial nerve.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 35 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Central nervous system: 1.1 Spinal cord and brain stem 1.2Cerebellum 1.3 Cerebrum	6 hours	Lecture/ power point	Written
2	Eye 2.1Sclera 2.2Cornea 2.3 Choroid 2.4 Ciliary body 2.5 Iris & Pupil 2.6 Retina	10 hours	Lecture/ power point	Written
3	Refractory media 3.1 Aqueous humor 3.2 Anterior chamber 3.3 Posterior chamber 3.4 Lens 3.5 Vitreous body	6 hours	Lecture/ power point	Written
4	Eyelids	4 hours	Lecture/ power point	Written
5	Conjunctiva, Development of eye & adnexia, EOM	10 hours	Lecture/ power point	Written

1. Textbook of Ocular Anatomy and Physiology: A K Khurana, latest editions

ITM-BOPT- 202- Ocular Physiology

Learning Objective : To provide the essential background in Eye functioning and Mechanism of the eye in detail. The subject will provide the essential background to the visual functioning and physiology of the human visual system, including eye and brain.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 35 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Protective mechanisms of the eye: Eye lids and lacrimation, description of the globe	2 hours	Lecture/ power point	Written
2	Extrinsic eye muscles, their actions and control of their movements.	2 hours	Lecture/ power point	Written
3	Coats of the eyeball	2 hours	Lecture/ power point	Written
4	Cornea	4 hours	Lecture/ power point	Written
5	Aqueous humor and vitreous Intraocular tension.	3 hours	Lecture/ power point	Written
6	Iris and pupil	2	Lecture/ power point	Written
7	Crystalline lens and accommodation –presbyopia, Mechanism- Accommodatio	3	Lecture/ power point	Written
8	Retina- structure & functions	4	Lecture/ power point	Written
9	Vision- general aspects of sensation	2	Lecture/ power point	Written
10	Pigments of the eye and photochemistry	4	Lecture/ power point	Written
11	The visual stimulus, refractive errors	3	Lecture/ power point	Written
12	Visual acuity, vernier acuity and the principals of measurement	2	Lecture/ power point	Written
13	Visual perception- Binocular vision, stereoscopic vision, optical illusions	4	Lecture/ power point	Written
14	Visual pathway, central and cerebral connections	5	Lecture/ power point	Written

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15	Color vision and color defects. Theories and diagnostic tests, Color mixing	5	Lecture/ power point	Written
16	Introduction to Electro Physiology	4	Lecture/ power point	Written
17	Scotopic and Photopic Vision, Retinal sensitivity & Visibility Receptive stimulation&Flicker	4	Lecture/ power point	Written
18	Ocular movement & saccades	2	Lecture/ power point	Written
19	Visual perception and adaptation, Introduction to visual psychology (Psychophysics)	4	Lecture/ power point	Written

- 1.Textbook of Ocular Anatomy and Physiology: A K Khurana, latest editions
- 2.Adler's Physiology of the Eye, latest editions

ITM-BOPT- 203- Ocular Biochemistry and basic pharmacology

Learning Objective: The subject will extend the range of clinical and academic material by providing the basic and pharmacology and pharmaceuticals for the application of diagnostic and over-the-counter ophthalmic drugs in general clinical optometric practice.

Learning outcomes: The material will provide a basis for understanding the therapeutic use of drugs in the treatment of external eye pathology and glaucoma.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 35 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Hormones basic concepts in metabolic regulation with examples say insulin	2	Lecture/ power point	Written
2	Metabolism. General whole body metabolism.(Carbohydrates, proteins, lipids.)	2	Lecture/ power point	Written
3	Ocular Biochemistry Various aspects of the eye, viz., cornea, lens aqueous, vitreous, retina and pigment rhodopsin. (The important chemicals in each and their roles.) Immunology of anterior segment	8	Lecture/ power point	Written
4	Technique. Colloidal state, sol. Gel. Emulsion, dialysis, electrophoresis. pH buffers mode of action, molar and percentage solutions, photometer, colorimeter and spectrometry	4	Lecture/ power point	Written

5	Radio isotopes: application in medicine and basic research.	1	Lecture/ power point	Written
6	Clinical Biochemistry Blood sugar, urea, creatinine and bilirubin significance of their estimation	4	Lecture/ power point	Written
7	General Pharmacology 7.1.Mechanisms of drug action 7.2 Dose –response relationship 7.3 Tachyphylaxis & idiosyncrasy 7.4Pharmacokinetics of drug absorption, distribution, Biotransformation, excretion and toxicity 7.5Factors influencing drug metabolism of drug action	6	Lecture/ power point	Written
8	ACTION OF SPECIFIC AGENTS 8.1Depressants 8.2Anti- coagulants 8.3C.N.S. Stimulants and antidepressants 8.4Diuretics and hypertensive agents 8.5Cardiovascular drugs 8.6Histamines 8.7Serotonin 8.8Prostaglandins	4	Lecture/ power point	Written
9	PRINCIPLES OF OCULAR PHARMACOLOGY 3.1 Current optometric drugs in use 3.2Preparation and packaging of ophthalmic drugs. 3.3General principals of ocular pharmacology: Drug actions and effectiveness. Drug safety. Factors influencing the objectively demonstrated response, Ocular penetration and Routes of ocular penetration	4	Lecture/ power point	Written
10	OPTOMETRIC DIAGNOSTIC DRUG 4.1Optometric use in pharmaceuticals 4.2Disinfection & Sterilization –Clinical instruments in particular	4	Lecture/ power point	Written

- 1.Biochemistry of the eye: Whikehart, latest editions
- 2.Basic Pharmacology : K D Tripathy, latest editions

ITM-BOPT- 204 – Microbiology and Pathology

Learning Objective: This subject covers in general the microbes and pathogens that are not only present in the the eye but in the whole body along with their different nature. Also different methods of stopping these pathogens from invading the body will be discussed.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 35 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Inflammation and repair	4	Lecture/ power point	Written
2	Infection in general	6	Lecture/ power point	Written
3	Specific infections 3.1 Tuberculosis 3.2 Leprosy 3.3 Syphilis 3.4 Fungal infection 3.5 Viral chlamydial infection	5	Lecture/ power point	Written
4	Neoplasia	5	Lecture/ power point	Written
5	Haematology 5.1 Anemia 5.2 Leukemia 5.3 Bleeding disorders Anemia : Introduction, Classification and Lab diagnosis of : Iron Deficiency Aneamia Hemolytic Aneamia ,Megaloblastic Anemia,Sickle cell Anemia	6	Lecture/ power point	Written
6	Circulatory disturbances 6.1 Thrombosis, Infarction 6.2 Embolism	6	Lecture/ power point	Written
7	Clinical pathology 7.1 Interpretation of urine report 7.2 Interpretation of blood smears	5	Lecture/ power point	Written
8	Immune system	6	Lecture/ power point	Written
9	Shock, Anaphylaxis, Allergy	5	Lecture/ power point	Written

1. Basic Pathology: Robbins, Kumar and Cotran, Elsevier Publications, latest editions
2. Basis of Microbiology: Ananthnaraya, Orient Longman, latest editions

ITM-BENG- 205 – Communicative English II

Learning Objective: The module is designed to provide introduction to Communicative English. It also gives scope to develop proficiency in the language and will help increase the usage of better vocabulary.

Learning outcomes: After successful completion of this module the students would be able to understand and write the language with confidence which would help in their personality development.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
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1	Vocabulary building: Synonyms & antonyms	5	Lecture/ power point	Written
2	Parts of speech: Noun, pronoun, verb, adverb, adjective, conjunction, interjection & prepositions and Exercises	10	Lecture/ power point	Written
3	Reading Comprehension	5	Lecture/ power point	Written
4	Sentences: Simple, compound, Complex	4	Lecture/ power point	Written
5	Essay writing	6	Lecture/ power point	Written

REFERENCE:

Wren & Martin

ITM-BCBM- 206 – Basics of Computer & Math for Biologists

Learning Objective: The module is designed to provide introduction to Basic math and provides practical approach to hone your computer skills.

Learning outcomes: After successful completion of this module the students would be able to use basic computers to make their projects, presentations and perform statistical functions.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Basic integrals	8	Lecture/ power point	Written
2	Basic statistics: Mean, median, mode	6	Lecture/ power point	Written
3	Word, power point, excel	10	Lecture/Practical	Written
4	Internet and its advantages & disadvantages ** Scholarly article search engine, sites	6	Lecture/Practical	Written

1.Comdex Computer kit, latest editions

Practicals**ITM-BBLTP- 207 – Basic Lab Technology****Standard of passing:**

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 35 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Spots and techniques d. Cotton plugs preparation di. Method of sterilization dii. Auclaving diii. Microscope div. Media dv. Plating methods	8	Practical	Written/Practical
2	Media preparation	8	Practical	Written/Practical
3	Plating techniques, slant preparation	6	Practical	Written/Practical
4	Stab culture	4	Practical	Written/Practical
5	Isolation of bacteria from air, soil, water	6	Practical	Written/Practical
6	Preparation of blood smear	2	Practical	Written/Practical
7	Identification of blood group (Kit)	4	Practical	Written/Practical
8	Amylase test	2	Practical	Written/Practical
9	Protein estimation by Folin Ciocalteu Reagent (Lowry method)	2	Practical	Written/Practical
10	Buffer Preparation (Sodium)	2	Practical	Written/Practical

ITM-BOPTP- 208 – Optometry**Standard of passing:**

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 35 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Spots Anatomical structures: Heart Kidney Eye Skeleton	10	Practical	Written/Practical
2	Optical instruments, their principle and uses	2	Practical	Written/Practical
3	Isolation of blood plasma	6	Practical	Written/Practical
4	Blood clotting and anti-coagulation with EDTA	4	Practical	Written/Practical
5	Height, weight measurement and BMI calculation	4	Practical	Written/Practical
6	Use of eye power detecting kit	5	Practical	Written/Practical

Course details: Semester 3

S.No	Paper Code	Paper Name	ESE	CCE	Total Marks
1	BOPT 301	Optometric optics I	70	30	100
2	BOPT 302	Optometric instrumentation	70	30	100
3	BOPT 303	Clinical examination of the visual system	70	30	100
4	BOPT 304	Geometrical optics II	70	30	100
5	BENG 305	Communicative English III	35	15	50
6	BARI 306	Analytical reasoning I	35	15	50
7	BOPTP 307	Geometrical Optics Practicals	35	15	50
8	BOPTP 308	Optometric Instrumentation Practical	35	15	50
			420	180	600

ITM-BOPT- 301- Optometric Optics I

Learning Objective: This subject requires the student to learn the different forms of lenses, manufacturing techniques, surface properties, other parameters and overall quality of lens from manufacturing unit to dispensing counter.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 31 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	SPECTACLE LENSES –PART I		Lecture/ power point	Written
	Introduction to spectacle lenses	1	Lecture/ power point	Written
	Forms of lenses	1	Lecture/ power point	Written
	Cylindrical lenses	1	Lecture/ power point	Written

	Properties of crossed cylinders	1	Lecture/ power point	Written
	Toric lenses	1	Lecture/ power point	Written
	Toric transposition	1	Lecture/ power point	Written
	Astigmatic lenses	1	Lecture/ power point	Written
	Axis direction of astigmatic lenses	1	Lecture/ power point	Written
	Obliquely crosses cylinders	1	Lecture/ power point	Written
	Sag formula	1	Lecture/ power point	Written
	Miscellaneous spectacle lenses	1	Lecture/ power point	Written
	Vertex distance and vertex power	1	Lecture/ power point	Written
	Tilt induced power	1	Lecture/ power point	Written
	Aberrations in ophthalmic lenses	1	Lecture/ power point	Written
2	SPECTACLE LENSES –PART II		Lecture/ power point	Written
	Manufacturing techniques of glass	1	Lecture/ power point	Written
	Lens surfacing	1	Lecture/ power point	Written
	Principle of surface generation & glass cements	1	Lecture/ power point	Written
3	LENS QUALITY		Lecture/ power point	Written
	Faults in lens materials	1	Lecture/ power point	Written
	Faults in lens surface	1	Lecture/ power point	Written
	Inspecting the quality of lenses	1	Lecture/ power point	Written
4	OPHTHALMIC PRISMS		Lecture/ power point	Written
	Definition of prisms; units of prism power	1	Lecture/ power point	Written
	Thickness difference and base –apex notation	1	Lecture/ power point	Written
	Dividing, compounding and resolving prisms	1	Lecture/ power point	Written
	Rotary prisms and effective prism power in near vision	1	Lecture/ power point	Written
	Prismatic effects, decentration, Prentice’s rule	1	Lecture/ power point	Written
	Prismatic effect of sphero-cylinders & plano-cylinders	1	Lecture/ power point	Written
	Differential prismatic effect	1	Lecture/ power point	Written
5	SPECTACLE FRAMES		Lecture/ power point	Written
	Frame types and parts	1	Lecture/ power point	Written
	Classification of spectacle frames-material, weight, temple position, coloration	1	Lecture/ power point	Written
	Frame construction	1	Lecture/ power point	Written
	Frame Measurements and markings	1	Lecture/ power point	Written

2.Clinical Optics: Fanin, latest editions

ITM-BOPT- 302- Optometric Instrumentation

Learning Objective: The subject will provide the optics and use of Instruments in the field of Optometry. The subject will teach the theory of, and examination with, instrumentation for anterior and posterior eye evaluation, such as ophthalmoscopy, Retinoscopy, contrast sensitivity, color vision and visual acuity measurements (trial case lenses and accessories in the trial box, glare & contrast testing, potential acuity meter and stereo tests), etc. It will also teach the use of instruments required in Specialty fields like Orthoptics and Low Vision.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 48 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Binocular Vision	1	Lecture/ power point	Written
2	Simple and compound microscope- oil immersion eyepiece	1	Lecture/ power point	Written
3	Refractive instruments	1	Lecture/ power point	Written
	Test charts standards	1	Lecture/ power point	Written
	Choice of test charts	1	Lecture/ power point	Written
	Trial case lenses & trial frame design	1	Lecture/ power point	Written
	Refractor (phoropter) head units	1	Lecture/ power point	Written
	Optical considerations of refractor units	1	Lecture/ power point	Written
	Near vision difficulties with units and trial frames	1	Lecture/ power point	Written
	Retinoscope – types available	1	Lecture/ power point	Written
	Adjustment of retinoscopes- special features	1	Lecture/ power point	Written
	Cylinder retinoscopy	1	Lecture/ power point	Written
	Objective optometers, Coincidence optometers- principals and details, Infrared optometer devices	1	Lecture/ power point	Written
	The interpretation of objective findings	1	Lecture/ power point	Written
	Special subjective test- polarizing and displacement- etc	1	Lecture/ power point	Written

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	Projection charts	1	Lecture/ power point	Written
	Illumination of the consulting room	1	Lecture/ power point	Written
4	SPECIAL INSTRUMENTS & TESTS Brightness acuity test, Vision analyzer,Pupilometer, Video acuity test, Potential Acuity Meter, Abberometer	3	Lecture/ power point	Written
	OPHTHALMOSCOPES AND RELATED DEVICES Design of ophthalmoscopes – illumination Design of ophthalmoscopes- viewing Ophthalmoscope disc filters for ophthalmoscopy Indirect ophthalmoscope The use of ophthalmoscope in special cases	2	Lecture/ power point	Written
5	Lensometer, Lens gauges or clock	2	Lecture/ power point	Written
6	SLIT LAMP Slit lamp systems Viewing microscope systems Scanning laser devices Slit lamp accessories Mechanical design instruments	2	Lecture/ power point	Written
7	TONOMETER Tonometer principles Types of tonometers and standardization Use and interpretation of tonometers	2	Lecture/ power point	Written
8	FUNDUS CAMERA Fundus camera-principles Fundus camera – techniques External eye photography apparatus	1	Lecture/ power point	Written
9	Keratometer and corneal topography	1	Lecture/ power point	Written
10	Refractometer	2	Lecture/ power point	Written
11	ORTHOPTIC INSTRUMENTS Orthoptic instruments – hapaloscopes Orthoptic instruments- in office & home devices Orthoptic instruments –pleoptics Historical instruments New instruments currently in use	2	Lecture/ power point	Written
12	COLOR VISION TESTING DEVICES Color confusion Hue discrimination Colour matching Different charts used by various age groups	1	Lecture/ power point	Written
13	FIELDS OF VISION AND SCREENING 2 DEVICES	2	Lecture/ power point	Written

	Perimeter and visual field Campimeters and fixation devices Illumination of field-testing instruments Projection perimeters and campimeters Screening devices for field defects Results of field examination Vision screeners – principles & details, analysis Bowl perimeter Automated perimeters			
14	Optical devices and electronic (low vision) aids	1	Lecture/ power point	Written
15	OPHTHALMIC ULTRASONOGRAPHY Biometry & Ultrasound “A” scan “B” scan & UBM OCT, HRT & GDx	3	Lecture/ power point	Written
16	Pachymetry & Specular microscopy	1	Lecture/ power point	Written
17	Electrophysiology (VEP, ERG, EOG)	2	Lecture/ power point	Written
18	FFA	1	Lecture/ power point	Written
19	Radiuscope	1	Lecture/ power point	Written
20	Gonioscopy	1	Lecture/ power point	Written
21	Newer instruments	2	Lecture/ power point	Written

1. Optometric Instrumentation: David Henson, latest editions

2. Primary Care in Optometry: Theodore G, latest editions

3. Optics & Refraction: A.K. Khurana, latest editions

ITM-BOPT- 303 / OPTP 308- Clinical examination of the visual system

Learning Objective: To introduce the range of clinical optometry work and will cover both objective and subjective examination methods. The Subject will teach the theory of, and examination with, ophthalmoscopy, Retinoscopy and other methods for objective assessment of refractive error, subjective techniques for assessing visual acuity and the subjective procedures of fan & block and cross cylinder, etc.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 35 (minimum) / 12 Practicals

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Binocular Vision	1	Lecture/ power point	Written
2	Simple and compound microscope- oil immersion eyepiece	1	Lecture/ power point	Written
3	Refractive instruments	1	Lecture/ power point	Written
	Test charts standards	1	Lecture/ power point	Written
	Choice of test charts	1	Lecture/ power point	Written
	Trial case lenses & trial frame design	1	Lecture/ power point	Written
	Refractor (phoropter) head units	1	Lecture/ power point	Written
	Optical considerations of refractor units	1	Lecture/ power point	Written
	Near vision difficulties with units and trial frames	1	Lecture/ power point	Written
	Retinoscope – types available	1	Lecture/ power point	Written
	Adjustment of retinoscopes- special features	1	Lecture/ power point	Written
	Cylinder retinoscopy	1	Lecture/ power point	Written
	Objective optometers, Coincidence optometers- principals and details, Infrared optometer devices	1	Lecture/ power point	Written
	The interpretation of objective findings	1	Lecture/ power point	Written
	Special subjective test- polarizing and displacement- etc	1	Lecture/ power point	Written
	Projection charts	1	Lecture/ power point	Written
	Illumination of the consulting room	1	Lecture/ power point	Written
	SPECIAL INSTRUMENTS & TESTS Brightness acuity test, Vision analyzer,Pupilometer, Video acuity test, Potential Acuity Meter, Abberometer	3	Lecture/ power point	Written
4	OPHTHALMOSCOPES AND RELATED DEVICES Design of ophthalmoscopes – illumination Design of ophthalmoscopes- viewing Ophthalmoscope disc filters for ophthalmoscopy Indirect ophthalmoscope The use of ophthalmoscope in special cases	2	Lecture/ power point	Written
5	Lensometer, Lens gauges or clock	2	Lecture/ power point	Written
6	SLIT LAMP Slit lamp systems Viewing microscope systems Scanning laser devices Slit lamp accessories Mechanical design instruments	2	Lecture/ power point	Written

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7	TONOMETER Tonometer principles Types of tonometers and standardization Use and interpretation of tonometers	2	Lecture/ power point	Written
8	FUNDUS CAMERA Fundus camera-principles Fundus camera – techniques External eye photography apparatus	1	Lecture/ power point	Written
9	Keratometer and corneal topography	1	Lecture/ power point	Written
10	Refractometer	2	Lecture/ power point	Written
11	ORTHOPTIC INSTRUMENTS Orthoptic instruments – hapaloscopes Orthoptic instruments- in office & home devices Orthoptic instruments –pleoptics Historical instruments New instruments currently in use	2	Lecture/ power point	Written
12	COLOR VISION TESTING DEVICES Color confusion Hue discrimination Colour matching Different charts used by various age groups	1	Lecture/ power point	Written
13	FIELDS OF VISION AND SCREENING 2 DEVICES Perimeter and visual field Campimeters and fixation devices Illumination of field-testing instruments Projection perimeters and campimeters Screening devices for field defects Results of field examination Vision screeners – principles & details, analysis Bowl perimeter Automated perimeters	2	Lecture/ power point	Written
14	Optical devices and electronic (low vision) aids	1	Lecture/ power point	Written
15	OPHTHALMIC ULTRASONOGRAPHY Biometry & Ultrasound “A” scan “B” scan & UBM OCT, HRT & GDx	3	Lecture/ power point	Written
16	Pachymetry & Specular microscopy	1	Lecture/ power point	Written
17	Electrophysiology (VEP, ERG, EOG)	2	Lecture/ power point	Written
18	FFA	1	Lecture/ power point	Written
19	Radiuscope	1	Lecture/ power point	Written

20	Gonioscopy	1	Lecture/ power point	Written
21	Newer instruments	2	Lecture/ power point	Written

1. Primary Care in Optometry: Grosvenor
2. Clinical Procedures in Optometry: Eskridge, latest editions

ITM-BOPT- 304- Geometrical optics II

Learning Objective: Geometrical (ray) optics will help the students to understand the basics of light reflection and refraction and the use of simple optical elements such as mirrors, prisms, lenses, and fibers.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 21 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	<p>INTRODUCTION</p> <p>1.1 Vergence and vergence techniques revised. Lens power, prism power, and cylindrical lenses</p> <p>1.2 Gullstrand's schematic eyes, visual acuity, Stiles Crawford experiment and binocular Telescopes</p> <p>1.3 Emmetropia and ametropia</p> <p>1.4 Correction of spherical ametropia</p> <p>1.5 Thin lens model of the eye – angular magnification – magnification of microscope telescope, spectacle and relative spectacle magnification</p> <p>1.6 Aperture stops- entrance and exit pupils</p> <p>1.7 Applications- to calculate the angular magnification, dioptric power of the spectacles, spectacles magnification, entrance and exit pupils, vertex distances</p> <p>1.8 Astigmatism. - Applications –for e.g. to calculate the dioptric power, angular magnification of spectacles in aphakic, presbyopic patients. To calculate the position of the line image in a spherocylindrical lens</p>	21 hours	Lecture/ power point	Written

	s 1.9 Spatial distribution of optical information-modulation transfer functions- Spatial filtering-applications			
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- 1.As in Geometrical Optics (I)
- 2.Optics & Refraction: A.K.Khurana, latest editions

ITM-BENG- 305 – Communicative English III

Learning Objective: The module is designed to provide introduction to Communicative English. It also gives scope to develop proficiency in the language and will help increase the usage of better vocabulary.

Learning outcomes: After successful completion of this module the students would be able to understand and write the language with confidence which would help in their personality development.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1.	Sentence formation	5	Lecture/Power point	Written
2	Details of tenses	5	Lecture/Power point	Written
3.	Essay writing	5	Lecture/Power point	Written
4.	Listening comprehensions.	5	Lecture/Power point	Written
5	Dictations, Reading Skills -Types Of Reading	5	Lecture/Power point	Written

Suggested Reading – Wren & Martin

ITM-BARI- 306 – Analytical Reasoning I

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Verbal Reasoning:	2	Lecture/ power point	Written

	• Analogy			
2	• Classification	3	Lecture/ power point	Written
3	• Word formation	2	Lecture/ power point	Written
4	• Statement and conclusions	5	Lecture/ power point	Written
5	• Syllogism • Statement and assumptions • Statement and arguments	6	Lecture/ power point	Written
6	• Coding Decoding • Blood Relations • Passage and conclusions	7	Lecture/ power point	Written

Practicals

ITM-BOPTP- 307 – Geometric Optics

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 12 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Spectrometer- minimum deviation	1	Practical	Practical/Written
2	Spectrometer- i-d curve	1	Practical	Practical/Written
3	Spectrometer – i-i'' curve	1	Practical	Practical/Written
4	Spectrometer –narrow angled prism	1	Practical	Practical/Written
5	Refractive index by microscope	1	Practical	Practical/Written
6	Foci meter	1	Practical	Practical/Written
7	Dispersive power of a prism	1	Practical	Practical/Written
8	Toric lens and meniscus lens	1	Practical	Practical/Written
9	Nodal slide	1	Practical	Practical/Written
10	Boy''s method –radius of curvature	1	Practical	Practical/Written
11	Liquid lens	1	Practical	Practical/Written
12	Refractive index of lenses	1	Practical	Practical/Written

ITM-BOPTP- 308 – Practical Optical Instrumentation

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 12 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Syllabus same as theory paper	12	Practical	Practical/Written

Semester 4: Course details

S.No	Paper Code	Paper Name	ESE	CCE	Total Marks
1	BOPT 401	Optometric optics II	70	30	100
2	BOPT 402	Ocular diseases I	70	30	100
3	BOPT 403	Nutrition and medical psychology	70	30	100
4	BOPT 404	Dispensing optics I	70	30	100
5	BENG 405	Communicative English IV	35	15	50
6	BARII 406	Analytical reasoning II	35	15	50
7	BOPT 407	Practical Dispension Optics I	35	15	50
8	BOPT 408	Practical Optometric Optics	35	15	50
			420	180	600

ITM-BOPT- 401- Optometric Optics II

Learning Objective: This subject requires the student to learn the different characteristics and forms of lenses, coatings, manufacturing techniques, surface properties, other parameters and overall quality of lens from manufacturing unit to dispensing counter.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 35 (minimum) / 12 Practicals

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Tinted and protective lenses & frames	1	Lecture/ power point	Written
2	Characteristics of tinted lenses	1	Lecture/ power point	Written
3	Absorptive glasses	1	Lecture/ power point	Written
4	Polarizing filters	1	Lecture/ power point	Written
5	Photo chromatic filters	1	Lecture/ power point	Written
6	Reflecting filters	1	Lecture/ power point	Written
7	Bifocal lenses & Trifocal lenses	3	Lecture/ power point	Written
8	Progressive addition lenses	3	Lecture/ power point	Written
9	Lenticular lenses	1	Lecture/ power point	Written
10	Spectacle magnifiers	1	Lecture/ power point	Written

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11	Recumbent prisms and Fresnel prisms	1	Lecture/ power point	Written
12	Reflections from spectacle lenses, ghost images reflections in bifocals at the dividing line	3	Lecture/ power point	Written
13	Anti-reflection coating	1	Lecture/ power point	Written
14	Safety Lenses / Toughened Lenses	1	Lecture/ power point	Written
15	Aspheric Lenses	1	Lecture/ power point	Written
16	Surface coated lenses	1	Lecture/ power point	Written
17	Field of the view of the lenses	1	Lecture/ power point	Written
18	Size, shape and mounting of the ophthalmic lenses	1	Lecture/ power point	Written
19	Lens Defects, Glazing & Edging	4	Lecture/ power point	Written
20	Lens forms & Standards	1	Lecture/ power point	Written

1. Textbook of Optics: M Jalle, latest editions
2. Clinical Optics: Fanin, latest editions

ITM-BOPT- 402 Ocular Diseases I

Learning Objective: The optometrists are becoming increasingly involved in the diagnosis and management of patients with different abnormal ocular conditions. This subject examines the brief introduction of eye most of the anterior segment eye diseases and their management. Emphasis is placed upon the advanced optometric management of these diseases. In some instances, education beyond current optometric practice is introduced in an effort to prepare the students for different clinical challenges that could appear in this ever-changing profession. Furthermore, the Subject intends to give the student the necessary knowledge for their future postgraduate assessments

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 20 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	EYELIDS Eyelid anatomy Congenital & developmental anomalies Blepharospasm Ectropion & Entropion Trichiasis and symblepharon Eyelids tumors Ptosis: types and its evaluation Eyelid retraction Eyelid trauma	3	Lecture/ power point	Written

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2	LACRIMAL SYSTEM Lacrimal anatomy Lacrimal pump and its mechanism Methods of lacrimal evaluation Congenital and development anomalies of the lacrimal system Lacrimal obstruction Lacrimal sac tumors Lacrimal trauma	2	Lecture/ power point	Written
3	SCLERA, EPISCLERA Scleritis and episcleritis Ectasia and staphyloma	1	Lecture/ power point	Written
4	ORBIT Orbital anatomy Incidence of orbital abnormalities Methods of orbital examination Congenital and developmental anomalies of the orbit Orbital tumors Orbital inflammation Sinus disorders affecting the orbit Orbital trauma	3	Lecture/ power point	Written
5	CONJUNCTIVA AND CORNEA Inflammation Therapeutic principles Specific inflammatory diseases Tumors Tumors of epithelial origin glandular and adenexal Tumors Tumors of neuroectodermal origin Vascular Tumors Xanthomatous origins Inflammatory tumors Metastatic lesions Degenerations and dystrophies: Definitions, Degenerations, Dystrophies, Corneal Dystrophies Miscellaneous conditions Keratoconjunctivitis Sicca (KCS) Tear function tests Steven- Johnson's syndrome Ocular Rosacea Atopic eye disorders Benign mucosal pemphigoid (BMP) – ocular Pemphigoid Vitamin A deficiency Metabolic diseases associated with corneal changes	7	Lecture/ power point	Written
6	IRIS, CILIARY BODY AND PUPIL Congenital anomalies Primary and secondary disease of the iris and ciliary body Tumors Anomalies of pupillary reaction	4	Lecture/ power point	Written
7	CHOROID	1	Lecture/ power point	Written

Congenital anomalies of the choroid			
Diseases of the choroid			
Tumors			

1. Systemic Diseases Of The Eye: Kanski, Mosby, latest editions
2. Ophthalmology: A.K.Khurana, latest editions
3. Diseases of the Eye: Parsons, latest editions

ITM-BOPT- 403 Nutrition & Medical Psychology

Learning Objective: This subject covers basic concepts of the nutrition, its elements and deficiencies, malnourishment, over- nourishment is discussed in NUTRITION and basic concepts of psychology in relation to dealing with patients in requirement of counseling is discussed in PSYCHOLOGY.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 27 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	INTRODUCTION History of Nutrition Nutrition as a science Food groups, FDA Balanced diet, diet planning Assessment of nutritional status	2	Lecture/ power point	Written
2	ENERGY Units of energy Measurements of energy and value of food Energy expenditure Total energy/calorie requirement for different age groups and diseases Satiety value Energy imbalance- obesity, starvation Limitations of the daily food guide	3	Lecture/ power point	Written
3	PROTEINS Sources and functions Essential and non- essential AA Incomplete and complete proteins Supplementary foods PEM and the eye Nitrogen balance Changes in protein requirement	4	Lecture/ power point	Written

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4	FATS Sources and functions Essential fatty acids Excess and deficiency Lipids and the eye Hyperlipidemia, heart diseases, atherosclerosis	4	Lecture/ power point	Written
5	MINERALS General functions and sources Macro and micro minerals associated with the eye Deficiencies and excess – ophthalmic complications (e.g. iron, calcium, iodine etc.)	5	Lecture/ power point	Written
6	General functions, and food sources 3 Vitamin deficiencies and associated eye disorders with particular emphasis to Vitamin A Promoting sound habits in pregnancy, lactation and infancy Nutrient with antioxidant Properties Digestion of Proteins, carbohydrates & lipids Essential amino acids Miscellaneous- Measles and associated eye disorders, low birth weight	10	Lecture/ power point	Written
7	Medical Psychology Introduction to medical psychology: definitions-schools of thought; fields of psychology	2	Lecture/ power point	Written
8	Man in society: Emotions & feelings Motivation- human motivation Personality- what is it? Concept of body image Normality and abnormality Why medical psychology The patient in his milieu- socio economic status The patient therapist relationship Illness- its impact on the patient	8	Lecture/ power point	Written
9	Eye diseases- their impact on the patient	1	Lecture/ power point	Written
10	The patient's adaptation to variants of normalcy in vision – prejudices and biases	1	Lecture/ power point	Written
11	Rehabilitation of the blind	1	Lecture/ power point	Written

1.Introductory Nutrition – Helen a. Guthrie, latest editions

2.Psychology In Action, Karen Huffman, 6 th ed, John Wiley and Sons 2001, latest editions

ITM-BOPT- 404 Dispensing Optics I**Learning Objective:** This subject requires th students to learn parts of frame, facial measurements and other

parameters in detail which they will deal with in day to day practice.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 14+14 practicals=28 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Introduction to lens manufacture. - Surfacing and polishing glass lenses	1	Lecture/ power point	Written
2	Glazing	1	Lecture/ power point	Written
3	Frame manipulation and repair	4	Lecture/ power point	Written
4	Facial measurements and frame choice	2	Lecture/ power point	Written
5	Power and measurements and frame choice	2	Lecture/ power point	Written
6	Complete dispensing for subjects	2	Lecture/ power point	Written
7	Special lenses- examination of specimens	2	Lecture/ power point	Written

1. Systems of Ophthalmic Dispensing: Brooks and Bousch, latest editions

ITM-BENG- 405 – Communicative English IV

Learning Objective: The module is designed to provide introduction to Communicative English. It also gives scope to develop proficiency in the language and will help increase the usage of better vocabulary.

Learning outcomes: After successful completion of this module the students would be able to understand and write the language with confidence which would help in their personality development.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Conversational english	5	Lecture/ power point	Written
2	Rephrasing	5	Lecture/ power point	Written
3	Writing skill development	5	Lecture/ power point	Written
4	Paragraph, Letter Writing, Essay writing, Memo, Circular, Notice, Cover Letter, Resume, Thesis,	10	Lecture/ power point	Written

Summary, Précis, Speaking			
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Suggested Reading : Wren & Martin

ITM-BARI- 406 – Analytical Reasoning II

Learning Objective: The module is designed to provide introduction to Communicative English. It also gives scope to develop proficiency in the language and will help increase the usage of better vocabulary.

Learning outcomes: After successful completion of this module the students would be able to understand and write the language with confidence which would help in their personality development.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Alphabet test • Series Test • Number , Ranking and time sequence	5	Lecture/ power point	Written
2	• Direction sense Test • Decision making test	5	Lecture/ power point	Written
3	• Figure series • Input/output, Assertion and reasoning • Sitting Arrangement	5	Lecture/ power point	Written
4	Non-Verbal Reasoning: • Series test • Odd figure Out	5	Lecture/ power point	Written
5	• Analogy • Miscellaneous Test etc.	5	Lecture/ power point	Written

ITM-BOPTP- 407 – Practical Dispensing Optics I

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 14 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
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1	Syllabus same as theory paper	14	Practical	Practical/Written
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TM-BOPTP- 408– Practical Optometric Optics**Standard of passing:**

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 14 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Syllabus same as theory paper	14	Practical	Practical/Written

Semester 5: Course details

S.No	Paper Code	Paper Name	ESE	CCE	Total Marks
1	BOPT 501	Biostatistics	70	30	100
2	BOPT 502	Ocular diseases II	70	30	100
3	BOPT 503	Visual Rehabilitation & Vision training & Sports vision	70	30	100
4	BOPT 504	Visual Optics (I) & (II)	70	30	100
7	BOPTP 505	Practical Visual Optics I	35	15	50
8	BOPTP 506	Practical Visual Optics II	35	15	50
			350	150	500

ITM-BOPT- 501 Biostatistics

Learning Objective: This subject includes statistics calculations required for conducting a research as an evidence on paper and is important in every field for continuous up gradation. It helps students conduct research individually and analyse their data collected.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 26 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Introduction of Biostatistics	1	Lecture/ power point	Written
2	Measures of Morality	1	Lecture/ power point	Written
3	Sampling	2	Lecture/ power point	Written
4	Statistical significance	2	Lecture/ power point	Written
5	Correlation	2	Lecture/ power point	Written
6	Sample size determination	2	Lecture/ power point	Written
7	Statistics – Collection of Data - presentation including classification & diagrammatic representation – frequency distribution. Measures of central tendency; measures of dispersion	6	Lecture/ power point	Written
8	Theoretical distributions. Binomial, Normal, Sampling –	4	Lecture/ power point	Written

	necessity of methods & techniques.			
9	Chi. Square test	2	Lecture/ power point	Written
10	Hospital statistics: Collection of hospital statistical data – presentation – analysis of daily hospital service – monthly and annual reports. Computation of percentages in patient census, bed occupancy rate	4	Lecture/ power point	Written

1.Principles And Practice Of Biostatistics, Dr J V Dixit, latest editions

ITM-BOPT- 502 Ocular Diseases II

Learning Objective: The subject continues from the basis of Third Semester lectures on Ocular Diseases (I). This will cover the most of the eye diseases relevant to the Posterior segment of the eye. The emphasis would be made on propersigns and symptoms of these relevant diseases. Emphasis is placed upon the advanced optometric managementof these diseases. In some instances, education beyond current optometric practice is introduced in an effort toprepare the students for different clinical challenges that could appear in this ever-changing profession.Furthermore, the Course intends to give the student the necessary knowledge for their future postgraduate assessments, and Optometrist role in eye care services.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 20 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	VITREOUS Developmental abnormalities Hereditary hyaloidoretinopathies Juvenile retinoschisis Asteroid hyalosis Cholestrolosis Vitreous hemorrhage Blunt trauma and vitreous Inflammation and vitreous Parasitic infestations Pigment granules in the vitreous Vitreous complications in cataract surgery	2	Lecture/ power point	Written
2	RETINA Retinal vascular anomalies Diseases of the choroidal vasculature, Bruch’s membrane, retinal pigment epithelium Retinal tumors	7	Lecture/ power point	Written

	<p>Retinoblastoma Phacomatoses Retinal vascular abnormalities Retinal and optic nerve head astrocytomas Lymphoid tumors Tumors of the retinal pigment epithelium Other retinal disorders Retinal inflammations Metabolic diseases affecting the retina Miscellaneous disorders Electromagnetic effects on the retina Retinal physiology & psychophysics Hereditary macular disorders (including albinism) Peripheral retinal degenerations Retinal holes and detachments Intraocular foreign bodies Photocoagulation</p>			
<p>3</p>	<p>Neuro- ophthalmic examination History Visual function test Technique of pupillary examination Ocular motility Checklist for testing Visual sensory system Retina, Optic disc & optic nerve Optic Chiasm & Optic Tracts Lateral geniculate Body Optic Radiations Visual Cortex Visual field The blood supply of the anterior and posterior visual systems disorders of visual system OCT, ERG, VEP, EOG Ocular motor system Supranuclear control of eye movements Saccadic system & Clinical disorders of the saccadic system Gaze palsies Progressive supranuclear palsies, Parkinson’s disease Ocular motor apraxia, ocular oscillation. Smooth pursuit system, vergences system and disorders Cerebella system Non- visual reflex system Position maintenance system Nystagmus Ocular motor nerves, and medial longitudinal fasciculus The facial nerve</p>	<p>6</p>	<p>Lecture/ power point</p>	<p>Written</p>

	Pain and sensation from the eye Autonomic nervous system Selected systemic disorders with neuro-ophthalmologic signs			
4	LENS Anatomy and pathophysiology Normal anatomy and aging process Developmental defects Acquired lenticular defects Management of lenticular defects	2	Lecture/ power point	Written
5	TRAUMA: Anterior & Posterior segment trauma	2	Lecture/ power point	Written
6	BLINDNESS Blindness definitions Causes Social implications Rationale therapy Drug induced ocular disease	1	Lecture/ power point	Written

Suggested reading :As in Ocular diseases (I)

ITM-BOPT- 503 Visual Rehabilitation & Vision training & Sports vision

Learning Objective: The subject continues from the basis of Third Semester lectures on Ocular Diseases (I). This will cover the most of the eye diseases relevant to the Posterior segment of the eye. The emphasis would be made on propersigns and symptoms of these relevant diseases. Emphasis is placed upon the advanced optometric managementof these diseases. In some instances, education beyond current optometric practice is introduced in an effort toprepare the students for different clinical challenges that could appear in this ever-changing profession.Furthermore, the Course intends to give the student the necessary knowledge for their future postgraduate assessments, and Optometrist role in eye care services.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 74 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Introduction to Optometric Rehabilitation	2	Lecture/ power point	Written
	History of Rehabilitation Optometry	2	Lecture/ power point	Written
	Definition and Principles of Rehabilitation	1	Lecture/ power point	Written
	Psychology in Optometric Rehabilitation Pain and Suffering Adaptation and Compensatory	2	Lecture/ power point	Written

Adjustmen Human Motivation Psychological Disturbance and Psychotherapy			
Symptomatology of Visual Disorders E.g. 1. Poor Balance 2. Visual Hallucinations 3. Poor Depth Perception 4. Poor Tracking Ability 5. Poor Visual memory 6. Poor Hand –Eye co-ordination 7. Others	2	Lecture/ power point	Written
Therapeutic Approach to Optometric Rehabilitation	1	Lecture/ power point	Written
Visual Therapy Training	2	Lecture/ power point	Written
Orthoptics	2	Lecture/ power point	Written
Peripheral Nerve Regeneration	2	Lecture/ power point	Written
Central Nervous System and Cognitive Remediation	2	Lecture/ power point	Written
The Physiologic / Aspects and Clinical Application of Functional Electrical Stimulation in Rehabilitation	2	Lecture/ power point	Written
Counseling	2	Lecture/ power point	Written
A) Optometric Rehabilitation Assessments: Actual Case Exposure & Observation Low Vision	2	Lecture/ power point	Written
No Visual Field Defect Central Visual Field Defect Peripheral Visual Field Defect B) Neurology Cerebral Palsy Cerebrovascular Accidents Head Injury Motor Neuron Diseases Multiple Sclerosis Muscular Dystrophy Parkinson’s Disease Peripheral Nerve Lesion Spinal Cord Lesion Brain Tumor Post – concussion Syndrome Others Special Concerns 1. Visual Agnosia 2. Alexia 3. Dyslexia 4. Dementia 5. Legally Blind 6. Down’s Syndrome 7. Others	2	Lecture/ power point	Written

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	Introduction to Optometric Rehabilitation Practice A Basis for Practice Roles in Daily Life and Professional Practice	10	Lecture/ power point	Written
	Optometric Rehabilitation Management Preliminary Rehabilitative Assessment and Screening Medical / Orthoptics / Low Vision / Surgical management Case History, Symptomatology and Expectations Psychological and Behavioral Assessment Referral:- Medical; Rehabilitation	1	Lecture/ power point	Written
	Rehabilitative Evaluation and Diagnosis Activity analysis and Interest Comprehensive Evaluation of Visual Skills Diagnosis of Visual Skill Dysfunction Prescribing of Appropriate Therapy and Enhancement of Remaining Skills: Visual Skills, Motility, Life Skills Adaptation / Orientation / Environmental Manifestation Counseling and Recommendation Referral System and / or Co-Management Physiatrist, physical therapist, occupational therapist, cognitive therapist, psychologist, neurologist, others	5	Lecture/ power point	Written
	Clinical Presentation and Case	4	Lecture/ power point	Written
	VISION TRAINING AND SPORTS VISION		Lecture/ power point	Written
1	Principles of Vision Training	1	Lecture/ power point	Written
2	Introduction to Sports Vision History of Sports Vision Definitions of Terms	1	Lecture/ power point	Written
3	Vision and Sports: Vision Performance and Athletics	1	Lecture/ power point	Written
4	Equipment List	1	Lecture/ power point	Written
5	Sports Terminologies	1	Lecture/ power point	Written
6	Sports Vision Examination	1	Lecture/ power point	Written
	Visual Acuity & Contrast	1	Lecture/ power point	Written
	Refraction	1	Lecture/ power point	Written
	Color Vision	1	Lecture/ power point	Written
	Stereopsis	1	Lecture/ power point	Written

	Dominant Eye / Hand	1	Lecture/ power point	Written
	Eye Health	1	Lecture/ power point	Written
	Ocular Motility	1	Lecture/ power point	Written
	Cover Test	1	Lecture/ power point	Written
	Visual Field	1	Lecture/ power point	Written
	Night Vision	1	Lecture/ power point	Written
7	Glare Sensitivity	1	Lecture/ power point	Written
	Glare Recovery	1	Lecture/ power point	Written
	Visual Skills Description and Training Procedures	1	Lecture/ power point	Written
	Accommodation – Vergence Facility	1	Lecture/ power point	Written
	Distance Fixation Disparity	1	Lecture/ power point	Written
	Dynamic Visual Acuity	1	Lecture/ power point	Written
	Eye–Hand & Eye-Foot Co-ordination, Response Speed	1	Lecture/ power point	Written
	Peripheral Awareness	1	Lecture/ power point	Written
	Anticipation Timing	1	Lecture/ power point	Written
	Visual Concentration	1	Lecture/ power point	Written
	Speed of Recognition	1	Lecture/ power point	Written
	Visual Adjustability	1	Lecture/ power point	Written
	Peripheral Reaction Time	1	Lecture/ power point	Written
	Visualization	1	Lecture/ power point	Written
	Speed of Focusing	1	Lecture/ power point	Written
	Increased Fusional Reserve	1	Lecture/ power point	Written
	Fixation Ability	1	Lecture/ power point	Written
8	Visual Memory	1	Lecture/ power point	Written
	Spatial Localization	1	Lecture/ power point	Written
	Visual Skills in Sports and Development	1	Lecture/ power point	Written
9	Designing Sports Vision Programs	1	Lecture/ power point	Written
10	Sports-related Injuries and First Aid	1	Lecture/ power point	Written

1.Sports Vision Donald F C Loran Butterworth- Heinemann, latest editions

ITM-BOPT- 503 Visual Optics I & II

Learning Objective: The subject continues from the basis of Third Semester lectures on Ocular Diseases (I). This will cover the most of the eye diseases relevant to the Posterior segment of the eye. The emphasis would be made on propersigns and symptoms of these relevant diseases. Emphasis is placed upon the advanced optometric managementof these diseases. In some instances, education beyond current optometric practice is introduced in an effort toprepare the students for different clinical challenges that could appear in this ever-changing profession.Furthermore, the Course intends to give the student the necessary knowledge for their future postgraduate assessments, and Optometrist role in eye care services.

Teaching Methodology: Lectures, Demonstrations & Practicals**Standard of passing:**

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 44 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	REVIEW OF GEOMETRICAL OPTICS Vergence and power Conjugacy, object & image space Sign convention Spherical refracting surface Spherical mirror; catoptrics power Cardinal points Magnification Light and visual function Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization, Birefringence, Dichroism Aberration and application Spherical and Chromatic	2	Lecture/ power point	Written
2	OPTICS OF OCULAR STRUCTURE Cornea and aqueous Crystalline lens Vitreous Schematic and reduced eye	7	Lecture/ power point	Written
3	MEASUREMENTS OF OPTICAL CONSTANTS OF THE EYE Corneal curvature and thickness Keratometry Curvature of the lens and ophthalmophakometry Axial and axis of the eye Basic Aspects of Monocular Vision. - Light and Dark Adaptation - Color Vision - Spatial and Temporal Resolution - Science of Measuring visual performance - Application to Clinical Optometry.	6	Lecture/ power point	Written
4	REFRACTIVE ANOMALIES AND THEIR CAUSES Etiology of refractive anomalies Contributing variability and their ranges Populating distributions of anomalies Optical component measurements Growth of the eye in relation to refractive errors	2	Lecture/ power point	Written

	Visual Optics II	2	Lecture/ power point	Written
6	Refractive conditions Emmetropia Myopia Hyperopia Astigmatism Accommodation Presbyopia Anisometropia and Aniseikonia Aphakia and Pseudophakia Correction and management of Amblyopia	1	Lecture/ power point	Written
7	ACCOMMODATION AND ITS RELATION TO EYE Far and near points of accommodation Correction of spherical ametropia Axial versus refractive ametropia Relationship between accommodation and convergence, AC / A ratio		Lecture/ power point	Written
8	Retinoscopy Retinoscopy- principles and methods Retinoscopy – speed of reflex and optimum condition Retinoscopy –design consideration. Dynamic / Static Review of objective refractive methods Different types of techniques with retinoscopy Review of subjective refractive methods Cross cylinder methods for astigmatism, Astigmatic Fan Test Difficulties in subjective and objective tests and their avoidance Transposition of lenses Spherical equivalent		Lecture/ power point	Written
9	REFRACTION & MAGNIFICATION Effective power of spectacles: vertex distance effect Ocular refraction versus spectacle refraction Ocular accommodation versus spectacle accommodation Spectacle magnification and relative spectacle magnification Retinal image blur; depth of focus and depth of field Prescribing Prisms / Binocular Refraction		Lecture/ power point	Written
10	The principles of Photometry measuring blur spread, functions		Lecture/ power point	Written

11	Defocus Blur on point, line and edge spread-functions, the images of gratings (square wave and single wave) Relation between luminous flux and luminous intensity, luminance and illuminance and units of measurement. Blur factors contributing to blur of the retinal image (improper focus, aberration, diffraction and scatter) WRITTEN The concept of spatial frequency and modulation (contrast) Modulation transfer function (MTF) of the eye Measuring the optical transfer function of lenses (OTF) and contrast sensitivity Human MTF, use of MTF, its relation to the blur spread functions (using Fourier theory) Constraints on the use of MTF	Lecture/ power point	Written
12	Pupil: Optical and sensory aspects	Lecture/ power point	Written

1. Clinical Optics: Bannet and Rabbets
2. Principles of Optics & Refractions: Duke Elder, latest editions
3. Optics & Refraction: A.K.Khurana, latest editions

ITM-BOPTP- 505– Practical Visual Optics I

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 17 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Study of Purkinje image II and I. and III and IV.	2	Practical	Written /Practical/Viva
2	Measurement of corneal curvature	2	Practical	Written /Practical/Viva
3	Measurement of corneal thickness	1	Practical	Written /Practical/Viva
4	Mathematical models of the eye- emmetropia, Hyperopia, Myopia	2	Practical	Written /Practical/Viva
5	Conjugate points – demonstration- worked examples	2	Practical	Written /Practical/Viva

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6	Axial and refractive hyperopia, myopia - worked examples	1	Practical	Written /Practical/Viva
7	Effect of lenses in front of the eye	2	Practical	Written /Practical/Viva
8	Effect of prisms in front of the eye	2	Practical	Written /Practical/Viva
9	Vision through pinhole, slit, filters, etc.	2	Practical	Written /Practical/Viva

ITM-BOPTP- 506– Practical Visual Optics II**Standard of passing:**

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 25 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Phorometry	2	Practical	Written /Practical/Viva
2	Visual acuity, stereo acuity in emmetropia	1	Practical	Written /Practical/Viva
3	Myopia and pseudomyopia, myopia and visual acuity	1	Practical	Written /Practical/Viva
4	Myopic correction- subjective verification & monocular & binocular	1	Practical	Written /Practical/Viva
5	Hypermetropia – determination of manifest error subjectively.	1	Practical	Written /Practical/Viva
6	Hypermetropic correction- subjective verification	1	Practical	Written /Practical/Viva
7	Demonstration of astigmatism: Use of slit and keratometry to find the principal meridians	1	Practical	Written /Practical/Viva
8	Astigmatism: Fan – subjective verification tests	1	Practical	Written /Practical/Viva
9	Astigmatism: Cross-cylinder. Subjective verification tests.	1	Practical	Written /Practical/Viva
10	Measurement of accommodation: near and far points and range	1	Practical	Written /Practical/Viva
11	Presbyopic correction and methods: accommodative reserve, balancing the relative accommodation and cross grid cylinder test	1	Practical	Written /Practical/Viva
12	Presbyopic correction and methods: accommodative reserve, balancing the relative accommodation and cross grid cylinder test.	1	Practical	Written /Practical/Viva

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13	Methods of differentiating axial and refractive ametropia	1	Practical	Written /Practical/Viva
14	Practice of retinoscopy – Emmetropia	1	Practical	Written /Practical/Viva
15	Practice of retinoscopy- spherical ametropia	1	Practical	Written /Practical/Viva
16	Practice of retinoscopy-simple astigmatism.	1	Practical	Written /Practical/Viva
17	Practice of retinoscopy- compound hyperopia	1	Practical	Written /Practical/Viva
18	Practice of retinoscopy- compound myopia	1	Practical	Written /Practical/Viva
19	Practice of retinoscopy- oblique astigmatism	1	Practical	Written /Practical/Viva
20	Practice of retinoscopy –media opacities	1	Practical	Written /Practical/Viva
21	Practice of retinoscopy- in irregular astigmatism	1	Practical	Written /Practical/Viva
22	Interpretation of cycloplegic retinoscopic findings	1	Practical	Written /Practical/Viva
23	Practice of retinoscopy- in strabismus and eccentric fixation	1	Practical	Written /Practical/Viva
24	Prescription writing, Photo refraction	1	Practical	Written /Practical/Viva
25	Vision Therapy and exercises for vergences	1	Practical	Written /Practical/Viva

Course details : Semester 6

S.No	Paper Code	Paper Name	ESE	CCE	Total Marks
1	BOPT 601	Binocular vision I	70	30	100
2	BOPT 602	Major eye diseases	70	30	100
3	BOPT 603	Contact lenses I	70	30	100
4	BOPT 604	Public-health, Community optometry & Occupational optometry	70	30	100
7	BOPTP 605	Practical Glaucoma	35	15	50
8	BOPTP 606	Practical Optometry	35	15	50
			350	150	500

ITM-BOPT- 601 Binocular vision I

Learning Objective: Students will develop theoretical understanding of the clinical investigation, diagnosis and management options for patients suffering from a range of binocular vision anomalies and Squint. Students will know about the management of Diagnosis of squint conditions. Students will know and understand the anatomy and pathology of comitant, incomitant (paralytic and mechanical) and supranuclear defects of binocular status and their impact on binocular sensory status. Students will also have a theoretical understanding of related anomalies such as those associated with specific learning difficulties.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 25 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Spatial sense	1	Lecture/ power point	Written
2	Evolution of binocular vision	1	Lecture/ power point	Written
3	Binocular fusion, suppression, rivalry 2 and summation	2	Lecture/ power point	Written
4	Visual direction, local sign and corresponding points	1	Lecture/ power point	Written
5	Visual distance, empirical cues	1	Lecture/ power point	Written
6	Panum's space	1	Lecture/ power point	Written
7	Stereopsis	1	Lecture/ power point	Written
8	Developmental binocular vision	1	Lecture/ power point	Written

9	Anatomy of EOM and actions	3	Lecture/ power point	Written
10	Longitudinal horopter	1	Lecture/ power point	Written
11	Neural aspects of binocular vision	1	Lecture/ power point	Written
12	Visually guided behavior and aniseikonia	1	Lecture/ power point	Written
13	ARC & Eccentric Fixation	2	Lecture/ power point	Written
14	Experiment – To plot the Horopter, fixation disparity curve (Practical)	1	Lecture/ power point	Written
15	Electro –Physiology experiments (Practical)	2	Lecture/ power point	Written
16	Differential Intensity (Webner's and Fechner's Law)	1	Lecture/ power point	Written
17	Visual Acuity in relation to intensity and contrast	1	Lecture/ power point	Written
18	Near Vision Complex Accommodation	3	Lecture/ power point	Written

1. Foundations and applications of Binocular vision by Scott, latest editions

ITM-BOPT- 602 Major eye diseases

Learning Objective: The optometrists are becoming increasingly involved in the diagnosis, management and treatment of patients suffering from a large variety of abnormal ocular conditions. Many of these disorders appear, however, as a direct consequence of some systemic disturbances. Moreover, treatment given for various eye conditions could have systemic side effects that should be recognized by optometrists. Therefore, education beyond current optometric practice could have a beneficial role in preparing students for clinical challenges that may appear in this ever-changing profession. The purpose of this Subject is to provide students with a basic understanding of the most common systemic diseases, and their relationship to the abnormal ocular conditions.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 26 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	GLAUCOMA	1	Lecture/ power point	Written
2	An over view of glaucoma	1	Lecture/ power point	Written
3	Aqueous humor dynamics	2	Lecture/ power point	Written
4	Intraocular pressure	1	Lecture/ power point	Written
5	Evaluation of the optic nerve head	1	Lecture/ power point	Written
6	Visual fields	1	Lecture/ power point	Written
7	Glaucoma screening	1	Lecture/ power point	Written

8	Classification of glaucoma	1	Lecture/ power point	Written
9	Primary open angle glaucoma	3	Lecture/ power point	Written
10	Primary angle closure glaucoma	1	Lecture/ power point	Written
11	Primary congenital glaucoma	1	Lecture/ power point	Written
12	Secondary glaucoma	1	Lecture/ power point	Written
13	Principles of medical therapy	2	Lecture/ power point	Written
14	Other modalities of glaucoma treatment	1	Lecture/ power point	Written
15	HRT, OCT, GDx	2	Lecture/ power point	Written
16	REFRACTIVE SURGERIES	1	Lecture/ power point	Written
17	LASERS	3	Lecture/ power point	Written
18	LATEST DEVELOPMENT IN EYE CARE	1	Lecture/ power point	Written

1. Systemic Diseases Of The Eye: Kanski, Mosby, latest editions
2. Clinical Practice in Medicine: Davidson, latest editions

ITM-BOPT- 603 Contact lenses I

Learning Objective: The students will learn the basic knowledge of RGP contact lenses and basic concepts in fitting of contact lenses and its use. The course will cover the major area of contact lens management and practice. It will cover methods of contact lens fitting its after care and the complications of contact lens usage. The Subject will cover also the special purpose lenses. The subject will range of RGP contact lenses presently on the market to correct refractive error including astigmatism and Presbyopia will be examined to allow Students to assess RGP contact lenses both today and as they develop in the future.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 16 Theory + 8 practical = 24 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	History of contact lenses	1	Lecture/ power point	Written
2	Corneal anatomy and physiology	2	Lecture/ power point	Written
3	Contact lens materials – RGP	1	Lecture/ power point	Written
4	Optics of contact lenses	3	Lecture/ power point	Written
5	Indications and contraindications	1	Lecture/ power point	Written
6	Patient's initial visit	1	Lecture/ power point/Practical	Written /Practical
7	Preliminary measurements	1	Lecture/ power point/Practical	Written /Practical
8	Keratometry & Corneal Topography	1	Lecture/ power point/Practical	Written /Practical

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9	Slit Lamp Techniques	2	Lecture/ power point/Practical	Written /Practical
10	Fitting philosophies	2	Lecture/ power point/Practical	Written /Practical
11	Handling instructions	1	Lecture/ power point/Practical	Written /Practical
12	Follow-up, post fitting problems	1	Lecture/ power point/Practical	Written /Practical
13	Fitting in astigmatism	1	Lecture/ power point/Practical	Written /Practical
14	Fitting in Keratoconus	1	Lecture/ power point/Practical	Written /Practical
15	RGP Bifocals & fitting in Presbyopes	1	Lecture/ power point/Practical	Written /Practical
16	Verification of RGP	1	Lecture/ power point/Practical	Written /Practical
17	Contact Lens Solution for RGP	1	Lecture/ power point/Practical	Written /Practical
18	Complications due to RGP CL	1	Lecture/ power point/Practical	Written /Practical
19	Newer RGP lenses	1	Lecture/ power point	Written

- 1.IACLE, latest editions
- 2.Nathan Effron, latest editions

ITM-BOPT- 604 Public-health, Community optometry & Occupational optometry

Learning Objective: The Course will provide the basic public health problem relevant to eye care services and the role of optometrist in the prevention of Blindness. This will cover the major vision threatening diseases in the region /country and government and International agencies policies in the prevention of particular diseases. Basically the course gives an outline to the Students for their role as a primary eye care practitioner and prevention of blindness in the country.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 26 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	PHILOSOPHY OF PUBLIC HEALTH History of public health History of public health optometry (including epidemiology, man power, projections,	1	Lecture/ power point	Written

<p>2</p>	<p>community reimbursement mechanisms</p> <p>HEALTH CARE SYSTEMS Organizations of health services (principles of primary, secondary and tertiary care) Health Care Delivery systems in India and determinants of health Detriments of health care delivery system Planning of health services (including relevant legislation and implications to optometric practice) Health economics Health manpower protection and in the practice of ophthalmology Third party involvement in financing health care services (including both governmental and non-governmental programs) Quality assurance</p>	<p>3</p>	<p>Lecture/ power point</p>	<p>Written</p>
<p>3</p>	<p>MODES OF HEALTH AND VISION CARE DELIVERY Solo and group practice modes Multidisciplinary and institutional practice modes Optometry's role as a care primary care profession</p>	<p>3</p>	<p>Lecture/ power point</p>	<p>Written</p>
<p>4</p>	<p>Global medicine and evolution of Public Health in India Public Health optometry: concepts and implementation Levels of prevention – optometrist's role in community Concepts of National Health Programs General principles of Epidemiology and methods Screening in populations Epidemiology of blindness – cataract, Glaucoma deficiency disorders Scope of geriatric ophthalmology in preventive and rehabilitation care Ocular manifestation in systematic disorders Natural history of diseases (Comm.) Transmission of disease Basics in research methodology in populations Demography and vital statistics National and International Agencies in Health Care Training and Instructional services</p>	<p>14</p>	<p>Lecture/ power point</p>	<p>Written</p>

1. Work And The Eye: Rachel V. North, Butterworth-Heinemann, latest editions
2. Epidemilogy in Medical Practice by T Bhaskar Rao, latest editions

ITM-BOPTP- 605– Practical Glaucoma**Standard of passing:**

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 12 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Intraocular tension	1	Practical	Practical/written
2	Gonioscopy	2	Practical	Practical/written
3	Indirect ophthalmoscopy	2	Practical	Practical/written
4	Use of vital dyes / Anesthetics	1	Practical	Practical/written
5	Evaluation of cornea	1	Practical	Practical/written
6	Visual field analysis	2	Practical	Practical/written
7	F.F.A, HRT, OCT analysis	3	Practical	Practical/written

ITM-BOPTP- 606– Practical Contact lenses I**Standard of passing:**

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 8 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	For Syllabus refer to Contact lenses I theory paper	1	Practical	Practical/written

Semester 7 : Course details

S.No	Paper Code	Paper Name	ESE	CCE	Total Marks
1	BOPT 701	Low vision aid	70	30	100
2	BOPT 702	Binocular vision II	70	30	100
3	BOPT 703	Pediatric Optometry & Geriatric Optometry	70	30	100
4	BOPT 704	Contact lenses II	70	30	100
7	BOPTP 705	Low Vision Aid Practical	35	15	50
8	BOPTP 706	Practical Optometry	35	15	50
			350	150	500

ITM-BOPT- 701 Low Vision Aid

Learning Objective: The Course will provide the basic public health problem relevant to eye care services and the role of optometrist in the prevention of Blindness. This will cover the major vision threatening diseases in the region /country and government and International agencies policies in the prevention of particular diseases. Basically the course gives an outline to the Students for their role as a primary eye care practitioner and prevention of blindness in the country.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 26 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Low Vision - Legal Blindness – Impairment – Disability – Handicap	1	Lecture/ power point	Written
2	Rehabilitation – Multidisciplinary Service – Volunteer activities – Agencies –Legislation	1	Lecture/ power point	Written
3	Impact of vision loss and its psychological aspects	1	Lecture/ power point	Written
4	Optics of low vision aids	1	Lecture/ power point	Written
	Effects of daily activities –Mobility – Vocational and leisure activities	1	Lecture/ power point	Written
	Abnormalities – Disease disorder related Pathologies responsible for low vision	1	Lecture/ power point	Written
	Assesment of low vision in adults	2	Lecture/ power point	Written
	Assesment of low vision in children – Multiple disabilities	2	Lecture/ power point	Written

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	Introduction Observation – Posture – Appearance – Mobility The Record Card Visual History – Diagnosis – Etiology – Onset – Management – Family History - Vocation – Visual Demands – Leisure Activities. Aids in use if any	2	Lecture/ power point	Written
6	Examination Retinoscopy – Refraction – Keratometry – Slit lamp Subjective at distance and near Binocular testing - Motor alignment – Fusion Measurement of visual acuity Different systems of measuring acuity Optotypes in decimal steps – Logarithmic steps – Gratings	6	Lecture/ power point/Practical	Written
7	Charts for distance and near - Single letter – Continuous Text	2	Lecture/ power point/Practical	Written
8	TESTS TO BE PERFORMED Contrast Sensitivity Definition of Contrast – Spatial Frequency – Contrast sensitivity Curve Adaptation to different levels of illumination – Glare – Scattered light Measuring contrast sensitivity – Charts: Bailey, Pelli Robson, and Cambridge Lea Symbols Visual Fields: Confrontation – Amsler grid - Tangent Screen – Perimetry Color Vision: Defects - Tests Ophthalmoscopy	5	Lecture/ power point/Practical	Written
9	Magnification: -Magnification by approach -Angular Magnification -Projection Magnification -Relative Size Magnification -Relative Distance Magnification	1	Lecture/ power point/Practical	Written
10	Telescope Telescope – Galilean – Keplerian Calculation of magnification Considerations of prescribing Types of telescopes – Hand held – Clip on – Spectacle mounted Use of telescope – handling – training Relative Distance Magnification – Principle & Calculation	5	Lecture/ power point/Practical	Written

11	Hand and Stand Magnifiers Optics – Range of magnification - Specifications Spectacle magnifiers – Magnifications – Advantages – Disadvantages – Trial sets	2	Lecture/ power point/Practical Lecture/ power point/Practical	Written
12	Telemicroscopes Projection Magnification – CCTV – Range of Magnifier – Advantage / Disadvantage Size Magnification – Large Print - Screen Cortical Magnification	1	Lecture/ power point	Written
13	Magnification needs – Working distance – Duration of activity Physical / Cognitive limitations Arthritis – Tremors – Memory issues, etc Monocular / Binocular	1	Lecture/ power point	Written
14	Nystagmus - Restrictions in gaze – Null Point: Visual field status – Eccentric Fixation – Position of scotoma	1	Lecture/ power point	Written
15	Field Loss Devices	1	Lecture/ power point	Written

1.The Art And Practice Of Low Vision Freeman and Jose, Butterworth-Heinemann, latest editions

ITM-BOPT- 702 Binocular Vision II

Learning Objective: Students will develop theoretical understanding of the clinical investigation, diagnosis and management options for patients suffering from a range of binocular vision anomalies and Squint. Students will know about the management of Diagnosis of squint conditions. Students will know and understand the anatomy and pathology of comitant, incomitant (paralytic and mechanical) and supranuclear defects of binocular status and their impact on binocular sensory status. Students will also have a theoretical understanding of related anomalies such as those associated with specific learning difficulties

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 22 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Qualitative and quantitative diagnosis of strabismus	4	Lecture/ power point	Written
2	Esodeviations	1	Lecture/ power point	Written
3	Exodeviations	1	Lecture/ power point	Written

4	A-V phenomenon	3	Lecture/ power point	Written
	Cyclovertical squint	1	Lecture/ power point	Written
6	Pseudostrabismus	2	Lecture/ power point	Written
7	Amblyopia and eccentric fixation	2	Lecture/ power point	Written
8	Treatment of amblyopia	2	Lecture/ power point	Written
9	Special forms of strabismus	2	Lecture/ power point	Written
10	Nystagmus	3	Lecture/ power point	Written
11	Non-surgical management of strabismus	1	Lecture/ power point	Written
12	Review of orthoptic procedures	1	Lecture/ power point	Written

1. Same as in Binocular (I)
2. Von Noorden, latest editions
3. Handbook of Binocular Vision, latest editions
4. Clinical Orthoptics: A.K.Khurana, latest editions

ITM-BOPT- 703 Pediatric Optometry & Geriatric Optometry

Learning Objective:

PEDIATRIC OPTOMETRY The students will learn the Pediatric management of refractive errors and other visual problems. The students will also learn the dispensing aspects of glasses in children and critical management of different refractive eye conditions in Pediatric eye care like Amblyopia, Anisometropia, etc. A detail of important ocular diseases affecting the pediatric age group will also be discussed.

GERIATRIC OPTOMETRY

Objective: The students will learn the Geriatric management of refractive errors and other visual problems. The students will also learn the dispensing aspects of glasses in elderly and critical management of different refractive eye conditions in Geriatric eye care. A detail of important ocular diseases affecting the geriatric age group will also be discussed.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 38

30 marks : CCE

Passing Marks: 12

Theory hours: 40 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	HISTORY Genetic factors Prenatal systems Prenatal factors Postnatal factors Normal prenatal development & Embryology Tissue origin of the various structure of the eye	5	Lecture/ power point	Written

	Anomalies of prenatal & postnatal development			
	Genetic origin a. Albinis b. Nystagmus c. Buphthalmos d. Macula disorders e. Color Deficiencies f. Retinitis pigmentosa g. Ectopia Lentis	4	Lecture/ power point	Written
	Acquired a. Micro cornea, Macro cornea b. Microphthalmos c. Ptosis d. Distichiasis e. Coloboma f. Cataract g. Aniridia h. Pupil displacement	5	Lecture/ power point	Written
	Normal postnatal development	1	Lecture/ power point	Written
2	VISUAL ACUITY TESTING IN CHILDREN – OBJECTIVE & SUBJECTIVE	12	Lecture/ power point	Written
	Normal appearance, pathology and structural anomalies of: Orbit Eyelids Lacrimal system Conjunctiva Cornea Sclera Anterior chamber, uveal tract, pupil Lens, vitreous, fundus Oculomotor system		Lecture/ power point	Written
	Measurement of the refractive system		Lecture/ power point	Written
	Determining binocular status, tests for Strabismus, Heterophoria, Amblyopia, Fixation Disorders		Lecture/ power point	Written
	ARC & Fusional and accommodative anomalies		Lecture/ power point	Written
	Determining sensory motor adaptability		Lecture/ power point/Practical	Written
	Part II –Post Examination process		Lecture/ power point/Practical	Written
	Compensatory treatment and remedial therapy for Myopia Pseudomyopia Hyperopia Astigmatism Anisometropia		Lecture/ power point/Practical	Written

Amblyopia			
Remedial & compensatory treatment for strabismus & nystagmus		Lecture/ power point/Practical	Written
Vergence and accommodation		Lecture/ power point/Practical	Written
Delayed development		Lecture/ power point/Practical Lecture/ power point/Practical	Written
Visual aids for children C/ L & LVA		Lecture/ power point	Written
GERIATRIC OPTOMETRY	10	Lecture/ power point	Written
Structural & Anatomical changes of the eye.		Lecture/ power point	Written
Physiological changes of the eye		Lecture/ power point	Written
Optical and refractive changes of the eye.		Lecture/ power point	Written
Functional & Neural changes with age		Lecture/ power point	Written
Aphakia, pseudophakia –its correction		Lecture/ power point	Written
Ocular diseases common in the old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye.		Lecture/ power point	Written
Special considerations in the ophthalmic dispensing to the elderly.		Lecture/ power point	Written
Management of visual problems of aging		Lecture/ power point	Written
How to carry on one „s visual task overcoming the problems of aging?		Lecture/ power point	Written
Contact lens in elderly		Lecture/ power point	Written
Optometric Examination of older adults		Lecture/ power point	Written

1. Pediatric Ophthalmology, latest editions
2. Vision And Aging, Rosenbloom And Morgan, latest editions

ITM-BOPT- 704 Contact Lenses II

Learning Objective :

The students will learn the basic knowledge of SOFT contact lenses and basic concepts in fitting of contact lenses and its use. The course will cover the major area of contact lens management and practice. It will cover methods of contact lens fitting its after care and the complications of contact lens usage. The Subject will cover also the special purpose lenses The subject will range of SOFT contact lenses presently on the market to correct refractive error including astigmatism and Presbyopia will be examined to allow Students to assess SOFT contact lenses both today and as they develop in the future.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

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Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 38

30 marks : CCE

Passing Marks: 12

Theory hours: 34 + 11= 45 hours (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	History of contact lenses	1	Lecture/ power point	Written
2	Contact lens materials	1	Lecture/ power point	Written
3	Indications and contraindications	1	Lecture/ power point	Written
4	Keratometry & Corneal Topography	1	Lecture/ power point	Written
5	Slit lamp examination of contact lens patients	2	Lecture/ power point/Practical	Written/Practical
6	Fitting philosophies	2	Lecture/ power point/Practical	Written/Practical
7	Handling instructions & insertion – removal techniques	2	Lecture/ power point/Practical	Written/Practical
8	Follow-up, post fitting problems	2	Lecture/ power point/Practical	Written/Practical
9	Fitting in aphakia	2	Lecture/ power point/Practical	Written/Practical
10	Fitting of contact lenses in children	2	Lecture/ power point/Practical	Written/Practical
11	Cosmetic contact lenses	1	Lecture/ power point	Written
12	low DK and high DK	3	Lecture/ power point	Written
13	Continuous and extended wear lenses	1	Lecture/ power point/Practical	Written/Practical
14	Disposable lenses	1	Lecture/ power point/Practical	Written/Practical
15	Contact lens –toric SCL	1	Lecture/ power point/Practical	Written/Practical
16	Contact lens –bifocals, Multifocals	1	Lecture/ power point/Practical	Written/Practical
17	Therapeutic lenses/ bandage contact lenses	2	Lecture/ power point	Written
18	Contact lens solutions	2	Lecture/ power point/Assignment	Written
19	Manufacturing semi finished lenses	2	Lecture/ power point	Written
20	Contact lens modifications of finished lenses	2	Lecture/ power point	Written
21	Instruments used in contact lens practice	2	Lecture/ power point	Written
22	Checking the parameters	1	Lecture/ power point	Written
23	Contact lenses – special purposes –	1	Lecture/ power point	Written

	swimming, sports, occupational etc.			
24	Soft Lens related Complications	1	Lecture/ power point	Written
25	Care & Maintenance	1	Lecture/ power point	Written

As in Contact Lens (I)

ITM-BOPTP- 705– Practical Low Vision Aid

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 8 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Simulating low vision Making of simulating glasses Experiments with simulating glasses	1	Practical	Practical/written
2	Visual acuity and refraction Measurement of visual acuity Experiments with normal distance Determination of contrast sensitivity in subnormal vision Determination of need of magnification Refraction	2	Practical	Practical/written
3	Application of low vision devices Magnifiers Magnification by Approach Shape magnification Magnified photocopies Large print books Problems of magnification Making a test to determine the need of magnification Magnification with computers Practical exercises with Galilean telescope (incl. mounting) Practical exercises with Keplerian telescope (incl. mounting) Daily living skills Orientation and mobility	2	Practical	Practical/written
4	Visit in a vocational training center Braille, Orientation and Mobility can only receive a short talk just enough to be introductory. We need not be drawn into the details of Rehabilitation	3	Practical	Practical/written

ITM-BOPTP- 706– Practical Contact Lenses II

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 11 (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	For the syllabus refer to Contact lenses II	11	Practical	Practical/written

Semester 8 : Course details

S.No	Paper Code	Paper Name	ESE	CCE	Total Marks
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1	BOPT 801	Law, Basic Accountancy & Public relations	70	30	100
2	BOPT 802	Dissertation	100	-	100

ITM-BOPT- 801 Law, Basic Accountancy & Public relations**Learning Objective :**

This subject includes the discipline and the Law that is required to be followed as a practitioner. Public Relations that are required to be maintained and the setup management for private practice.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 38

30 marks : CCE

Passing Marks: 12

Theory hours: 58 hours (minimum)

S.No	Topic/ Sub Topic	Duration	Mode of teaching	Mode of Evaluation
1	Legal environment and techniques- history law and equity.	25 hours	Lecture/ power point	Written
2	History and theory of licensure		Lecture/ power point	Written
3	Indications and contraindications Licensure as a means of internal and external discipline – unprofessional conduct – incompetence – gross immorality		Lecture/ power point	Written
4	International Optometry – important foreign optometry law		Lecture/ power point	Written
5	The optometrist in court		Lecture/ power point/Practical	Written/Practical
6	Malpractice – theory of liability – damages – minimizing malpractice claims		Lecture/ power point/Practical	Written/Practical
7	Insurance		Lecture/ power point/Practical	Written/Practical
8	Negligence		Lecture/ power point/Practical	Written/Practical
9	Ethics – professional ethics		Lecture/ power point/Practical	Written/Practical
10	Laws governing practice of medical profession and paramedical profession in India		Lecture/ power point/Practical	Written/Practical
11	Registered medical practitioner – laws against practice of medicine of those unregistered. – Medical council of India –Dental council of India – Nursing council		Lecture/ power point	Written
12	Present rules and regulations – Laws regarding optical products		Lecture/ power point	Written

	manufacturers – dispensing in India			
13	Opticians -Are they registered? Dispensing Opticians –Rules in U.K.		Lecture/ power point/Practical	Written/Practical
	ACCOUNTS	17 hours	Lecture/ power point/Practical	Written/Practical
	Introduction: Terms used in accounts Principles of accountancy		Lecture/ power point/Practical	Written/Practical
16	Journals and journalizing		Lecture/ power point/Practical	Written/Practical
17	Ledger and ledger posting		Lecture/ power point	Written
18	Trial balance, subsidiary books cash book, petty cash book, sales register, and purchase register		Lecture/ power point/Assignment	Written
19	Bank reconciliation. Depreciation and other adjustments. Balance sheet and profit and loss account statements. Income tax and sales tax. (General idea)		Lecture/ power point	Written
21	PUBLIC RELATIONS DEFINING THE SUBJECT – THEORY AND PRACTICE Definitions Public relations- its distinction from publicity, propaganda & Advertising The universe of Public relations – internal and external support aspects of PR. Phases of P.R: Analysis of the internal and external environment – formulating & implementing PR policy- feedback, research and evaluation. The benefits of PR policy- Image building, promotion, of the product or services, better employee, government & community relations	10 HOURS	Lecture/ power point Lecture/ power point	Written Written
22	METHODS OF PUBLIC RELATIONS Press Relations: Writing and issuing a press release – press conference- facility visit & open house – letters to the editor – assembling press activity		Lecture/ power point	Written
23	The printed word: Style, color, and design, -knowledge, of topography and layouts –direct mails, publicity material and house journal. Explain the use of photographs for publications and special events The spoken word: Public speaking-		Lecture/ power point	Written

	<p>microphone techniques Radio and other Audio media: communicating by cassettes – radio interview, discussions & other programs Film and television: Publicity and educational use of these media – production & distribution Research in P.R: Opinion and panel research – drawing up of a Questionnaire – interpreting the results</p>			
24	<p>PUBLIC RELATIONS IN ACTION The employee public: The working relationship- labour management relations – Establishing effective leadership – high cost of breakdowns and alienation- planned effort at P.R The customer public: Needs of customers – efficiency & effectiveness of customer service – feedback & suggestion system. The government public: Knowledge and interaction with the central government – state government and municipal government The community public: Community opinion – community relations – open house & volunteer activities</p>		Lecture/ power point	Written
25	<p>SPECIALISED PUBLIC RELATIONS Public relations for welfare agencies Public relations for health agencies Public relations for hospitals The perspective: rising demands- escalating costs – charitable heritage public opinion consciousness- growing consumer movement The P.R. program, employee relations – volunteer groups – medical staff, patient’s sensitivity to the press and other media</p> <p>GENERAL THEORY OF BUSINESS MANAGEMENT Business management context</p>		Lecture/ power point	Written
	Organization of business	1		
	Form the idea of opening a business to its final concept	1		
	Marketing / Efficiency of business	1		
	Opening of shop.	1		

ITM-BOPT- 802 Dissertation

Learning Objective :

THE basic idea of a dissertation is to prepare the students to be independent and inculcate skilled thinking & practice.

Teaching Methodology: Lectures, Demonstrations & Practicals

Standard of passing:

Total Marks (70+ 30)= 100

Passing Marks = 40