ROYAL GLOBAL UNIVERSITY
GUWAHATI

ROYAL SCHOOL OF MEDICAL AND ALLIED SCIENCES(RSMAS)

COURSE STRUCTURE AND SYLLABUS

(BASED ON NATIONAL EDUCATION POLICY 2020)

FOR

Bachelor in Optometry

(4 YEARS SINGLE MAJOR)

W.E.F

AY: 2025 - 26

BACHELOR OF OPTOMETRY

1st SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P-C**
Major (Core)	OPT242M101/ OPT242M111	General Anatomy + General Anatomy Lab	100	4	3-0-2-4
Major (Core)	OPT242M102/ OPT242M112	General Physiology + General Physiology Lab	100	4	3-0-2-4
Interdisciplinary (IDC)	IKS992K101	Iks-I	100	3	3-0-0-3
Ability Enhancement course (AEC)	CEN982A101/ BHS982A102	Communicative English I Behavioural Science I	100	2	2-0-0-2
Skill Enhancement Course (SEC)	OPT242S101	Biochemistry	100	3	3-0-0-3
Value Added Course (VAC)		Selected From the Pool of Courses Offered	100	3	3-0-0-3
SWAYAM Course			100	3	
TOTAL CREDIT FOR 1st SEMESTER				22	
2nd SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P-C**
Major (Core)	OPT242M201/OPT242M211	OCULAR ANATOMY + OCULAR ANATOMY LAB	100	4	3-0-2-4
Major (Core)	OPT242M202/OPT242M212	OCULAR PHYSIOLOGY + PHYSIOLOGY LAB	100	4	3-0-2-4
IDC	IKS992K201	IKS-2	100	3	3-0-0-3
AEC	CEN982A201 BHS982A202	Communicative English II/ Behavioural Science II	100	2	20-0-2

SEC	OPT242S201/ OPT242S211	OPTOMETRIC OPTICS + OPTOMETRIC OPTICS LAB	100	3	2-0-2-3
VAC		Selected from the pool of courses offered	100	3	3-0-0-3
SWAYAM Course				3	
TOTAL CREDIT FOR 2nd SEMESTER				22	
3rd SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P-C**
Major (Core)	OPT242M301/OPT242M311	OPHTHALMIC & OPTICAL INSTRUMENTATION & PROCEDURE + OPHTHALMIC & OPTICAL INSTRUMENTATION & PROCEDURE LAB	200	4	3-0-2-4
Major (Core)	OPT242CM302/OPT242CM312	VISUAL OPTICS +LAB	200	4	3-0-2-4
Major (Core)	OPT242M303	HUMAN VISUAL SYSTEM II	200	4	4-0-0-4
IDC	OPT242I301	EYE DISEASE AWARENESS	200	3	3-0-03
AEC	Communicative English-III Behavioral science-III	CEN982A301/ BHS982A302	200	2	2-0-0-2
SEC	MEDICAL PATHOLOGY & MICROBIOLOGY & PHARMACOLOGY	OPT242S304	200	3	3-0-0-3
SWAYAM Course				3	
TOTAL CREDIT FOR 3rd SEMESTER				23	
4th SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P-C**
Major (Core)	OPT242M401/ OPT242M411	CLINICAL REFRACTION + CLINICAL REFRACTION LAB	200	4	3-0-2-4

Major (Core)	OPT242M403	OCULAR DISEASE I	200	4	4-0-0-4
Major (Core)	OPT242M402/OPT242M412	OPHTHALMIC LENS & DISPENSING OPTICS + OPHTHALMIC LENS & DISPENSING OPTICS LAB	200	4	3-0-2-4
Major (Core)	OPT242M413	CLINICAL POSTING	200	4	
AEC	CEN982A401/ BHS982A402	COMMUNICATIVE ENGLISH / Behavioural science-IV	200	2	2-0-0-2
SWAYAM Course				3	
TOTAL CREDIT FOR 4th SEMESTER				21	

5th SEMESTER

COMPONENT	COURSE CODE	COURSE TITLE	LEVEL	CREDIT	L-T-P-C
Major (Core)	OPT242M501	INTRODUCTION TO CONTACT LENS	300	4	4-0-0-4
Major (Core)	OPT242M502	BINOCULAR VISION & OCULAR MOTILITY	300	4	4-0-0-4
Major (Core)	OPT242M503	OCULAR DISEASE II	300	4	4-0-0-4
Major (Core)	OPT242M504	BASICS OF LOW VISION	300	4	4-0-0-4
Major (Core)	OPT242M521	CLINICAL POSTING	300	4	
TOTAL CREDIT FOR 5th SEMESTER				20	

6th SEMESTER

COMPONENT	COURSE CODE	COURSE TITLE	LEVEL	CREDIT	L-T-P-C
Major (Core)	OPT242M601	SYSTEMIC CONDITIONS & THE EYE	300	4	4-0-0-4
Major (Core)	OPT242M602	LAW & OPTOMETRY + OCCUPATIONAL OPTOMETRY	300	4	4-0-0-4

Major (Core)	OPT242M603/OPT242M611	APPLIED OPTOMETRY & ORTHOPTICS +LAB	300	4	3-0-2-4
Major (Core)	OPT242M604/OPT242M612	CONTACT LENS II+ LAB	300	4	3-0-2-4
Major (Core)	OPT242M605/OPT242M613	LOW VISION AIDS & VISUAL REHABILITATION + LOW VISION AIDS & VISUAL REHABILITATION LAB	300	4	3-0-2-4
TOTAL CREDIT FOR 6th SEMESTER				20	
7th SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P-C**
Major (Core)	OPT242M711	PEDIATRIC CLINIC SPECIALITY & GERIATRIC CLINIC SPECIALITY	400	4	0-0-8-4
Major (Core)	OPT242M712	LOW VISION SPECIALITY	400	4	0-0-8-4
Major (Core)	OPT242M713	CONTACT LENS SPECIALITY	400	4	0-0-8-4
Major (Core)	OPT242M714	BINOCULAR VISION SPECIALITY	400	4	0-0-8-4
TOTAL CREDIT FOR 7th SEMESTER				16	
8th SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P-C**
Major (Core)	OPT242M811	CLINICAL EVALUATION	400	6	0-0-12-6
Major (Core)	OPT242M812	COMPREHENSIVE CLINICAL OPTOMETRY	400	6	0-012-6
Project / Dissertation	OPT242M823	Project / Dissertation	400	12	
TOTAL CREDIT FOR 8th SEMESTER				24	

SYLLABUS (1ST SEM)	
PAPER /SUBJECT NAME: GENERAL ANATOMY + GENERAL ANATOMY LAB **SUBJECT CODE: OPT242M101/OPT242M111** **SCHEME OF EVALUATION: (T+ P)**	
Total Credits: 4	**L-T-P-C=3-0-2-4**

Course Objective:

The objective of this subject is to deal with the entire human anatomy with emphasis on different tissues, blood vessels, glands, nerves and the entire central nervous system in particular.

Course Outcome:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**identify** the microscopic structures of various tissues, and organs in the human body and correlate the structure with the functions.	**BT 1**
CO 2	**comprehend** the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the human body	**BT 2**
CO 3	**applying** the knowledge of the basic structure and connections between the various parts of the central nervous system so as to analyse the integrative and regulative functions on the organs and systems.	**BT 3**
CO4	**analyze** the anatomical structures of the eye, explain their functional significance, and evaluate how alterations in these structures can lead to ocular disorders	**BT 4**

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Introduction of anatomy – gross human anatomy & their relations : The skeleton – axial & appendicular (over view), Cavities of body- (cranial, thoracic, abdominal, pelvic). Structure of bone, Type & function of bone, Blood & nerve supply of the bone. Planes of the body. Anatomical terminology. Skull – General features, Cranial bones (frontal, parietal, temporal, occipital, sphenoid, ethmoid). Facial bone – (nasal, maxilla, zygomatic, lacrimal, palatine, inferior nasal conchae, vomar, mandible). Special feature of the skull (sutures, paranasal sinuses, foramina, fontanels, nasal septum). Joints – classification, fibrous joints, cartilaginous joints, synovial joints(structure & types). Types of movement at sinovial joints. Anatomy of muscular system – Skeletal muscle structure. Important skeletal muscle (muscles of facial expression, mastication. Muscle that move the head). Over view of Trunk muscles, upper limb muscles, lower limb muscles. Anatomy of nervous system – spinal cord anatomy (external & internal anatomy). Connection & distribution of spinal nerves-overview(Branches, plexuses. Intercostal nerves). Overview of brain organization & blood supply. Brief anatomical idea on – brain stem, cerebellum, diencephalon, cerebrum. Cranial nerves	**11**
2	Embryology – general Gametogenesis(spermatogenesis & oogenesis) –Structure of testis,ovary &sperm –Phases of embryonic development – formation of three germ layers- derivatives of germ layers –Embryonic or Foetal membrane (chorion, amnion, allantois, yolk sac) &placenta & its functions.	**11**
3	Cell Structure: Ultra structure and functions of cell- Plasma membrane- Nucleus – Mitochondria- Centrosome- Ribosome-Endoplasmic reticulum- Golgi body & lysosome. Nucleus – Ultra structure & functions. Chromosomes: Structure & chemical composition, types of chromosome. Chromosome aberration.	**11**

4	Cell Division: Amitosis- Mitosis- Meiosis- Significance of mitosis & meiosis- Cell cycle. Tissues: Structure, position and functions of epithelial, connective, muscular & nervous tissue.	**11**
	TOTAL	**44**

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Identification of skull ,[Skull-bones comprising, base of skull orbits]	**7.5**
2	Identification of skeleton (bones)	**7.5**
3	Identification of organs & viscera	**7.5**
4	Identification of histological tissues . a) Epithelial tissue-squamous, columnar, cuboidal b) Connective tissue-skeletal muscle, cardiac muscle, smooth muscle c) Cytology-mitosis.	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOKS: -

1. PETER L. WILLIAMS AND ROGER WARWICK: - Gray's Anatomy - Descriptive and Applied, 36th Ed., 1980, Churchill Livingstone.

2. G.J. TORTORA & N.P ANAGNOSTAKOS: Principles of Anatomy and Physiology. (recent edition)

3. B.D. CHAURASIA: Handbook of General Anatomy, 2nd Ed., CBS Publishers and Distributors, New Delhi - 110 032.

Reference Books:

1. **H. McMinn, John Pegington, Peter H. Abrahams.** *A Color Atlas of Human Anatomy*, 3rd edition, Mosby, 1996. ISBN: 978-0815158585
2. **Richard S. Snell.** *Clinical Anatomy for Medical Students*, 6th edition, Lippincott Williams & Wilkins, 2000. ISBN: 978-0781715744
3. **Derek Field.** *Field's Anatomy, Palpation and Surface Marking*, 4th edition, Butterworth-Heinemann Ltd, 2006. ISBN: 978-075068848

SYLLABUS (1ST SEM)

PAPER/SUBJECT NAME: GENERAL PHYSIOLOGY + GENERAL PHYSIOLOGY LAB **SUBJECT CODE: OPT242M102/OPT242M112**

SCHEME OF EVALUATION: (T+P)

Total credits: 4 **L-T-P-C=3-0-2-4**

Course Objective:

Objective of this subject is to deal with the entire human anatomy with emphasis on different organ systems, their physiological functions with special emphasis on blood and neuro physiology.

Course Outcome: At the end of the course, the student will be able to:

On successful completion of the course, the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**explain** the normal functioning of various organ systems of the body, their interactions.	**BT 1**
CO2	**Understand** the physiological aspects of normal growth and development.	**BT2**
CO 3	**relate** the physiological principles underlying pathogenesis of disease and understand the physiological response and adaptations to environmental stresses.	**BT 3**
CO 4	**Analyze** the relationship between ocular physiology and common visual disorders	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Basic Biological (Biophysical & Biochemical) Principles: Diffusion, surface tension and viscosity – their characteristics, factors influencing and biological applications. Osmosis – osmometers, laws of osmosis, biological applications, relation with depression of freezing points. Acids, bases and pH. Colloids – classification, properties, biological importance of colloids. Dialysis, electrodialysis and ultra-filtration. Chromatography: Principles & applications, Electrophoresis: Principles & applications, Gel electrophoresis. Ultracentrifugation: moving boundary and density gradient ultracentrifugation. Adsorption, absorption.	**11**

2	2. Genetics: Nucleic acid- Structure of DNA- Physical & Chemical properties of DNA & RNA, Ultra structure & types of DNA & RNA(in details), Brief idea about super coiling of DNA Semiconservative mode of replication of DNA, Mechanism of replication of DNA, ,Genetic code. Genetically relation of color blindness and ocular albinism. Chromosome aberration- Structural aberration- Deletion- Duplication- Inversion- translocation. Numerical aberration (Polyploidy & aneuploidy- Hyper & hypo). Gene mutation- classification-spontaneous & Induced- Chemical mutation- Practical Application of mutation.	**11**

3	3. Blood Vascular system Composition and functions of blood. Plasma proteins – normal values, origin and functions. Brief idea on Bone marrow. Formed elements of blood – origin, formation, functions and fate. Hemoglobin – functions, compounds and derivatives. Abnormal hemoglobin-overview. Thalassemia-brief idea. Different types of anemia and their causes-overview. Erythrocyte sedimentation rate (ESR) and its significance. Hematocrit. PCV, MCV, MCH, MCHC. Blood volume – normal values, regulation. Blood coagulation – factors, process, anticoagulants, Prothrombin time. Clotting time. Bleeding time. Blood groups – ABO systems and Rh factors. Blood transfusion. Ultra structure & functions of blood vessels (artery & vein). Structure type and function of capillaries. Differences between artery & vein. 4. Muscular Physiology: Microscopic and electron microscopic structure of skeletal, smooth and cardiac muscles. Difference between skeletal, smooth and cardiac muscles. The sarcotubular system. Red and white striated muscle fibers. Single unit and multi unit smooth muscle. Motor point. Properties of muscle: excitability and contractility, all or none law, summation of stimuli, summation of contractions, effects of repeated stimuli, genesis of tetanus, onset of fatigue, refractory period, tonicity, conductivity, extensibility and elasticity. Electromyography. Muscle contraction – E C Coupling, Muscle fatigue, Rigor mortis, Sliding filament theory, Slow & fast muscle fibers, Isotonic & Isometric contraction. 5. Neuro Physiology Electron microscopic structure of nerve cell or neurons. Neuroglia. Myelinated and unmyelinated nerve fibers. Conduction velocity of nerve impulse in relation to myelination and diameter of nerve fibers. Properties of nerve fibers – excitability, conductivity, all-or-none law, accommodation, adaptation, summation, refractory period, indefatiguability. Concept of chronaxie and rheobase. Synapses – types, structure, synaptic transmission of the impulse, synaptic potentials, neurotransmitters. Motor unit. Injury to peripheral nerves – degeneration and regeneration-brief idea. Automatic nervous system – Introduction, Comparison of autonomic & somatic nervous system, Anatomy of autonomic motor pathways – Pre-ganglionic neurons, autonomic ganglia, sympathetic ganglia, autonomic plexus, post-ganglionic neurons structure of sympathetic and parasympathetic division. ANS- neurotransmitter and receptors- cholinergic neurons & receptors. Receptor agonist & antagonist. Physiological effect of ANSsympathetic & parasympathetic response. Integration & control of autonomic function- autonomic Reflexes, autonomic control by higher centers. Neural Transmission- Introduction, Autonomic Synaptic Transmission-Modes of transmission, sympathetic & parasympathetic response. CNS Synaptic transmission-Electrical synaptic transmission & chemical synaptic transmission. Neuro muscular Junction – The neuromuscular junctions – structure, events in transmission, end-plate potential, post tetanic potential.	**11**

4	6. Cardio Vascular System – Structure & function of Heart & blood vessels (artery, vein and capillary) (Anatomical position, chambers of heart.) Blood circulation through heart. Special junctional tissue of heart.(Myogenic and neurogenic heartconducting system of heart. E.C.G. Cardiac cycle. Heart Sound , Blood vessels – type, Structure & function, Systemic & pulmonary circulation. Blood – composition, Function, blood group, Blood clotting. Cardiac cycle and cardiac output. Blood Pressure-regulation & controlling factors. 7. Renal System- Function of kidney, Anatomy & Histology of Nephron & collecting duet. – Urine formation(Filtration, reabsorbtion and secretion)- Counter – current system of urine concentration, Anomalies in urine concentration.	**11**
	TOTAL	**44**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Identification of fixed histological slides – nerve tissues (cerebellum, cerebral cortex, neurons, spinal cord, nodes of Ranvier, corneal cell space), renal tissues. Blood vessels (artery & vein),skin, Tongue, Liver. Hemoglobin estimation	**7.5**
2	Determination of blood pressure Determination of BT, CT, ESR	**7.5**
3	Blood film making & identification of different blood corpuscle. ECG wave identification	**7.5**
4	Measurement of TC of RBC & WBC & DC of WBC.. Determination of Blood Group (ABO; Rh).	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOKS:

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

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

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

Reference Books

1. H.McMinn, John Pegington, Peter H. Abrahams. A Color Atlas of Human Anatomy 3rd edition, M, Mosby, 1996, ISBN: 978-0815158585
2. Richard S. Snell. Clinical Anatomy for Medical Students 6th edition, Lippincott Williams & Wilkins, 2000, ISBN: 9780781715744 Derek Field. Field's Anatomy, Palpation and Surface Marking 4th edition, Butterworth-Heinemann Ltd, 2006, ISBN : 978-0750688482

SYLLABUS (1st SEM)

INTERDISCIPLINARY /SUBJECT NAME: Introduction to Indian Knowledge System-I

Course Level: 100

SUBJECT CODE: IKS992K101

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C – 3-0-0-3**

Credit Distribution (hours)		
L/T	P	EL
60	0	30

Course objectives:

This Foundation course is designed to present an overall introduction to all the streams of IKS relevant to the UG program. It would enable students to explore the most fundamental ideas that have shaped Indian Knowledge Traditions over the centuries.

Course Outcomes:

On completion of this course, students will be able to –

CO Level	Contents	BT Level
CO_1	**Recall** the rich heritage of Indian knowledge systems	BT level 1
CO_2	**Describe** the contribution of Indian knowledge systems to the world	BT level 2
CO_3	**Demonstrate** knowledge of sociocultural and ethnolinguistic diversity that constitutes the soul of Bharat Varsha	BT level 2
CO_4	**Apply** traditional knowledge and techniques in day-to-day life	BT level 3
CO_5	**Distinguish** knowledge traditions that originated in the Indian subcontinent	BT level 3

Module	Course Contents	Periods
I	**<u>Introduction to Indian Knowledge Systems (IKS)</u>:** -What is the Indian Knowledge System? -Definition of Indigenous/ Traditional Knowledge -Scope, and Importance of Traditional Knowledge. **<u>Ancient India- Bharat Varsha:</u>** -People of Ancient Bharat Varsha -Our great natural heritage: The great Himalayas and the rivers. - The civilizations of the Sindhu-Ganga valley, and the Brahmaputra valley. -Our coastal plains. -Our Nature: Forests and Minerals -Ancient Indian Traditional Knowledge and Wisdom about nature and climate.	15
II	**<u>Indian Heritage of Knowledge</u>:** -Ancient Indian Knowledge: The *Vedas* and its components-the *Vedangas* -Ancient Indian books and treaties: The *Sastras*. -The Great Indian Epics: The Ramayana and The Mahabharata,	15

	-Epics and religious treaties of ancient Assam: Introduction to Madhav Kandali's *Ramayan* and Srimanta Sankardev's *Dasam Skandha Bhagavat* of the Puranas. -Ancient Traditional Knowledge-The *Agamas* -The ancient Buddhist knowledge: *Tripitaka: Vinaya, Sutta* and *Abhidhamma Pitaka* **Languages and language studies in India**: -What is linguistics? -Script and Language -Alphabet of the Indian languages *Varnamala:* Origin, Evolution, and phonetic features. -Languages of India -Important texts of Indian languages: Skills *Siksha,* Expression/Prounciation-*Nirukta,* Grammer-*Vyakarana,* Poetic rhythm-*Chandas.* -Paninian Grammar: A Brief Introduction **Introduction to Fine Arts and Performing Arts of India:** -Ancient Indian classical music and dance forms: The Science of Dramas-*Natyasastra* and the Science of Music-*Gandharva-Veda.* -Aesthetics in Indian Art and Culture. -Folk music and traditional dance forms of the Northeast.	
III	**Indian Science & Technology** -Ancient India's contribution to Mathematics- Number System. Algebra and Arithmetic, Geometry and Trigonometry. -Origin of Decimal system in India; nomenclature of numbers in the Vedas. Zero and Infinity. Sulba-sutras. Contribution of Brahmagupta and Sridhar Acharya to Mathematics. Important texts of Indian mathematics. • **Indian Astronomy:** Planetary System. Motion of the Planets. Velocity of Light. Eclipse. Astronomy. Navagrahas. Important works in Indian Astronomy. Aryabhata and Nilakantha: Contribution to Astronomical Studies	15

	• **<u>Indian Metal Works</u>:** Mining Techniques. Types of Metals. Tools & Techniques for Metal Smelting with examples. Metalworks in pre-modern India: Special reference to NE India.	
IV	**<u>Contribution of Ancient India to Health Sciences</u>:** -Traditional Indigenous systems of medicines in India: - *Ayurveda* and *Yoga:* Elements of *Ayurveda: Gunas* and *Doshas*, *Pancha Mahabhuta* and *Sapta-dhatu*. -Concept of disease in Ayurveda -Ayurvedic lifestyle practices: *Dinacharya* and *Ritucharya.* -Important Ayurvedic Texts -Hospitals in Ancient India • -*Ayurveda*: Gift of India to the modern world.	15
EL	The experiential learning sessions may include: • Field Visits: Organizing visits to historical sites, museums, traditional craft centers, and other places relevant to Indian knowledge systems. • Interactive Sessions: Engaging students in discussions with experts and practitioners in various fields of Indian knowledge systems to gain insights and practical knowledge. • Online Lecture Series: Providing the students with online lectures by distinguished experts in the field of the Indian Knowledge System. • Hands-on Activities: Providing opportunities for students to participate in activities related to traditional arts, crafts, music, dance, agriculture, etc., to understand the practical aspects of Indian knowledge systems. • Practical Demonstrations: Conducting workshops or sessions to demonstrate traditional practices, such as yoga, Ayurveda, Vastu Shastra, etc., for the students.	30
	Total	90

Textbooks Books:

1. Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavan RN. (2022), *Introduction to Indian Knowledge System: Concepts and Applications.* PHI Learning Private Ltd.

2. Mukul Chandra Bora, *Foundations of Bharatiya Knowledge System.* Khanna Book Publishing

Reference Books:

1. Baladev Upadhyaya, *Samskrta Śāstrom ka Itihās*, Chowkhambha, Varanasi, 2010.
2. D. M. Bose, S. N. Sen and B. V. Subbarayappa, Eds., *A Concise History of Science in India*, 2nd Ed., Universities Press, Hyderabad, 2010.
3. Astāngahrdaya, Vol. I, *Sūtrasthāna and Śarīrasthāna*, Translated by K. R. Srikantha Murthy, Vol. I, Krishnadas Academy, Varanasi, 1991.
4. Dharampal, *The Beautiful Tree: Indian Indigenous Education in the Eighteenth Century*, Dharampal Classics Series, Rashtrotthana Sahitya, Bengaluru, 2021.
5. J. K. Bajaj and M. D. Srinivas, *Indian Economy, and Polity in Eighteenth-century Chengalpattu*, in J. K. Bajaj ed., Indian Economy and Polity, Centre for Policy Studies, Chennai, 1995, pp. 63-84.

SYLLABUS (1ST SEM)

AECC/SUBJECT NAME: Communicative English and Behavioral Science-I

Course Level: 100

SUBJECT CODE: CEN982A101/BHS982A102

SCHEME OF EVALUATION: (T)

Total credits: 2 **L-T-P-C – 2-0-0-2**

Course Objective: To understand the four major aspects of communication by closely examining the processes and outlining the most effective ways to communicate with interactive activities.

Course Outcomes: On successful completion of the course the students will be able to

CO Level	Course Outcome	Blooms Taxonomy Level
CO 1	**List** the elements and processes that make for successful communication and **recognise** everyday activities that deserve closer attention in order to improve communication skills	**BT 1**

CO 2	**Contrast** situations that create barriers to effective communication and **relate** them to methods that are consciously devised to overcome such hindrance	**BT 2**
CO 3	**Apply** language, gestures, and para-language effectively to avoid miscommunication and **articulate** one's thoughts and build arguments more effectively	**BT 3**

Detailed Syllabus		
Units	**Course Contents**	**Periods**
I	Introduction to Effective Communication • Listening Skills o The Art of Listening o Factors that affect Listening o Characteristics of Effective Listening o Guidelines for improving Listening skills	**5**
II	• Speaking Skills o The Art of Speaking o Styles of Speaking o Guidelines for improving Speaking skills o Oral Communication: importance, guidelines, and barriers	**5**
III	• Reading Skills o The Art of Reading o Styles of Reading: skimming, surveying, scanning o Guidelines for developing Reading skills	**5**
IV	• Writing Skills o The Art of Writing o Purpose and Clarity in Writing o Principles of Effective Writing	**5**

Texts Book:

1. Rizvi, M. Ashraf. (2017). *Effective Technical Communication*. McGraw-Hill.
2. Chaturvedi, P. D. and Chaturvedi, Mukesh. (2014). *Business Communication.* Pearson.
3. Raman, Meenakshi and Sharma, Sangeeta. (2011). *Technical Communication: Principles and Practice* (2nd Edition): Oxford University Press.

Reference Book

Rizvi, M. Ashraf. (2017). *Effective Technical Communication*. McGraw-Hill.

1. Chaturvedi, P. D. and Chaturvedi, Mukesh. (2014). *Business Communication.* Pearson.
2. Raman, Meenakshi and Sharma, Sangeeta. (2011). *Technical Communication: Principles and Practice* (2nd Edition): Oxford University Press.

Credit Distribution		
Lecture/Tutorial	**Practicum**	**Experiential Learning**
15 hours	-	10 hours - Movie/ Documentary /Podcasts screening - Peer teaching

Course objectives: To increase one's ability to draw conclusions and develop inferences about attitudes and behaviour, when confronted with different situations that are common in modern organizations.

Course Outcomes: On completion of the course the students will be able to :

CO1: Understand self & process of self exploration

CO2: Learn about strategies for development of a healthy self esteem CO3: Apply the concepts to build emotional competencies.

Detailed Syllabus:

Modules	Course Contents	Periods
I	**Introduction to Behavioral Science** Definition and need of Behavioral Science,Self: Definition components, Importance of knowing self, Identity Crisis,Gender and Identity, Peer Pressure, Self image: Self Esteem, Johari Window ,Erikson's model.	**4**
II	**Foundations of individual behavior** Personality- structure, determinants, types of personalities. Perception: Attribution, Errors in perception. Learning- Theories of learning: Classical, Operant and Social	**4**
III	**Behaviour and communication.** Defining Communication, types of communication, barriers to communication, ways to overcome barriers to Communication, Importance of Non-Verbal Communication/Kinesics, Understanding Kinesics, Relation between behaviour and communication.	**4**
IV	**Time and Stress Management** Time management: Introduction-the 80:20, sense of time management, Secrets of time management, Effective scheduling. Stress management: effects of stress, kinds of stress-sources of stress, Coping Mechanisms. Relation between Time and Stress.	**4**
Total		**16**

Text books

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management; Pfeiffer &Company
- Blair J. Kolasa, Introduction to Behavioural Science for Business, John Wiley & Sons Inc
- K.Alex, Soft skills; S.Chand.

SYLLABUS (1ST SEM)

SEC PAPER/SUBJECT NAME: BIOCHEMISTRY **SUBJECT CODE: OPT242S101**

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C=3-0-0-3**

Course Objective:

The objective of this subject is to deal with the biochemical nature of carbohydrates, proteins, minerals, vitamins, lipids etc. A detailed study of these, emphasizing on their chemical composition and their role in metabolism is the required aim of this course.

Course Outcome:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Identify** each principle of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data.	**BT 1**
CO2	**understand** the structure, function and interrelationship of biomolecules and consequences of deviation from normal.	**BT2**
CO 3	**integration** of the various aspects of metabolism, and their regulatory pathways.	**BT 3**
CO 4	**analyze** the metabolic pathways involved in the breakdown and utilization of carbohydrates, proteins, and lipids for energy production.	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	1. Basic concept & metabolism of carbohydrate, protein & fat.Process of glycolysis, glycogenolysis, TCA cyclesignificance. Non Protein Nitrogen, Nitrogen balance, Metabolism of Amino acids, Transamination, Deamination. Process of □-oxidation of unsaturated fatty acid, á & □□oxidation overview. 2. Amino acids, protein structures. a. Amino acids- Function, classification, properties b. Protein - Primary, secondary, tertiary & quaternary structures & the bond involves.	**15**
2	3. Brief outline: Enzyme- General characteristics, classification, Factors affecting enzymatic activity. Kinetics of Enzyme – km. Michaelis Menten equation. Line Weaver Burk plot. Enzyme Inhibition – Reversible & Irreversible. Allosteric enzyme. 4. Oxygen transporting protein Hemoglobin & Myoglobin – Structure & their characteristics. Comparison between hemoglobin & myoglobin. Oxygen transporting Mechanism of Hemoglobin affinity for Oxygen. Bohr's effect 5. Vitamins Water & Fat soluble Vitamins. Vitamins- A,D,E,KP,C B complex- source, daily requirement, Metabolism, Functions, deficiency.	**15**
3	6. Basic outline of hormone action Physical & Chemical Characteristics of hormone. Types of hormone. General mechanism of hormone action via Massenger system. Source & importance of different hormones-STH, ACTH, GTH , T4, parath hormone, Insulin, Glucagon, Glucocorticoid, Mineralocorticoid, Melatonin, Estrogen, Progesteron, Testosterone & HCG 7. Cornea – Biochemical composition of cornea. Sources of Nutrients- Oxygen, Glucose, Amino acid. Metabolic pathway in cornea – Glycolysis, HMP shunt. 8. Tear film- Functions of Tear film. Different layers of Tear film. Chemical composition of tears. Tear film abnormalities. Tests for film Adequacy.	**15**

4	9. Lens – Biochemical composition of lens. Lens protein – their types & characteristics. Lens Metabolism - Carbohydrate metabolism, protein metabolism. Cataract – Due to biochemical defects of lens. Antioxidant mechanism in the lens. 10. Biochemistry of the visual process Photopigments – Rhodopsin & Iodopsin. Chemical nature of Rhodopsin. Visual cycle (Bleaching of Rhodopsin, Transducin cycle, Role of Phosphodiestareses).	**15**
	TOTAL	**60**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
3*20 =60 NCH	0	30NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOK:

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

2. S. Ramakrishnan, K G Prasannan and R Rajan: Textbook of Medical Biochemistry, Orient Longman, Madras, 1990

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

REFERENCE BOOKS:

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

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

SYLLABUS (1ST SEM)
SUBJECT NAME: VAC **Subject Code:** **Course Level: 100** **SUBJECT CODE:** **SCHEME OF EVALUATION: (T)** **Total credits: 3** **L-T-P-C – 3-0-0-3**

SYLLABUS (1ST SEM)
SUBJECT NAME: SWAYAM COURSE **Subject Code:** **Course Level: 100** **SUBJECT CODE:** **SCHEME OF EVALUATION: (T)** **Total credits:**

SYLLABUS (2ND SEM)

PAPER /SUBJECT NAME: OCULAR ANATOMY + OCULAR ANATOMY LAB **SUBJECT CODE: OPT242M201/OPT242M211**

SCHEME OF EVALUATION: (T+ P)

Total credits: 4 **L-T-P-C=3-0-2-4**

Course Objective:

The objective of this subject is to deal with detailed anatomy of the orbit, eyeball and cranial nerves associated with ocular functions.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Identify** the microscopic structures of various tissues in the eye	**BT 1**
CO 2	**Understand** the basic principles of ocular embryology and the neural connections and distribution.	**BT 2**
CO 3	**Relate** the basic structure and connections between the various parts of the central nervous system and the eye	**BT 3**
CO 4	**Analyse** and correlate the structure with the functions.	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Embryology –ocular Formation of optic vesicle & optic stalk, formation of lens vesicle, formation of optic cup, changes in associated mesoderm, development of various structure of eye ball – retina, optic nerve, crystalline lens, cornea, sclera, choroid, cilliary body, iris, viterous. Development of accessory structures of eyeball – eyelids, lacrimal apparatus, extra-ocular muscles, orbit. Milestones in the development of the eye. Orbit Bony orbit Size, shape & relations, walls of the orbit , Base of the orbit, Apex of orbit. Orbital fascia Fascial bulbi , Fascial sheaths of extraocular muscles, intermuscular septa. Spaces of orbit Orbit fat & reticular tissue - Apertures at the base of orbit- Contents of the orbit - Orbital Nerve culomotor , Trochler, Abducent, Trigeminal, facial nerves - their functional components, course & distribution, clinically applied aspects.	**11**
2	Cornea (a)Layers & peculiarities, (b). Blood supply & nerve supply of cornea. .(c) Corneal Transparency. Lens , Zonules (a) Structure. of lens capsule, Ant. Epithelium, lens fibers (structured & zonal arrangement). (b). Ciliary zonules structure gross appearance,(c). Arrangement of zonules fibers. Uveal Tract & its vascular supply (a). Iris macroscopic & microscopic appearance . (b) ciliary body – Macroscopic structure.(c). chloride - Macroscopic structure.(d) Blood supply to uveal structure- short & Long Posterior artery & Anterior Artery. (e). Venous drainage. Vitreous- main masses of vitreous. Base of the vitreous. Hyaloidean vitreous. Vitreous cells. Sclera – Anterior, posterior & middle apertures. Episclera. Sclera proper. Lamina fusca. Blood supply of the sclera. Nerve suply of the sclera. Anterior chamber and its angle- angle of the anterior chamber. Trabecular meshwork. Canal of Schlemm. Schwalbe's line. Drainage of aqueous humor.	**11**

3	Retina & its vascular supply (a). Gross anatomy,(b). Microscopic structure of fovea centralize, (c). Blood retinal barrier.(d.) Anatomy of optic nerve, (e). Anatomy of optic nerve, (f.) optic chaisma optic tracts, (g) Lateral Geneculate body, (h). optic radicalism (i). visual cortex, (j). Arrangement of nerve fibers.(K). Blood supply of visual pathways (Arterial circle of willis & its branches). The Ocular motor system Extraocular muscles, nerve supply, motor nuclei, supra nuclear motor centers. The pupillary & ciliary muscle Anatomy of sphincter & Dilator muscle. Ciliary muscle – Anatomy, types The nerve supply of the eye ball. The lachrymal appears (a) Lachrymal gland, (b) Palpebral part, (c) Duets of lachrymal gland, (d) structure of the lachrymal gland, (e) Blood supply & nerve supply of the lachrymal gland, (f) lachrymal passages.	**11**
4	Anatomy of the Ocular Adnexa & glands; Lids - a. Structures of the lids: - Skin, Subcutaneous Areolar Layer, Layer of Staiated muscle, Submuscular Areolar Tissue, Fibrous Layer, Conjunctiva.Glands of the Lids- Meibomaian Glands, Glands of Zela and Glands of Moll. Blood Supply of the Lids, Lymphatic Drainage of the Lids, Nerve Supply of the Lids. Conjunctiva - Palpebral Conjunctiva, Bulbar Conjunctiva, Conjunctival Fornix, Microscopic Structure of the conjunctiva- Epithelium, Substantia Propria. Conjunctival Glands Krause's Glands, Wofring's Glands, Henley's Glands, Manz Glands. Blood Supply of the Conjunctiva, Nerve Supply of the Conjunctiva, Caruncle, Plica Semilunaris.	**11**
	TOTAL	**44**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Identification of ocular histology slides.	**7.5**
2	Identification of projection slides of Ocular Anatomy.	**7.5**
3	Identification of structure & related viva.	**7.5**
4.	Identification of anterior segment structure	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

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

Reference Books

1. RD Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001
2. PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002

SYLLABUS (2ND SEM)

PAPER/SUBJECT NAME: OCULAR PHYSIOLOGY + OCULAR PHYSIOLOGY **LAB**
SUBJECT CODE: OPT242M202/OPT242M212

COURSE LEVEL: 100

SCHEME OF EVALUATION: (T)

Total credits: 4 **L-T-P-C=3-0-2-4**

Course Objective:

The objective of the subject is to deal with the physiological functions of each part of the eye.

Course Outcome:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Explain** the phenomenon of vision, understand the physiological principles underlying pathogenesis and treatment of diseases of the eye.	**BT 1**
CO 2	**Summarize** the normal functioning of all structures of the eye and their interactions	**BT 2**
CO 3	**Relate** the physiological aspects of normal growth and development of the eye	**BT 3**
CO 4	**Correlate** the physiological mechanisms of the eye with their corresponding diagnostic tests in ophthalmology.	**BT 4**

Credit Distribution		
Lecture/Tutorial	**Practicum**	**Experiential Learning**
3*20 =60 NCH	0	30NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Identification of ocular histology slides.	**7.5**
2	Identification of projection slides of Ocular Physiology .	**7.5**
3	Identification of structure & related viva.	**7.5**
4	Identification of Retinal cell physiology.	**7.5**
	TOTAL	**30**

TEXTBOOK:

1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
2. RD Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001
3. PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002

Reference Books

1. David H. K. Mann. *The Development of the Human Eye*, 3rd edition, British Medical Association, 1982. ISBN: 978-0723604564
2. Lee Ann Remington. *Clinical Anatomy and Physiology of the Visual System*, 3rd edition, Elsevier, 2011. ISBN: 978-1437719260
3. Frederick A. Jakobiec & Daniel M. Albert. *Principles and Practice of Ophthalmology: Basic Sciences (Volume 1)*, 2nd edition, W.B. Saunders Company, 2000. ISBN: 978-0721673760
4. Sidney L. Fox, Edward W. Millman. *The Anatomy of the Eye and Orbit*, 7th edition, H.K. Lewis & Co Ltd, 1976. ISBN: 978-0812104844

SYLLABUS (2ND SEM)

INTERDISCIPLINARY /SUBJECT NAME: Introduction to Indian Knowledge System-II

Course Level: 100

SUBJECT CODE: IKS992K201

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C – 3-0-0-3**

Credit Distribution (hours)		
L/T	P	EL
60	0	30

Course objectives:

This Foundation course is designed to present an overall introduction to all the streams of IKS relevant to the UG program. It would enable students to explore the most fundamental ideas that have shaped Indian Knowledge Traditions over the centuries.

Course Outcomes:

On completion of this course, students will be expected to –

CO Level	Contents	BT Level
CO_1	**Recall** traditional Indian knowledge traditions constituting Indian culture	BT level 1
CO_2	**Summarize differences** between classical literature in Sanskrit and other Indian languages	BT level 2
CO_3	**Compare** knowledge traditions originating in NE India	BT level 2
CO_4	**Appreciate** the contribution of Indian Knowledge Systems to the world	BT level 3

Module	Course Contents	Periods
I	**Indian Classical Literature** Indian Classical Literature: A Brief Introduction.	15

	- Ancient Indian Spritual Poetics-*Kavya*: Contribution of Kalidasa **Diversity and Indian Culture**: - Diversity and Indian Culture -Indigenous Faith and Religion -Preservation of culture and indigenous knowledge **The Purpose of** Knowledge - Understanding Self-Awareness and Spirituality. -Indian concept and purpose of Knowledge and Education - Understanding Spirituality and Materialism: *Para* and *Apara Vidya*	
II	**Methodology of Indian Knowledge System**: - *Shruti* and *Smriti* traditions. -Intoduction to *Shastras.* -Manuscriptology: The art and science of documenting knowledge. - Repositories of ancient manuscripts with special reference to the Norteast India. **Indian Architecture and Town Planning**: - Introduction ancient Indian architecture. - *Sthapatya-Veda*: An Introduction - Indigenous tools & techniques for town planning & Temple Architecture. Lothal, Mohan Jo Daro. - Temple Art: Lepakshi Temple, Jagannath Puri Temple, Konark Sun Temple. - Vernacular architecture of Assam: Special reference to Brahmaputra Valley	15
III	**Indian Agriculture**: - Agriculture: Significance in Human Civilization. - Sustainable Agriculture. - Historical significance of agriculture and sustainable farming in India. - Step Cultivation of India: Special reference to Northeast India. - Wet rice cultivation of Assam. **Indian Textiles**: What is Textile?	15

	- Tradition of cotton and silk textiles in India. - The historical contribution of textile and weaving to the Indian economy. - Varieties of textiles and dyes developed in different regions of India with special reference to Northeast India	
IV	**<u>Indian Polity and Economy</u>**: - Understanding Kingdom and Chiefdom - Role of a king - The Indian idea of a well-organized polity and flourishing economy. - The *Chakravarti* System: Administrative System of Ancient Bharatvarsha. - Village administrative system: Northeast India. - *Arthashastra*: Brief synopsis **<u>The outreach of Indian Knowledge System across Geographical Boundaries</u>** - Indian Languages. - Scripts. - Linguistics. - Ayurveda. - Yoga and Meditation. - Textile - Decimal value place system-based arithmetic, Algebra and Astronomy	15
EL	The experiential learning sessions may include: • Field Visits: Organizing visits to historical sites, museums, traditional craft centers, and other places relevant to Indian knowledge systems. • Interactive Sessions: Engaging students in discussions with experts and practitioners in various fields of Indian knowledge systems to gain insights and practical knowledge. • Online Lecture Series: Providing the students with online lectures by distinguished experts in the field of the Indian Knowledge System. • Hands-on Activities: Providing opportunities for students to participate in activities related to traditional arts, crafts, music, dance, agriculture, etc., to understand the practical aspects of Indian knowledge systems.	30

	• Practical Demonstrations: Conducting workshops or sessions to demonstrate traditional practices, such as yoga, Ayurveda, Vastu Shastra, etc., for the students.	
	Total	90

Textbooks Books:

1. Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavan RN. (2022), *Introduction to Indian Knowledge System: Concepts and Applications.* PHI Learning Private Ltd.

2. Mukul Chandra Bora*, Foundations of Bharatiya Knowledge System.* Khanna Book Publishing

Reference Books:

1. Baladev Upadhyaya, *Samskrta Śāstrom ka Itihās*, Chowkhambha, Varanasi, 2010.
2. D. M. Bose, S. N. Sen and B. V. Subbarayappa, Eds., *A Concise History of Science in India*, 2nd Ed., Universities Press, Hyderabad, 2010.
3. Astāngahrdaya, Vol. I, *Sūtrasthāna and Śarīrasthāna*, Translated by K. R. Srikantha Murthy, Vol. I, Krishnadas Academy, Varanasi, 1991.
4. Dharampal, *The Beautiful Tree: Indian Indigenous Education in the Eighteenth Century*, Dharampal Classics Series, Rashtrotthana Sahitya, Bengaluru, 2021.
5. J. K. Bajaj and M. D. Srinivas, *Indian Economy and Polity in Eighteenth century Chengalpattu*, in J. K. Bajaj ed., Indian Economy and Polity, Centre for Policy Studies, Chennai, 1995, pp. 63-84.

SYLLABUS (2ND SEM)

AEC/SUBJECT NAME: Communicative English and Behavioral Science-I
Subject Code: CEN982A201/BHS982A202

Course Level: 100

SUBJECT CODE:

SCHEME OF EVALUATION: (T)

Total credits: 2 **L-T-P-C – 2-0-0-2**

Course Objectives

To introduce the students to the various forms of technical communication and enhance their knowledge in the application of both verbal and non-verbal skills in communicative processes.

Course Outcomes

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**List** the different types of technical communication, their characteristics, their advantages and disadvantages.	**BT 1**
CO 2	**Explain** the barriers to communication and ways to overcome them.	**BT 2**
CO 3	**Identify** the means to enhance conversation skills.	**BT 3**
CO 4	**Determine** the different types of non-verbal communication and their significance.	**BT 4**

Detailed Syllabus

Modules	**Topics (if applicable) & Course Contents**	**Periods**
I	**Technology Enabled Communication** Communicating about technical or specialized topics, Different forms of technology-enabled communication tools used in organizations Telephone, Teleconferencing, Fax, Email, Instant messaging, Blog, Podcast, Videos, videoconferencing, social media	**4**
II	**Communication Barriers** Types of barriers: Semantic, Psychological, Organisational, Cultural, Physical, Physiological, Methods to overcome barriers to communication.	**4**
III	**Conversation skills/Verbal Communication** Conversation – Types of Conversation, Strategies for Effectiveness, Conversation Practice, Persuasive Functions in Conversation, Telephonic Conversation and Etiquette Dialogue Writing, Conversation Control.	**4**

IV	**Non-verbal Communication** Body language- Personal Appearance, Postures, Gestures, Eye Contact, Facial expressions Paralinguistic Features-Rate, Pause, Volume, Pitch/Intonation/ Voice/Modulation, Proxemics, Haptics, Artifacts, Chronemics,	**4**
	Total	**16**

Texts:

1. Rizvi, M. Ashraf. (2017). *Effective Technical Communication*. McGraw-Hill.
2. Chaturvedi, P. D. and Chaturvedi, Mukesh. (2014). *Business Communication.* Pearson.
3. Raman, Meenakshi and Sharma, Sangeeta. (2011). *Technical Communication: Principles and Practice* (2nd Edition): Oxford University Press.

BHS:

Course objectives: To increase one's ability to draw conclusions and develop inferences about attitudes and behaviour, when confronted with different situations that are common in modern organizations.

Course outcomes: On completion of the course the students will be able to:

CO 1: Develop an elementary level of understanding of culture and its implications on personality of people.
CO2: Understand the concept of leadership spirit and to know its impact on performance of employees.
CO3: Understand and apply the concept of Motivation in real life.

Modules	Course Contents	Periods
I	**Culture and Personality** Culture: Definition, Effect, relation with Personality, Cultural Iceberg, Overview of Hofstede's Framework, Discussion of the four dimensions of Hofstede's Framework.	**4**
II	**Attitudes and Values** Attitude's definition: changing our own attitudes, Process of cognitive dissonance Types of Values, Value conflicts, Merging personal and Organisational values	**4**
III	**Motivation** Definition of motivation with example, Theories of Motivation (Maslow, McClelland's theory& Theory X and Y)	**4**
IV	**Leadership** Definition of leadership, Leadership continuum, types of leadership, Importance of Leadership, New age leaderships: Transformational & transactional Leadership, Leaders as role models.	**4**
Total		**16**

Text books:

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management; Pfeiffer &Company
- Blair J. Kolasa, Introduction to Behavioural Science for Business, John Wiley & Sons Inc.
- Organizational Behaviour by Kavita Singh (Vikas publishers, 3rd Edition).

SYLLABUS (2ND SEM)

SEC PAPER/SUBJECT NAME: Optometric Optics +Optometric Optics Lab

SUBJECT CODE: OPT242S201/ OPT242S211

COURSE LEVEL: 100

SCHEME OF EVALUATION: (T + P)

Total credits: 3 **L-T-P-C= 2-0-2-3**

Course Objective:

The objective of the subject is to study of light, its properties and its interaction with matter. Specifically, the phenomena of interference, diffraction, polarization and scattering will be dealt with in detail.

Course outcome:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**explain** the outcome from this course is to equip the students with thorough **knowledge** of properties of light.	**BT 1**
CO 2	**interpret** the properties of different lens and mirror, image formation at different focal points.	**BT 2**
CO 3	**applying** the knowledge, students will be able to **categorize** the distribution of light under various conditions.	**BT 3**
CO 4	**analyze** and optimize spectacle lens designs based on principles of light propagation and refraction to correct refractive errors.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	What is light- dual nature- particle & wave nature, speed, wavelength & frequency of light. Fermats' principle- laws of relation & refraction at a plane surface using Fermats' principle, Snells' law, relative and absolute refractive indices, total internal reflection and Critical angle, refraction by plane parallel slab of glass.	**11**
2	Geometrical path length & optical path length of rays, Concept of wave fronts & rays, concept of Vergence divergence , convergence. Refraction by spherical surfaces- convex & concave, Derivation of vergence equation, focal points, diopter. power, image point, lateral & axial magnification, simple numerical. Thin Lens- shapes, derivation of lens makers' formula, thin lens vergece equation, equivalent focal length of two thin lenses separated by a distance & placed in contact, lateral magnification of thin lenses in contact, simple numerical, concept of reduced systems, symmetrical eye.	**11**
3	Thick Lens- Cardinal points & planes, front & back vertex power, matrix theory in paraxial Optics to locate positions of cardinal planes. Different types of aberrations & their effects. Prism- Dispersion of prism, reflecting prisms, prisms diopters.	**11**
4	Polarization & Crystal Optics: Concept of polarization , linear , circular , elliptical polarization (qualitatively), Plane of polarization & vibration, degree of polarization, polarizes, analyzers, Production of polarized light, birefringence, calculate crystal , veal prism, Wallaston prism , retarders - full, half & quarter wave plates, analysis of light of unknown Polarization. Linear Scattering- Raleigh & Mce Principles of LASERs, uses of Laser in ophthalmology .	**11**
	TOTAL	**44**

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Determination of the focal length & hence the power of a convex lens by displacement method..To determine the wavelength of a monochromatic light source with the help of Fresnel's Biprism. To determine the radius of curvature of convex surface of a lens by Newton's ring method.	**7.5**
2	Determination of the refractive index of a transparent liquid by using a travelling microscope. Determination of the refractive index of the material of a convex lens measuring its focal length, using the lens & a plane mirror.To determine Planck's constant using photocell. To study the diffraction through a single slit & to determine its width.	**7.5**
3	Determination of the focal length of a concave mirror by graphical method.To determine the slit width & the separation between the slits of a double slit system from its Fraunhoffer diffraction pattern. Determination of the wavelength of monochromatic light using diffraction grating.	**7.5**
4	To calibrate a Polarimeter & hence to determine the unknown concentration of sugar solution. To determine the wavelength of the Laser source by forming diffraction pattern with transmission grating. Determination of refractive index of the material of a prism by minimum deviation method. To draw curve of a prism by a spectrometer & hence to find out the angle of minimum deviation.	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOK:

1. Subrahmanyan N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
3. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA

Reference Book (s)

1. Ophthalmic Dispensing, Second edition, ButterworthHeinemann, USA, 1996

SYLLABUS (2ND SEM)

SUBJECT NAME: VAC
Subject Code:

Course Level: 100

SUBJECT CODE:

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C – 3-0-0-3**

SYLLABUS (2nd SEM)

SUBJECT NAME: SWAYAM COURSE
Subject Code:

Course Level: 100

SUBJECT CODE:

SCHEME OF EVALUATION: (T)

Total credits: 3

SYLLABUS (3RD SEM)

PAPER/SUBJECT NAME: OPHTHALMIC & OPTICAL INSTRUMENTATION & PROCEDURE + OPHTHALMIC & OPTICAL INSTRUMENTATION & PROCEDURE LAB

SUBJECT CODE: OPT242M301/OPT242M311

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T + P)

Total credits: 4 **L-T-P-C= 3-0-2-4**

Course Objective:

The objective of this course to cover commonly used optometric instruments, its basic principle, description, and usage in clinical practice.

Course outcome:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**identify** basic ophthalmic instruments and their uses.	**BT 1**
CO 2	**describe** the operating principles of common ophthalmic instruments.	**BT 2**
CO 3	**utilize** basic maintenance procedures on ophthalmic instruments.	**BT 3**
CO 4	**examine** the functionality and application of various ophthalmic and optical instruments, assessing their use in diagnostic and therapeutic procedures to improve patient care.	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Detailed study of the Principles of operation, types, optical properties, constructions, adjustments and applications of the following Instruments and Devices: Binoculars, telescopes and projectors. Simple and Compound Microscopes (with Huygens and Ramsden Eye pieces and oil immersion objectives). Spectrometer. Lensometer Trial case lenses-best forms. Trial frame design. Cross cylinder	**16**
2	Radiuscope Retinoscopes Standard Tests Charts. Devices for color vision testing – CS testing / Glare testing. Ultrasonography – (A scan, B scan) – Principles and application. Autorefractometer- subjective and objective types	**16**
3	Opthalmoscopes- direct and indirect types. Refractometers- Auto refractors, Dioptron Slit lamp Biomicroscope Keratometer Tonometer – Principles, types, clinical importance as a routine procedure (application) Pachometer – Principles, types, clinical importance	**17**
4	F.F.A – Principles and demonstration of film. OCT- Principles and demonstration PAM – Principles and importance. Perimeter – Basics of perimetry – Humphray instruments, Automated perimetry – basics, types(names) , interpretation of normal Glaucoma Field of Definition. LASER – Introduction – Einstein co-efficient, population inversion. Different types of LASER (mention) – Excimer, Lasik Nd-yag, Argon, Diode, He-Ne gas LASER, Xenon. LASER safety, Ophthalmic LASER application(Argon, Yag) **New Advancements in instruments**	**17**
	TOTAL	**66**

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Determination of the focal length & hence the power of a convex lens by displacement method..To determine the wavelength of a monochromatic light source with the help of Fresnel's Biprism. To determine the radius of curvature of convex surface of a lens by Newton's ring method.	**8**
2	Determination of the refractive index of a transparent liquid by using a travelling microscope. Determination of the refractive index of the material of a convex lens measuring its focal length, using the lens & a plane mirror.To determine Planck's constant using photocell. To study the diffraction through a single slit & to determine its width.	**8**
3	Determination of the focal length of a concave mirror by graphical method.To determine the slit width & the separation between the slits of a double slit system from its Fraunhoffer diffraction pattern. Determination of the wavelength of monochromatic light using diffraction grating.	**7**
4	To calibrate a Polarimeter & hence to determine the unknown concentration of sugar solution. To determine the wavelength of the Laser source by forming diffraction pattern with transmission grating. Determination of refractive index of the material of a prism by minimum deviation method. To draw curve of a prism by a spectrometer & hence to find out the angle of minimum deviation.	**7**
	TOTAL	**30**

Credit Distribution

Lecture/ Tutorial	Practicum	Experiential Learning
3*22 =66 NCH	2*15= 30 NCH	3*8=24NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

1. Subrahmanyan N, BrijLal, A textbook of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
3. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA

REFERENCE BOOKS:

1. P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002
2. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997

SYLLABUS (3RD SEM)

PAPER /SUBJECT NAME: VISUAL OPTICS + LAB **SUBJECT CODE:** **OPT242CM302/**OPT242CM312

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:3-0-2-4**

Total credits: 4

Course Objective:

The objective of the subject is to deal with the concept of the eye as an optical instrument and thereby cover different optical components of the eye, types of refractive errors, and clinical approaches in the diagnosis, and management of various types of refractive errors.

Course Outcome: Upon completion of the course, the student should be able:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Identify** the fundamentals of the optical components of the eye.	**BT 1**
CO 2	**Acquire** and **integrate** theoretical knowledge and practical skills on visual acuity measurement, objective and subjective clinical refraction.	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Review of Geometrical Optics: From Geometrical Optics. Schematic and reduced eyes and their properties.	**22**
2	Optical constants of the eye and their measurement. Purkinje images. Corneal curvature and thickness. Keratometry and pachometry. Indices of aqueous and vitreous. Optical Defects of the Eye- Shape of Cornea, Shape & RI of the lens, Optical axis, Visual axis (angle alpha, Fixation axis (angle gamma), Aberration of the Optical system of eye, Depth of focus, Diffraction & resolving power	**22**
3	Emmetropia and ametropia, Axial versus spherical ametropia, Myopia Hypermetropia(Hyperopial) Astigmatism.	**22**

4	Accommodation- possible mechanism of accommodation- Schiener disc experiment- theories of accommodation- modern theory- changes in the lens during accommodation- the amplitude of accommodation- the measurement of the amplitude n of accommodation- depth of field, luminance and blur tolerance- amplitude of accommodation versus age. Presbiopia-near vision addition- estimate of addition-unequal near vision addition- effect of changing the spectacle distance – hypermetropia and accommodation.	**22**
	TOTAL	**88**

PRACTICAL:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Identification of lens and the mirror	**7.5**
2	Identification of the projection slides of prism.	**7.5**
3	Identification of structure & related viva.	**7.5**
4	Experiment to understand the static retinocopy	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
4*22 =88 NCH	0	4*8=32NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOK:

1. A H Tunnacliffe: Visual optics, The Association of British Optician, 1987
2. AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998

Reference Book (s):

1. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
2. Michael P Keating: Geometric, Phisical& Visual Optics, 2nd edition, Butterworth – Heinemann, 2002
3. WJ Benjamin: Borish's clinical refraction,2nd edition, Butterworth Heinemann, Missouri, USA,2006
4. HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.

SYLLABUS (3RD SEM)

PAPER /SUBJECT NAME: HUMAN VISUAL SYSTEM II **SUBJECT CODE: OPT242M303**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T)

Total credits: 4 **L-T-P-C= 4-0-0-4**

Course Objective:

The objective of the course is to gain a comprehensive understanding of the eye's structure and function as an optical instrument, focusing on the key components involved in forming clear vision.

Course outcome:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Apply** your understanding of the fundamental optical components of the eye to explain the process of vision	**BT 3**
CO 2	**Analyze** the optical components of the eye and their interactions to categorize and differentiate between various types of refractive errors, proposing appropriate management strategies for each	**BT 4**

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Advanced Optics of the Eye: Review of geometrical optics; Refractive power of the eye; Accommodation mechanism; Photoreceptor function and retinal illumination; Visual illusions and their relationship to eye optics	**22**
2	Refractive Errors: Classification and characteristics of refractive errors; Clinical signs and symptoms of refractive errors; Methods for assessing refractive errors (refraction techniques); Correction of refractive errors (eyeglasses, contact lenses, refractive surgery)	**22**
3	Practical Applications and Instrumentation: Introduction to ophthalmic instruments (phoropter, retinoscope); Hands-on practice with clinical instruments; Interpretation of clinical findings through instrumental assessment	**22**
4	Advanced Topics in Vision: Color vision and its anomalies; Binocular vision and depth perception; Vision in special populations (pediatric, geriatric); Recent advancements and future directions in vision science	**22**
	TOTAL	**88**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
4*22 =88 NCH	0	32NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

4. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
5. Principles & Practice of Refraction, Duke Elder

Reference Books

1. **David H. K. Mann.** *The Development of the Human Eye*, 3rd edition, British Medical Association, 1982. ISBN: 978-0723604564
2. **Lee Ann Remington.** *Clinical Anatomy and Physiology of the Visual System*, 3rd edition, Elsevier, 2011. ISBN: 978-1437719260
3. **Frederick A. Jakobiec, Daniel M. Albert.** *Principles and Practice of Ophthalmology: Basic Sciences (Volume 1)*, 2nd edition, W.B. Saunders Company, 2000. ISBN: 978-0721673760
4. **Sidney L. Fox, Edward W. Millman.** *The Anatomy of the Eye and Orbit*, 7th edition, H.K. Lewis & Co Ltd, 1976. ISBN: 978-0812104844

SYLLABUS (3RD SEM)

MINOR I /SUBJECT NAME: EYE DISEASE AWARENESS **SUBJECT CODE: OPT242I301**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C= 3-0-0-3**

Course Objective:

The objective of the course is to equip students with the knowledge to identify common eye diseases, understand their risk factors, and promote preventative care and awareness within communities.

Course outcome:

On successful completion of the course the students will be able to:		
CO Level	**urse Outcome**	**Blooms Taxonomy Level**
CO 1	**list** the key risk factors, symptoms, and treatment options associated with common eye diseases.	**BT 1**
CO 2	**explain** the importance of early detection and prevention strategies in reducing the progression of eye diseases.	**BT 2**

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS

1	• **Overview of Ocular Anatomy**:
	  • Basic structure of the eye
	  • Functional overview: how vision occurs
	• **Key Structures and Functions**:
	  • Cornea, iris, lens, retina, optic nerve
	• **Protective and Supportive Structures**:
	  • Eyelids, eyelashes, lacrimal glands (tear production)
	  • Extraocular muscles and their role in eye movement
	• **Blood Supply and Innervation**:
	  • Vascular supply to the eye (e.g., ophthalmic artery)
	  • Nerves involved in vision and eye movement
		16

2	• **Introduction to Refractive Errors**:
	
	  • Explanation of refraction and its role in focusing light on the retina
	
	• **Types of Refractive Errors**:
	
	  • **Myopia** (nearsightedness): Causes, symptoms, correction
	  • **Hyperopia** (farsightedness): Causes, symptoms, correction
	  • **Astigmatism**: Distortion of vision due to irregular corneal shape
	  • **Presbyopia**: Age-related difficulty focusing on close objects
	
	• **Diagnosis and Measurement**:
	
	  • Methods such as visual acuity tests, retinoscopy, and autorefractors
	
	• **Treatment Options**:
	
	  • Corrective lenses (glasses and contact lenses)
	  • Refractive surgery (e.g., LASIK, PRK)
		16

3	• **Understanding Dry Eye Syndrome**: • Definition and prevalence, especially in aging populations • Importance of a healthy tear film • **Causes and Risk Factors**: • Environmental factors (e.g., screen time, air conditioning) • Systemic health conditions (e.g., autoimmune disorders) • Medications that affect tear production • **Symptoms and Diagnostic Techniques**: • Symptoms: irritation, burning, redness, fluctuating vision • Diagnostic tests: Schirmer test, tear breakup time (TBUT), ocular surface staining • **Management and Treatment**: • Artificial tears and lubricating ointments • Lifestyle modifications (e.g., increasing humidity, reducing screen time) • Prescription therapies: anti-inflammatory drops, tear-stimulating medications • Surgical options: punctal plugs for tear retention • **Introduction to Conjunctivitis:** • **Types of Conjunctivitis:** •Viral: Often associated with respiratory infections, highly contagious •Bacterial: Causes, symptoms, and transmission •Allergic: Triggered by allergens (e.g., pollen, pet dander) • **Symptoms and Diagnosis** • **Treatment and Prevention:** • **Prevention: Hygiene practices (handwashing, avoiding touching eyes)**	**17**

4	• **Common ocular conditions:** Cataracts, Corneal opacity, Pterygium, Pingeucula etc. • **Occupational optometry** o Evaluate vision demands and eye health in the workplace o Identify and mitigate eye hazards (e.g., glare, UV exposure) o Prescribe task-specific eyewear for various occupations o Promote ergonomic practices and eye safety o Educate on preventive measures to reduce eye strain and injuries	**17**
	TOTAL	**66**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
3*22 =66 NCH	0	24NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
2. Principles & Practice of Refraction, Duke Elder

Reference Books :

1. **Jack J. Kanski, Brad Bowling.** *Clinical Ophthalmology: A Systematic Approach*, 7th edition, Elsevier, 2011. ISBN: 978-0702040931
2. **World Health Organization (WHO).** *World Report on Vision*, 1st edition, WHO Press, 2019. ISBN: 978-9241516570
3. **Bruce Muchnick.** *Ocular Therapeutics Handbook: A Clinical Manual*, 1st edition, Lippincott Williams & Wilkins, 2008. ISBN: 978-0781768658

SYLLABUS (3RD SEM)

AECC/SUBJECT NAME: Communicative English and Behavioral Science-I

Course Level: 100

SUBJECT CODE: CEN982A301/BHS982A302

SCHEME OF EVALUATION: (T)

Total credits: 2 **L-T-P-C – 2-0-0-2**

Course Objective: The aim of the course is to develop essential business communication skills, including effective writing, speaking, and interpersonal communication, to enhance professional interactions, collaboration, and successful communication strategies within diverse corporate environments.

Course Outcomes: On successful completion of the course the students will be able to:

SYLLABUS (3RD SEM)

CO Level	Course Outcome	Blooms Taxonomy Level
CO 1	**Define and list** business documents using appropriate formats and styles, demonstrating proficiency in written communication for various business contexts.	BT 1
CO 2	**Demonstrate** confident verbal communication skills through persuasive presentations, active listening, and clear articulation to engage and influence diverse stakeholders.	BT 2
CO 3	**Apply** effective interpersonal communication strategies, including conflict resolution and active teamwork, to foster positive relationships and contribute to successful organizational communication dynamics	BT 3

Detailed Syllabus		
Units	**Course Contents**	**Periods**
I	**Business Communication: Spoken and Written** • The Role of Business Communication • Classification and Purpose of Business Communication • The Importance of Communication in Management • Communication Training for Managers • Communication Structures in Organizations • Information to be Communicated at the Workplace • Writing Business Letters, Notice, Agenda and Minutes	**5**
II	**Negotiation Skills in Business Communication** • The Nature and Need for Negotiation o Situations requiring and not requiring negotiations • Factors Affecting Negotiation o Location, Timing, Subjective Factors • Stages in the Negotiation Process o Preparation, Negotiation, Implementation • Negotiation Strategies	**5**
III	**Ethics in Business Communication** • Ethical Communication • Values, Ethics and Communication • Ethical Dilemmas Facing Managers • A Strategic Approach to Business Ethics • Ethical Communication on the Internet • Ethics in Advertising	**5**
IV	**Business Etiquettes and Professionalism** • Introduction to Business Etiquette • Interview Etiquette • Social Etiquette • Workplace Etiquette • Netiquette	**5**

Texts:

1. *Business Communication* by Shalini Verma
2. *Business Communication* by P.D. Chaturvedi and Mukesh Chaturvedi
3. *Technical Communication* by Meenakshi Raman and Sangeeta Sharma

BHS:

Course objectives: To increase one's ability to draw conclusions and develop inferences about attitudes and behaviour, when confronted with different situations that are common in modern organizations. To enable the students to understand the process of problem solving and creative thinking.

Course outcomes: On completion of the course the students will be able to: CO1: Understand the process of problem solving and creative thinking.

CO2: Develop and enhance of skills required for decision-making.

Modules	Course Contents	Periods
I	**Problem Solving Process** Defining problem, the process of problem solving, Barriers to problem solving(Perception, Expression, Emotions, Intellect ,surrounding environment)	4
II	**Thinking as a tool for Problem Solving** What is thinking: The Mind/Brain/Behaviour Critical Thinking and Learning: -Making Predictions and Reasoning. -Memory and Critical Thinking. - Emotions and Critical Thinking.	4
III	**Creative Thinking** - Definition and meaning of creativity, - The nature of creative thinking :Convergent and Divergent thinking, - Idea generation and evaluation (Brain Storming) - Image generation and evaluation. - The six-phase model of Creative Thinking: ICEDIP model	4
IV	**Building Emotional Competence** Emotional Intelligence – Meaning, components, Importance and Relevance Positive and Negative emotions Healthy and Unhealthy expression of emotions	4
Total		**16**

Text books:

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management; Pfeiffer &Company
- Blair J. Kolasa, Introduction to Behavioural Science for Business, John Wiley & Sons Inc.

Reference book:

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management; Pfeiffer &Company
- Blair J. Kolasa, Introduction to Behavioural Science for Business, John Wiley & Sons Inc.

SEC PAPER/SUBJECT NAME: MEDICAL PATHOLOGY, MICROBIOLOGY & PHARMACOLOGY

SUBJECT CODE: OPT242S304 COURSE

SCHEME OF EVALUATION: (T) **L-T-P-C:3-0-0-3**

Total credits: 3

Course Objective:

The objective of this subject is to deals with basic biological, biochemical and pathogenic characteristics of pathogenic organisms.

Course Outcome:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**understand** basic principles of diagnostic ocular Microbiology, the principles of sterilization and disinfection in hospital and ophthalmic practice;	**BT 2**
CO2	**apply** knowledge of pathophysiological processes and relevant microorganisms to formulate differential diagnoses.	**BT 3**
CO 3	**analyze** the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections and	**BT 4**

SYLLABUS:

1	Bacteria: Cell structure, elementary idea about classification and morphological basis. Staining reactions: Gram staining, spore staining, acid fast staining. Bacterial growth: nutritional requirements, physical factor affecting, culture media, and growth curve. Elementary idea about bactericidal agents: Phenol, alcohol. Sterilization(principles, types & methods). Pasteurization. Antibiotics: Bacteriostatic and bactericidal effects. Virus: elementary knowledge of viral-morphology, viral genome and classification, viral replication. Herpes viruses, hepatitis viruses, miscellaneous viruses, human immunodeficiency viruses.	**16**
2	Microbial growth & death, Laboratory culture, host pathogen interactions, antimicrobial chemotherapy, pathogenic mechanisms common to external ocular infections process – clinical pathology. Physiology, pathology, treatment & epidemiology of infectious diseases caused by bacteria, virus, fungi & parasitic organisms with emphasis to disease with ocular manifestations & infectious eye diseases in hot climate as in India. AIDS & eye.	**16**
3	General Pathology Structure & function of immune system – Structure and function of thymus, spleen & red bone narrow- Immunity & its types , plasma proteins & immune reaction, cells involved in immune system. Humoral immunity theories of antibodies formation. Structure & function of lymph nodes. Structure & function of thymus, spleen & red bone narrow. Non specific immunity, Antibody mediated immunity, specific immunity, cell modified immunity, Active immunity, Passive immunity. The acute inflammatory reaction – changes in acute inflammation, changes in the calibre of the blood vessels, changes in blood flow, changes associated with exudation. Local sequelae of acute inflammation. The chemical mediators of acute Inflammation & Repair: inflammation. Role of the mast cell in inflammation. Role of the platelets in inflammation. Chronic inflammation – cause, classification, general features. Source of infection. Transmission of organisms to the body. wound infections. Wound healing. Immuno-pathogenesis – type I, II, III & IV hypersensitivity. Mechanism of autoimmunity. Organ specific & non organ specific auto immune disease. The HLA system – histocompatibility complex. Pyogenic & bacterial infection.Gralt rejection-basic outline. Disorder of growth – metaplasia, dysplasia, neoplasia. Circulatory disturbances – thrombosis, infarction, ischemia, embolism. Degeneration (calcification).	**17**

4	**1. General Pharmacology** • Drug sources, classifications, and routes (focus on ocular). • Drug absorption, distribution, metabolism, excretion (ADME). • Drug-receptor interaction, mechanism of action, dose-response. • Adverse drug reactions (ocular/systemic), drug toxicity, treatment. **2. CNS & ANS Drugs (Relevant to Eye Care)** • Autonomic drugs: Mydriatics, miotics, cycloplegics. • Local anesthetics in ocular procedures. • Analgesics, NSAIDs, and sedatives: Use in ocular pain. **3. Ocular Pharmacology** • Ocular drug formulations, packaging, and penetration. • Diagnostic agents: Mydriatics, cycloplegics, anesthetics. • Therapeutic drugs: o **Antibiotics, corticosteroids, antivirals.** o **Antiglaucoma medications.** o **Viscoelastic agents** in surgery.	**17**
	TOTAL	**66**

TEXT BOOK:

1. BURTONG .R.W:Microbiology for the Health Sciences, third edition,J.P.LippincottCo., St. Louis, 1988.
2. MJPelczar (Jr),ECSChan, NRKrieg: Microbiology, fifth edition ,TATAMcGRAW-HILL Publisher, New Delhi,1993
3. K S Ratnagar: Pathology of the eye & orbit, Jaypee brothers Medical Publishers, 1997

Reference Books :

1. **Harsh Mohan.** *Textbook of Pathology*, 6th edition, Jaypee Brothers Medical Publishers, 2010. ISBN: 978-8184487053
2. **R. Ananthanarayan, C. K. Jayaram Paniker.** *Textbook of Microbiology*, 9th edition, Universities Press, 2013. ISBN: 978-8173718793
3. **K. D. Tripathi.** *Essentials of Medical Pharmacology*, 7th edition, Jaypee Brothers Medical Publishers, 2013. ISBN: 978-9350259375

SYLLABUS (3rd SEM)
SUBJECT NAME: SWAYAM COURSE **Subject Code:** **Course Level: 100** **SUBJECT CODE:** **SCHEME OF EVALUATION: (T)** **Total credits:**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
3*22 =66 NCH	0	24NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

SYLLABUS (4TH SEM)

PAPER/SUBJECT NAME: CLINICAL REFRACTION 1 + CLINICAL REFRACTION LAB

SUBJECT CODE: OPT242M401/ OPT242M411

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T+P) **L-T-P-C:3-0-2-4**

Total credits: 4

Course Objective:

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

Course Outcome:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**apply** understanding of the fundamental optical components of the eye to explain the process of vision	**BT 3**
CO 2	**Analyze** objective vs. subjective refraction, justifying the most suitable method for specific scenarios based on optics and patient factors	**BT 4**

SYLLABUS:THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Ophthalmic Case Historian: Demographic data, chief complaints, secondary complaints, ocular history, medical history, drugs and medications, family ocular history, family medical history, social history, review of system, few example of history writing. 2. Recording Visual Acuity: Distance – Snellens and log MAR. near-points/'M'/RS, use of Baily-lovie word reading chart.	**16**
2	Objective Refraction: Streak Retinoscopy – all procedures to use streak retinoscope; static and dynamic retinoscopy, different methods of dynamic retinoscopy – MEM, Nott's, Sheard's, Low and high neutral, Bells, Cross, Taits. Other methods of retinoscopy-Radical, Near(Mahandra), Chromoretinoscopy, String Lensbar, use of objective and autorefractor.	**16**

3	Subjective Refraction: Monocular Distance – Classic fogging, testing of astigmatism under fog fixed astigmatic dial (clock dial), rotary astigmatic dial, combination of fixed and rotary dial (Fan and Block test), J.C.C. Duochrome or Bichrome, Binocular balancing – alternate occlusion, prism dissociation, dissociated duochrome balance, Borish dissociated fogging, equalization	**17**
4	Binocular Distance – T.I.B. (Turville Infinity Balance), Polarized – Target and polarized filter, fogging. Near subjective refraction. Cycloplegic refraction, cycloidemia, sudden unfogging , Borish delayed spherical end point, pinhole estimation of refractive error, stenopaic slit refraction, measurement of vertex distance, distometer, use of subjective autorefractor. Different methods of measuring amplitude of accommodation. Correction of Presbyopia – Different methods of stimulation of tentative presbyopic addition – amplitude of accommodation, J.C.C., NRA-PRA balance, Bichrome, Plus Build-up, based on age, Dynamic retinoscopy. Occupational consideration, finalization of odd for near and intermediatedifferent options of correction. Measurement of IPD and significance. Final discussion with the patient. Writing prescription of power and counseling	**17**
	TOTAL	**66**

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	History writing Recording VA	**7**
2	Practice of Streak Retinoscopy Direct Opthalmoscopy-Normal Fundus	**7**
3	Subjective refraction – fogging, clockdial, fan, JCC, prism balance, TIB, duochrome, cyclodeimia, Slit refraction Measurement of amplitude of accommodation.	**8**
4	Presbyopic add Writing prescription	**8**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
3*22 =66 NCH	2*15=30NCH	3*8=24NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOK:

1. Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinemann, 2007
2. David B. Elliot: Clinical Procedures in Primary Eye care, 3rd edition, Butterworth Heinemann, 2007
3. WJ Benjamin: Borish's clinical refraction,2nd edition, Butterworth Heinemann, Missouri, USA,2006

Reference Books

1. **Jack T. Holladay.** *Refraction and Clinical Optics*, 1st edition, Butterworth-Heinemann, 2000. ISBN: 978-0750671286
2. **David B. Elliott.** *Clinical Procedures in Primary Eye Care*, 4th edition, Elsevier, 2020. ISBN: 978-0702077562
3. **Frederick A. Bartlett.** *Clinical Refraction Guide*, 1st edition, Professional Press, 2003. ISBN: 978-0937404725
4. **Grosvenor Theodore.** *Primary Care Optometry*, 5th edition, Butterworth-Heinemann, 2006. ISBN: 978-0750675758

SYLLABUS (4TH SEM)

PAPER/SUBJECT NAME: OPHTHALMIC LENS & DISPENSING OPTICS + OPHTHALMIC LENS & DISPENSING OPTICS LAB **SUBJECT CODE:** **OPT242M402/ OPT242M412**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T+ P) **L-T-P-C:3-0-2-4**

Total credits: 4

Course Objective:

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

Course Outcome:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**apply** understanding of lenses, their grinding, and prisms to choose corrective lenses or implement prismatic interventions for specific vision needs	**BT 3**
CO 2	**analyze** various facial shapes & dispense various spectacle lenses, frames. Do final checking of finished spectacle with frame adjustments, troubleshooting complaints, delivery and follow up.	**BT 4**

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Ophthalmic lens: Characteristics of lenses: Introduction. Spherical lenses. Plano-cylindrical lenses. Sphero-cylindrical lenses. Designation of lens power. Power of lenses. Transposition. Write the prescription. Base curve of spherical lens. Base curve of cylindrical single vision lens. Aberration of lens. Prism prescription. Prism effects in a lens. Neutralization. Spectacle lenses: Characteristics of lens materials. Specific gravity (weight). Refractive index. Abbe number. Impact resistance. Scratch resistance.Curve variation factor. Current materials: Crownglass. CR-39. High –index glass. High –index plastic. Poly carbonate. Photochromatic materials. Lens types: Single vision lens. Bi-focal lenses. Tri-focal lenses. Vocational & occupational multifocal progressive lenses.	**16**
2	Introduction of bi-focal lenses: History of bi-focal lenses. Modern bi-focal designs. Types of bi-focal designs. Glass tri-focal lenses. Invisible multi-focal Double segment lens. Plastic bi-focal. 6.Opthalmic lens coating: Anti-reflecting coatings. Special notes concerning anti-reflecting coatings. Protective coating, color coating. Absorptive lenses: Classification of lens tints. Chemical that produces color & assist in absorptive characteristics of glass lenses. Effect in prescription on lens color. Availability of tinted lenses. Impact resistant lenses: Types of impact resistant lenses. Plastic lenses. Impact resistant Dress-Eye wear lenses. Tempered glass lenses. Types of impact resistant lenses most beneficial of specific patients. Lens for special uses: Fresnel lenses. Thinlite lenses. Lenses for the Aphakic patient. Aspheric lenses. Lens surfacing & quality. Principles of lens surface generation. Glass assessment. Faults in lens materials & lens surface. Inspection of lens quality.	**16**

3	Basics of dispensing: Spectacle frame Current frame materials: a) Plastics b) Metals Frame types: a) Combination of frames b) Half-eye frames c) Mounts d) Nylon-cord frame e) Special purpose frames. Frame measurements: a) The boxing system b) The datum system c) Comparison of the two systems d) Lens position e) Segment specification Frame Selection: a) Fashion b) Function c) Feel d) Conflicting needs e) Price f) Standard alignment Lens Selection: a) Ground rule for selection b) Selection criteria Facial Measurement: a) The PD b) Visual axes c) Measuring inter papillary distance d) Using PD ruler e) Common difficulties in measuring PDs f) Measuring monocular PD g) Measuring near PD	**17**

4	Measuring heights: a) Single vision b) Multi focal c) Bi-focal d) Progressive Pediatric Dispensing: a) The changing image of spectacle b) Age differences. Frame Selection a) Technical Criteria b) Fashion criteria c) Some tips on selection Lens Selection Technical criteria a) Communicating with kids. b) The kids corner Facial measurement of the kids a) PDs b) Centers c) Bi-focals Dealing with problems: a) Dealing with clients b) Common client problems c) Dealing with professional colleagues d) Dealing with the laboratories Special needs dispensing: a) Occupational dispensing b) Hazards in the work place c) Occupational health safety legislation d) Common hazards. Eye protection: a) Industrial eye protection b) Sport c) Standards covering eye protection d) Lens materials & impact resistance e) Frame & eye protection.	**17**
	TOTAL	**66**

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Find out the menidean & optical center of ophthalmic lens Neutralization – manual & help of lensometer Identification of lens-spherical, cylindrical & spheno-cylindrical lenses	**7**

2	Lens-surfacing & edging, cutting & marking of single vision bifocal progressive Frame measurement: The boxing system, the datum system. Comparison of the two systems, Lens position, segment specification	**7**
3	Frame selection: Fashion, function & standard alignment Lens selection : Ground rule for selection, selection criteria	**8**
4	Facial measurements: The PD, Visual axes, & measuring inter-pupillary distance using P.D ruler. Common difficulties in measuring P.D , Measuring monocular P.D, measuring near C.D. Measuring heights :- single vision , bifocal, multifocal, progressive Pediatric dispensing	**8**
	TOTAL	**30**

Credit Distribution

Lecture/ Tutorial	Practicum	Experiential Learning
3*22 =66 NCH	2*15=30NCH	3*8=24NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

1. Jalie MO: Ophthalmic lens and Dispensing, 3rd edition, Butterworth –Heinemann, 2008
2. Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth – Heinemann, 1996
3. C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rdedition, Butterworth - Heinemann, 2007
4. Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth – Heinemann, 200

Reference Books

1. **M. Jalie.** *Ophthalmic Lenses and Dispensing*, 3rd edition, Elsevier Health Sciences, 2008. ISBN: 978-0750688949
2. **M. Jalie.** *The Principles of Ophthalmic Lenses*, 4th edition, Association of British Dispensing Opticians (ABDO), 1984. ISBN: 978-0900099061
3. **C. V. Brooks, I. M. Borish.** *System for Ophthalmic Dispensing*, 3rd edition, Elsevier, 2006. ISBN: 978-0750674805
4. **N. V. Subrahmanyam.** *Textbook of Optics*, 22nd edition, S. Chand Publishing, 2017. ISBN: 978-9352531226

SYLLABUS (4TH SEM)

PAPER/SUBJECT NAME: OCULAR DISEASE I (ANTERIOR SEGMENT DISEASE) **SUBJECT CODE: OPT242M403**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:4-0-0-4**

Total credits: 4

Course Objective:

The objective of the course is to deal with various ocular diseases affecting various parts of the eyes. It covers clinical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.

Course Outcome:

On successful completion of the course the students will be able to:		
CO Level	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**apply** knowledge of the different aspects of ocular diseases to interpret clinical signs and symptoms, suggesting potential diagnoses	**BT 3**
CO 2	**analyze** disease conditions and plan proper treatment/management for the patient.	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Anterior segment ocular diseases involving orbit, eyelids, adnexa, conjunctiva, cornea, urea, sclera, anterior chamber, iris and lens. Symptomatology, clinical signs, diagnosis, pathogenesis, pathophysiology , systemic disease relationships and treatment of degenerative, infections and inflammatory conditions affecting these structures. Disease of the Lids – Congenital Deformities of the Lids .Oedema of the Lids. Inflammatory Conditions of the Lids. Deformities of the Lid Margins. Deranged Movement of the Eyelids. Neoplasm's of the Lids. Injuries of the Lids. Diseases of the Lachrymal Apparatus-. Dry Eye. Disease of the Lachrymal Gland. Disease of the Lachrymal Passages. Operations for Chronic Dacryocystitis.	**22**
2	Disease of the Conjunctiva- Subconjunctival Haemorrhage Infective Conjunctivitis. Follicular Conjunctivitis. Granulomatous Conjunctivitis. Allergic Conjunctivitis. Conjunctivitis Associated with Skin conditions. Degenerative conditions of the Conjunctiva. Vitamin- A Deficiency. Cysts and Tumours of the Conjunctiva. Conjunctival Pigmentation . Injuries of the Conjunctiva. Disease of the Cornea –Congenital Anomalies. Inflammation of the Cornea (Keratitis). Superficial Keratitis. Deep Keratitis. Vascularisation of Cornea. Opacities of the Cornea. Keratoplasty. Corneal Degenerations. Corneal Dystrophy's. Corneal Pigmentation. Corneal Injuries. Refractive Corneal Surgery. Corneal Ulcer (Bacterial , Viral , Fungal)	**22**
3	Disease of the Sclera- Episcleritis. Scleritis. Staphyloma of the Sclera. Blue Sclerotic Scleromalacia Performs. Nanophthalmos. Injuries of the Sclera. Disease of the Iris.-. Congenital Anomalies. Inflammations (Anterior Uveitis) . Specific Types of Iriodocyclitis . Degenerations of the Iris. Cysts and Tumours of the Iris. Injuries of the Iris. Disease of the Celery Body- Inflammations of the Celery Body. Purulent Iriodocyclitis (Panophthalmitis) . Evisceration . Sympathetic Opthalmia. Vogt-Koyanagi – Harada Syndrome. Tumours of the Celery body. Injuries of the Celery body.	**22**

4	Glaucoma- .Formation of Aqueous Humor. Drainage of Aqueous. Intraocular Pressure(IOP) . Ocular Rigidity. Tonography. .Developmental Glaucoma (Buphthalmos) . Primary Narrow Angle Glaucoma. Primary Open Angle Glaucoma. Normotensive Glaucoma . Ocular Hypertension . Secondary Glaucoma. Surgical Procedures for Glaucoma(Steps Only) ,YOGPI ,trabeculectomy.Laser Procedure in Glaucoma . Artificial Drainage Devices in Glaucoma Surgery(Molteno). Disease of the Lens- Congenital Malformations. Cataract . Congenital and Developmental Cataract . Senile Cataract. Traumatic Cataract. Complicated Cataract. Secondary Cataract. After Cataract. Dislocation of the Lens. SurgicalProcedures for Removal of the Lens(Operative Steps Only). Phacoemulsification(ICCE,ECCE,IOL) . Small Incision Cataract Surgery (Manual Phaco).Intraocular Lens Implantation-AC+PC, IOL.	**22**
	TOTAL	**88**

Credit Distribution

Lecture/ Tutorial	Practicum	Experiential Learning
4*22 =88 NCH	0	4*8=32NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOK:

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

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

3. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann, 2007

Reference Books –

1. **Bruce Muchnick.** *Ocular Therapeutics Handbook: A Clinical Manual*, 1st edition, Lippincott Williams & Wilkins, 2008. ISBN: 978-0781768658
2. **Mitchell Scheiman, Bruce Wick.** *Clinical Management of Binocular Vision: Heterophoric, Accommodative, and Eye Movement Disorders*, 4th edition, Wolters Kluwer, 2014. ISBN: 978-1451175257
3. **Jack Kanski, Brad Bowling.** *Clinical Ophthalmology: A Systematic Approach*, 7th edition, Elsevier, 2011. ISBN: 978-0702040931
4. **Myron Yanoff, Joseph W. Sassani.** *Ocular Pathology*, 7th edition, Elsevier, 2014. ISBN: 978-1455738564

SYLLABUS (4TH SEM)

PAPER/SUBJECT NAME: CLINICAL POSTING **SUBJECT CODE: OPT242M413**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:0-0-8-4**

Total credits: 4

This subject will be conducted in a hospital setting to provide students with practical exposure and clinical understanding of the concepts taught.

SYLLABUS (4TH SEM)

PAPER/SUBJECT NAME: COMMUNICATIVE ENGLISH/BEHAVIOURAL SCIENCE
SUBJECT CODE: CEN982A401/BHS982A402 COURSE

LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:2-0-0-2**

Total credits: 2

Course Objectives: This course is designed to enhance employability and maximize the students' potential by introducing them to the principles that determine personal and professional success, thereby helping them acquire the skills needed to apply these principles in their lives and careers.

Course Outcomes: After the successful completion of the course, the students will be able to

CO Level	Course Outcome	Blooms Taxonomy Level
CO 2	**Demonstrate** understanding the importance of verbal and non-verbal skills while delivering an effective presentation.	BT 2

CO 3	**Develop** professional documents to meet the objectives of the workplace	**BT 3**

CO 3	**Identify** different life skills and internet competencies required in personal and professional life.	**BT 3**

Detailed Syllabus		
Units	**Course Contents**	**Periods**
I	**Presentation Skills** Importance of presentation skills, Essential characteristics of a good presentation, Stages of a presentation, Visual aids in presentation, Effective delivery of a presentation	**5**
II	**Business Writing** Report writing: Importance of reports, Types of reports, Format of reports, Structure of formal reports Proposal writing: Importance of proposal, Types of proposal, structure of formal proposals Technical articles: Types and structure	**5**
III	**Preparing for jobs** Employability and Unemployability, Bridging the Industry-Academia Gap Knowing the four- step employment process, writing resumes, Guidelines for a good resume, Writing cover letters Interviews: Types of interview, what does a job interview assess, strategies of success at interviews, participating in group discussions.	**5**
IV	**Digital Literacy and Life Skills** **Digital literacy:** Digital skills for the '21st century', College students and technology, information management using Webspace, Dropbox, directory, and folder renaming conventions. Social Media Technology and Safety, Web 2.0. **Life Skills**: Overview of Life Skills: Meaning and significance of life skills, Life skills identified by WHO: self-awareness, Empathy, Critical thinking, Creative thinking, Decision making, problem- solving, Effective communication, interpersonal relationship, coping with stress, coping with emotion. Application of life skills: opening and operating bank accounts, applying for PAN, Passport, online bill payments, ticket booking, gas booking	**5**

Texts:

1. *Business Communication* by Shalini Verma References:
2. *Technical Communication* by Meenakshi Raman and Sangeeta Sharma

Credit Distribution		
Lecture/Tutorial	**Practicum**	**Experiential Learning**
15 hours	-	10 hours - Movie/ Documentary screening - Field visits - Peer teaching - Seminars - Library visits

BHS:

Course objectives: To increase one's ability to draw conclusions and develop inferences about attitudes and behaviour, when confronted with different situations that are common in modern organizations.

Course outcomes: On completion of the course the students will be able to: CO1**:** Understand the importance of individual differences
CO2: Develop a better understanding of self in relation to society and nation CO3: Facilitation for a meaningful existence and adjustment in society

Modules	Course Contents	Periods
I	**Managing Personal Effectiveness** Setting goals to maintain focus, Dimensions of personal effectiveness (self disclosure, openness to feedback and perceptiveness), Integration of personal and organizational vision for effectiveness, A healthy balance of work and play, Defining Criticism: Types of Criticism, Destructive vs Constructive Criticism, Handling criticism and interruptions.	**4**
II	**Positive Personal Growth** Understanding & Developing positive emotions,Positive approach towards future, Impact of positive thinking, Importance of discipline and hard work, Integrity and accountability, Importance of ethics in achieving personal growth.	**4**
III	**Handling Diversity** Defining Diversity, Affirmation Action and Managing Diversity, Increasing Diversity in Work Force, Barriers and Challenges in Managing Diversity.	**4**
IV	**Developing Negotiation Skills** Meaning and Negotiation approaches (Traditional and Contemporary) Process and strategies of negotiations. Negotiation and interpersonal communication. Rapport Building – NLP.	**4**
Total		**16**

Text books:

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 3, Management; Pfeiffer &Company
- Blair J. Kolasa, Introduction to Behavioural Science for Business, John Wiley & Sons Inc.

SUBJECT NAME: SWAYAM COURSE **Subject Code:**

Course Level: 100

SUBJECT CODE:

SCHEME OF EVALUATION: (T)

Total credits:

SYLLABUS (5TH SEM)

PAPER /SUBJECT NAME: INTRODUCTION TO CONTACT LENS

SUBJECT CODE: OPT242M501

SCHEME OF EVALUATION: (T)

Total Credits: 04 **L-T-P-C = 4-0-0-4**

Course Objective:

The objective of the subject is to study the concept of contact lens, its benefits, manufacturing and understand briefly about soft contact lens and RGP contact lens.

Course outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the history, development, benefits and manufacturing of contact lens.	**BT 1**
CO 2	**To interpret** the optics, classification, vertex distance and FDA classification of contact lens and its materials.	**BT 2**
CO 3	**To determine** the indications and contraindications of contact lens and soft contact lens fitting and assessment.	**BT 3**
CO 4	**To explain** RGP contact lens fitting, assessment, care and maintenance.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Contact lens history & development. Benefits of contact lens over spectacle. Manufacturing methods-spin cast, Lethe cut, Cast modeling. Slit lamp Examination technique Corncal topography- Keratometry & Extended Keratometry	16
2	Contact lens optics-Contact lens & spectacle lens. Back vertex calculation. Contact lens & Tear	16

	lens system. Classification of contact lens & its material (soft & RGP); Material property. Contact lens terminology. RGP & soft lens design. FDA classification of contact lens material.	
3	Patient selection & prescreening. Indications & contra indications of contact lens. Soft spherical contact lens fitting & Assesment. Soft contact lens case & maintenance.	17
4	Spherical RGP contact lens fitting & assessment. RGP contact lens care & maintenance.	17

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

1. Agarwal S, 2005, Dr. Agarwals' Textbook on Contact Lenses, Jaypee Brothers Medical Publishers.
2. Sinha R, 2017, Textbook of Contact Lenses, Jaypee Brothers Medical Publishers.

Reference Books

1. **Nathan Efron.** *Contact Lens Practice*, 4th edition, Elsevier, 2013. ISBN: 978-0702042508
2. **Milton Hom, Adrian Bruce.** *Manual of Contact Lens Prescribing and Fitting*, 3rd edition, Butterworth-Heinemann, 1995. ISBN: 978-0750600405
3. **Edward S. Bennett, Craig W. Borovoy.** *Clinical Contact Lens Practice*, 2nd edition, Lippincott Williams & Wilkins, 2006. ISBN: 978-0781740589
4. **Ruth B. Peters.** *Contact Lens Complications*, 3rd edition, Butterworth-Heinemann, 2006. ISBN: 978-0750687751

SYLLABUS (5TH SEM)

PAPER /SUBJECT NAME: BINOCULAR VISION & OCULAR MOTILITY
SUBJECT CODE: OPT242M502
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C = 4-0-0-4**

Course Objective:

The objective of the subject is to study the concept of contact lens, its benefits, manufacturing and understand briefly about soft contact lens and RGP contact lens.

Course outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the concept of binocular vision, its grades, advantages, theories of binocular vision.	**BT 1**
CO 2	**To interpret** dichoptic stimulation, depth perception and stereopsis.	**BT 2**
CO 3	**To determine** binocular defects, binocular muscular anomalies and binocular muscular coordination.	**BT 3**
CO 4	**To explain** binocular vision tests, eye movements, extra ocular muscles, ocular movements and vergences.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Grades of binocular vision-simultaneous perception (first grade of binocular vision), fusion, stereopsis (third grade of binocular single vision). Advantages of binocular vision. Visual direction and the horopter visual direction, corresponding point and normal retinal correspondence, horopter, physiologic diplopia. Binocular fusion-panum's area, fixation disparity, theories of binocular fusion, synergy hypothesis of panum, local sign hypothesis of hering, eye movement hypothesis of helmholts, suppression hypothesis of du tour and verhoeff, physiologic basis of fusion.	22
2	Dichoptic stimulation-depth with fusion and depth with diplopia, diplopia without depth, retinal rivalry and suppretion, binocular lusure. Stropsis-physiological basis of	22

	stereopsis,local and global stereopsis and fusion, stereopsis acuity neurophysiology of stereopsis. Depth perception-stereopsis, non-stereoscopic clues to the perception of depth under binocular condition, monocular clues (non-stereoscopic clues to spatial orientation)-parallactic movements, linear perspective overiay of contours, size distance from horizon, distribution of highlights, shadow, shades and light, aerial perspective , influence of accommodation and convergence on depth perception, conclusion. Integration of the motor and sensory system into binocular vision.	
3	Binocular defects: Binocular optical defects-anisometropia-vision in anisometropia, treatment, Binocular optical defects-aniseikonia symptoms, clinical investigation, treatment. Binocular muscular co-ordination-orthophoria-binocular vision. Binocular muscular anomalies-heterophoria-the causes of imbalance ,exophoria, esophoria, hyperphoria, cyclophoria, symptoms of heterophoria, treatment. Binocular muscular anomalies-heterotropia—the vision in concomitant strabismus, treatment. Binocular muscular co-ordination-convergence-voluntary and reflex convergence, reflex convergence, the measurement of convergence, the relation between accommodation and convergence, binocular accommodation, fatigue of convergence. Binocular muscular anomalies-anomalies of convergence and other reading difficulties—insufficiency of convergence, convergence excess, the ophthalmologist and the reading ability of children.	22
4	BINOCULAR VISION TEST: Test for simultaneous macular perception, test for fusion, test for stereopsis-synoptophore or stereoscope test, vectograph test, titmus stereo test, random dot stereogram test, simple motor task test based on stereopsis. Eye movements: the orbit anatomy of the extraocular muscles. Interactive dynamics of orbital mechanisms & brain stem neurophysiology – out line of extra ocular muscle control. Extra ocular muscles-their function & nerve supply. Mechanics of actions of extra ocular muscles -cross sectional area of muscle, length of muscle. Arc of contact, muscle plane, Muscle axis of rotation. Physiology of ocular movement – Basic Kinematics, (position of gaze, Fick's axes) Ocular movements - Monocular Movements (Adduction, Abduction, supraduction, Infraduction, Incycloduction, excycloduction). Binocular Movements –VERSIONS- (saccadic & pursuit movement, position maintenance movements, stabilization movements & their characteristics). VERGENCES – (Convergence, divergence, vertical vengeance), Supra nuclear control of eye movements. (the	22

	superior colliculi, the occipital cortex, the psycho optical reflexes & fixation. Oculomotor system: vestibular – ocular reflexes, optokinetic reflexes. Diagnosis & clinical aspects of ocular anomalies & disorders. Converge through a spectacle lens. Prismatic effects in spectacle lenses.	

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

Scheiman M, Wick B, 2013, Clinical Management of Binocular Vision, Lippincott Williams and Wilkins.

Reference Books

1. **Mitchell Scheiman, Bruce Wick.** *Clinical Management of Binocular Vision: Heterophoric, Accommodative, and Eye Movement Disorders*, 4th edition, Wolters Kluwer, 2014. ISBN: 978-1451175257
2. **Kedar N. Prasad.** *Binocular Vision and Ocular Motility: Theory and Management of Strabismus*, 2nd edition, Mosby, 2012. ISBN: 978-0323047927
3. **David Elliott.** *Clinical Procedures in Primary Eye Care*, 4th edition, Elsevier, 2020. ISBN: 978-0702077562
4. **Gunter K. Von Noorden, Emilio C. Campos.** *Binocular Vision and Ocular Motility: Theory and Management of Strabismus*, 6th edition, Mosby, 2002. ISBN: 978-0323002494

SYLLABUS (5TH SEM)

PAPER /SUBJECT NAME: OCULAR DISEASE II **SUBJECT CODE: OPT242M503**
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C =4-0-0-4**

Course Objective:

The objective of the subject is to study the diseases of posterior segment of the eye and understand the clinical features, classification and causes.

Course outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the diseases of vitreous humour, retina and optic nerve.	**BT 1**
CO 2	**To interpret** the different optic nerve diseases, its classification, clinical features and causes.	**BT 2**
CO 3	**To determine** the various congenital optic nerve anomalies, nystagmus and subnuclear disorders of eye movements.	**BT 3**
CO 4	**To explain** third nerve palsy, fourth nerve palsy, sixth nerve palsy, neurofibromatosis, ocular myopathies and related disorders.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Diseases of the Vitreous Humor- Congenital Anomalies. Vitreous Opacities. Hereditary Vitreo – Retinal Degeneration's. Vitreous Haemorrhage .Detachment of Vitreous Humor . Vitreous Surgery . Methods of clinically assessing the posterior segment (direct & indirect opthalmoscopy) Disease of the Retina- Congenital & Dev. Defects. Inflammation of the Retina(Retinitis) . Retinal Vasculitis . Oedema of the Retina. Haemorrhage of the Retina. Vascular Occlusion . Retinal Arteriosclerosis. Retinopathies . Retinal Telangiectasis. Degeneration's of the Retina. Detachment of the Retina. Surgical	22

	Procedures for Retinal Detachment .Tumours of the Retina. Phakomatoses,. Injuries of the Retina. Disease of the Optic Nerve- Congenital Anomalies. Papilloedema. Inflammation of the Optic Nerve(Optic- Neuritis). Ischaemic Optic Neuropathy . Optic Atrophy. Tumours of the Optic Nerve. Injuries of the Optic Nerve. Symptomatic Disturbances of Visual Function – Visual Field Defects . Amblyopia. Amaurosis. Night Blindness. Day Blindness. Defects in Color Vision. Congenital Word Blindness. Malingering.	
2	Neuro –eye disease: Evaluation of optic nerve disease Clinical features of optic nerve dysfunction., Optic disc changes. Optic atrophy. Special investigation. Classification of optic neuritis Optic neuritis and demyelination Systemic features of multiple sclerosis, Special investigation. Optic neuritis. Other causes of optic neuritis Parainfectious optic neuritis. Infectious optic neuritis. Non-arteritic anterior ischaemic optic neuropathy Arteritic anterior ischaemic optic neuropathy Clinical features of giant cell arteritis. Special investigation. Arteritic anterior ischaemic optic neuropathy. Leber hereditary optic neuropathy Hereditary optic atrophies Kjer syndrome. Behr syndrome. Wolfram syndrome. Alcohol-tobacco amblyopia Drug-induced optic neuropathies PAPILLOEDEMA Raised intracranial pressure - Causes.Hydrocephalus. Systemic features. Clinical features of papilloedema Differential diagnosis.	22
3	CONGENITAL OPTIC NERVE ANOMALIES Without neurological associations Tilted disc. Optic disc drusen. Optic disc pit. Myelinated nerve fibers. With neurological associations Optic disc coloboma. Morning glory anomaly. Optic nerve hypoplasia. Aicardi syndrome. Miscellaneous anomalies. PUPILLARY REACTION Applied anatomy. Abnormal pupillary reactions Afferent pupillary conduction defects	22

	Argyll robertson pupils Differential dignosis of light-near dissociation Adie pupil oculosympathetic palsy (horner syndrome) NYSTAGMUS Classifications Causes Physiological nystagmus. Motor imbalance nystagmus. Ocular nystagmus. nystagmoid movements. SUPRANUCLEAR DISORDER OF EYE MOVEMENTS Conjugate eye movements Saccadic movements. Smooth pursuit movements. Non-optical reflexes. Supranuclear gaze palsies Horizontal gaze palsies. Vertical gazepalsies.	
4	THIRD NERVE DISEASE Applied anatomy Clinical aspects Clinical features. Aberrant regeneration. Causes isolated third nerve palsy. FOURTH NERVE DISEASE Applied anatomy Clinical aspects Clinical features. Causes of isolated fourth nerve palsy. SIXTH NERVE DISEASE Applied anatomy Clinical aspects Clinical features. Causes. DISORDERS OF CHIASM Classification Applied anatomy Applied physiology Hyperpituitarism. Hypopituitarism. Pituitary adenoma Clinical features. Special investigation. Treatment. Craniopharyngioma Meningioma DISORDERS OF RETROCHIASMAL PATHWAYS AND CORTEX Clinical features of optic tract lesion	22

	Lesions of optic radiations Applied anatomy. clinlcal features. Lesions of striate calcarine cortex Migraine Clinical features Management OCULAR MYOPATHIES AND RELATED DISORDERS Myasthienia gravis Clinical features. Special investigations. Treatment. Ocular myopathies Myotonic dystrophy Systemic features. Ocular features. Essential blepharospasm Clinical features. Treatment. NEUROFIBROMATOSIS Neurofibromatosis type-1(NF-1) Systemic features. Ocular features. Neurofibromatosis type-2(NF-2)	

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

1. S John, 2019, Kanski's Clinical Ophthalmology, Elsevier.

Reference Books

1. **Bruce Muchnick.** *Ocular Therapeutics Handbook: A Clinical Manual*, 1st edition, Lippincott Williams & Wilkins, 2008. ISBN: 978-0781768658
2. **Mitchell Scheiman, Bruce Wick.** *Clinical Management of Binocular Vision: Heterophoric, Accommodative, and Eye Movement Disorders*, 4th edition, Wolters Kluwer, 2014. ISBN: 978-1451175257
3. **Jack Kanski, Brad Bowling.** *Clinical Ophthalmology: A Systematic Approach*, 7th edition, Elsevier, 2011. ISBN: 978-0702040931
4. **Myron Yanoff, Joseph W. Sassani.** *Ocular Pathology*, 7th edition, Elsevier, 2014. ISBN: 978-1455738564

SYLLABUS (5TH SEM)

PAPER /SUBJECT NAME: BASICS OF LOW VISION
SUBJECT CODE: OPT242M504
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C =4-0-0-4**

Course Objective:

The objective of the subject is to study the definition of low vision, its magnification, grades, assessments, refraction, and low vision prescription.

Course outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the definition of low vision, its grades and the relationship between disorder, impairment and handicapped.	**BT 1**
CO 2	**To interpret** the assessment of low vision, contrast sensitivity testing, comprehensive eye examination and medical management of low vision.	**BT 2**
CO 3	**To determine** the optical aids and non-optical aids of low vision.	**BT 3**
CO 4	**To explain** the impact of low vision on mobility, reading, driving, and social interaction.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	**Introduction to Low Vision:** Definition of low vision, Epidemiology and prevalence, Difference between low vision and blindness, Impact on daily living and quality of life . **Causes and Classification of Low Vision:** Common causes of low vision (e.g., age-related macular degeneration, diabetic retinopathy, glaucoma), Classification systems (e.g., WHO classification, ICD-10 coding).	22

2	**Low Vision Assessment:** Visual acuity testing, Visual field assessment, Contrast sensitivity testing, Assessment of visual function and activities of daily living (ADLs), Referral for comprehensive eye examination and medical management.	22
3	**Optical Aids for Low Vision:** Magnification devices (e.g., magnifiers, telescopes), Spectacle-mounted magnifiers, Handheld and stand magnifiers, Electronic magnification aids (e.g., CCTVs) **Non-Optical Aids for Low Vision:** Lighting and contrast enhancement, Environmental modifications, Adaptive techniques and strategies, Orientation and mobility training.	22
4	**Impact of Low Vision:** Effects on mobility, reading, driving, and social interaction, Psychological and emotional impact, Rehabilitation potential and goal setting, Low vision rehabilitation process, Community resources and support groups.	22

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

Textbook:

"Low Vision Rehabilitation: A Practical Guide for Occupational Therapists" by Mitchell Scheiman and Bruce Rosenthal.

Reference Books – Basics of Low Vision

1. **Richard B. Ruth.** *Low Vision and Vision Rehabilitation*, 1st edition, Mosby, 1996. ISBN: 978-0815163565
2. **Janet L. Weiss, Bruce E. Spivey.** *Vision Rehabilitation: Multidisciplinary Care of the Patient with Visual Loss*, 1st edition, Springer, 2013. ISBN: 978-1461454191
3. **Mark S. Wilkinson, Christina M. Lewis.** *Low Vision Rehabilitation: A Guide for Occupational Therapy Practice*, 2nd edition, AOTA Press, 2013. ISBN: 978-1569003671

SYLLABUS (5TH SEM)

PAPER/SUBJECT NAME: CLINICAL POSTING **SUBJECT CODE: OPT242M521**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:0-0-8-4**

Total credits: 4

Note: This subject will be conducted in a hospital setting to provide students with practical exposure and clinical understanding of the concepts taught.

SYLLABUS (6TH SEM)

PAPER /SUBJECT NAME: SYSTEMIC CONDITION & THE EYE
SUBJECT CODE: OPT242M601
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C = 4-0-0-4**

Course Objective:

The objective of the subject is to study the different systemic diseases, its classification, clinical features, diagnosis, complications, and management.

Course outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** Diabetes mellitus, Hypertension, Acquired Heart Disease and its pathophysiology, classification, clinical features, diagnosis, complications and management.	**BT 1**
CO 2	**To interpret** the definition, classification and clinical features of malignancy, connective tissue disorder and thyroid disease.	**BT 2**
CO 3	**To determine** the etiology, pathology, clinical features of tuberculosis, tropical diseases, vitamin deficiency and the eye.	**BT 3**
CO 4	**To explain** the neurological disorders and the eye, genetic disorders and phacomatosis.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Arterial Hypertension i) Pathophysiology, classification, clinical examination, diagnosis, complications, management. ii) Hypertension and the eye. Diabetes mellitus i) Pathophysiology, classification, clinical features, diagnosis, complications, management. ii) Diabetes mellitus and the eye. Acquired Heart Disease – Embolism i) Rheumatic heart disease ii) Subacute bacterial endocarditis. iii) Heart disease & the eye	22
2	Malignancy i) Definitions, nomenclature, characteristics of benign & malignant	22

	neoplasms. ii) Grading and staging of cancer, diagnosis, priniples of treatment. iii) Neoplasia and the eye. Connective Tissue Disease i) Anatomy and pathophysiology: Arthritis. ii) Eye and connective tissue disease. Thyroid Disease i) Anatomy and physiology of the thyroid gland. ii) Classification of thyroid disease iii) Diagnosis, complications, clinical features, management of thyroid disease involving eye.	
3	Tuberculosis i) Etiology, pathology, clinical features, pulmonary TB, diagnosis, complications, treatment of tuberculosis involving the eye. Tropical Disease and the Eye i) Leprosy. ii) Syphilis. iii) Malaria. Vitamin deficiency and the eye	22
4	Neurological disease and the eye i) Classification of neurological diseases. ii) Demyelinating diseases iii) Visual pathway lesions iv) Papiloedema. Genetic disorders and the eye. Phacomatoses & the eye	22

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

S Pramod, 2017, Medical Surgical Nursing Systemic Disease, Jaypee Brothers Medical Publishers.

Reference Books – Systemic Conditions & The Eye

1. **Frank J. Kreutzer, David G. Albert.** *Neuro-Ophthalmology: Diagnosis and Management*, 2nd edition, Elsevier, 2009. ISBN: 978-1416051836
2. **Terry J. Smith, John J. Chen.** *Systemic Disease and the Eye*, 3rd edition, Butterworth-Heinemann, 2011. ISBN: 978-0750684918

SYLLABUS (6TH SEM)

PAPER /SUBJECT NAME: LAW & OPTOMETRY + OCCUPATIONAL OPTOMETRY
SUBJECT CODE: OPT242M602
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C = 4-0-0-4**

Course Objective:

The objective of the subject is to study the concepts of occupational health and safety, occupational eye diseases and injuries, laws governing medical and paramedical professionals, optometry code of conduct and ethics.

Course outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the concept of occupational health and safety, its objectives, ILO convention on occupational safety and health.	**BT 1**
CO 2	**To interpret** occupational eye diseases and injuries, causes, clinical features, treatment, and management.	**BT 2**
CO 3	**To determine** the laws governing medical and paramedical professions and consumer act.	**BT 3**
CO 4	**To explain** the concept of optometry code of conduct, ethics and ethical issues in optometry practice.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	**Introduction to Occupational Health:** Definition, Concept of occupational health, Safety, Hazard, Objectives of occupational health, ILO convention on occupational safety and health.	22
2	**Occupational eye diseases:** Occupational eye diseases and injuries, causes, clinical features, treatment, and management.	22
3	**Introduction to Law & Optometry:** Laws governing medical and paramedical professions, consumer act with respect to optometry and dispensing of optical aids, partnership and alternatives.	22
4	**Optometry Code of Conduct:** Definition, Concept, Ethics, Negligence, ethical issues in optometry practice.	22

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

SK Haldar, 2023, Industrial and Occupational Health, CBS Publishers & Distributors Pvt Ltd.

Reference Books

1. **James R. Wolffsohn, Fiona Stapleton.** *Occupational Optometry*, 1st edition, Butterworth-Heinemann, 2011. ISBN: 978-0750688055
2. **David S. Friedman.** *Vision and Work: An Occupational Health Perspective*, 1st edition, Wiley-Blackwell, 2014. ISBN: 978-0470514040
3. **Mark Rosenfield, Peter J. Bex.** *Occupational Vision and Eye Care*, 2nd edition, Oxford University Press, 2018. ISBN: 978-0190624767
4. **David B. Elliott.** *Law and Ethics in Optometry*, 1st edition, Butterworth-Heinemann, 2013. ISBN: 978-0750683333
5. **Brendan J. O'Donoghue.** *Optometric Practice and the Law*, 2nd edition, Butterworth-Heinemann, 2008. ISBN: 978-0750681582

SYLLABUS (6TH SEM)

PAPER /SUBJECT NAME: APPLIED OPTOMETRY & ORTHOPTICS + LAB
SUBJECT CODE: OPT242M603/OPT242M611
SCHEME OF EVALUATION: (T+P)
Total Credits: 04 **L-T-P-C = 3-0-2-4**

Course Objective:

The objective of the subject is to study the different orthoptic instruments, procedures, management and treatment.

Course outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the different orthoptic instruments.	**BT 1**
CO 2	**To interpret** the procedures, Assessment of degree of squint, ocular motality status, binocular single vision and types of squint.	**BT 2**
CO 3	**To determine** the orthoptic treatment procedure and management.	**BT 3**
CO 4	**To explain** the definition, neuropathology, classification, clinical features, treatment of Amblyopia.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	ORTHOPTIC INSTRUMENTS Prism Bar Synoptophore Maddox Wing Maddox Rod Red Green Goggles Hess Screen Risley Prisms	**11**
2	Investigative procedures Motor signs in squint A) Head position: Face turn, chin position, Head tilt. B) Cover test & cover-uncover tests C) Maddox wing to assess heterophoria.	**11**

	Assessment of degree of squint a) Hirschbag test. b) Prism bar test. c) Krimskey test d) Synoptophore test Assessment of ocular motality status a) Hess chart b) Diplopia testing c) Bielschowskys Head tilting test Assessment of visual sensory status in squint. Amblyopia Suppression Binocular single vision – SMP, Fusion, Stereopsis. Mechanisms leading to squint Types of squint – a) latent / manifest b) horizontal / vertical c) paralytic / concomitant	
3	Orthoptic Treatment Procedures Management of – Convergence insufficiency Amblyopia Suppresion ARC Use of prism - For Exercise & correction	**11**
4	AMBLYOPIA Definition. Neuropathology. Classification. Clinical Features. Treatment. a) Occlusion. b) Penalisation. c) Role of drugs	**11**
	TOTAL	**44**
PRACTICAL		
MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Demonstration of following Orthoptic instruments/methods and their uses – Prism Bar Synoptophore Maddox Wing Maddox Rod Red Green Goggles RAF Gauge	**7.5**
2	Cover test Hirschberg test Krimsky test	**7.5**

	Diplopia charting Visuoscopy Accommodative flipper	
3	Orthoptic Investigative & Therapeutic Procedure	**7.5**
4	Case records AND Case Handling	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

AK Khurana, 2018, Theory and Practice of Squint and Orthoptics, CBS Publishers and Distributors.

Reference Books

1. **Gerald F. Krenzer.** *Orthoptics and Vision Therapy*, 3rd edition, Butterworth-Heinemann, 2002. ISBN: 978-075067 2870
2. **Robert W. Arnold, Suzanne M. Arnold.** *Clinical Manual of Pediatric Orthoptics*, 2nd edition, Slack Incorporated, 2014. ISBN: 978-1556429267
3. **James R. Handa.** *Orthoptics: Theory and Practice*, 2nd edition, Butterworth-Heinemann, 2008. ISBN: 978-075068 1028
4. **Ian L. Bailey, Gerald F. Krenzer.** *Orthoptics and Ocular Motility: Theory and Management of Strabismus*, 5th edition, Mosby, 2000. ISBN: 978-0323006713

SYLLABUS (6TH SEM)

PAPER /SUBJECT NAME: CONTACT LENS II + LAB
SUBJECT CODE: OPT242M604/OPT242M612

SCHEME OF EVALUATION: (T+P) **L-T-P-C: 3-0-2-4**
Total credits: 4

Course Objective: The subject provides the student with suitable knowledge both in theoretical and practical aspects of Contact Lenses.

Course Outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	Understand the basics of contact lenses & finalise the CL design for various kinds patients Recognize various types of fitting & explain all the procedures to patient	**BT 2**
CO2	Identify and manage the adverse effects of contact lens	**BT 3**
CO 3	List the important properties of contact lenses	**BT 4**

DETAILED SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Contact lens fitting in astigmatism. Contact lens fitting in keratokonus. Contact lens fitting in children. RGP lenses – low D.K. and high D.K. lenses.	**9**
2	Instructions regarding handling and care of lenses. Cosmetic and prosthetic contact lenses. Extended wear lenses versus Daily wear Disposable lenses	**9**
3	Contact lens – Toric, Bifocal, Multifocal. Therapeutic lenses / Bandage lenses. Contact lens solutions – principle of action, compositions Ordering contact lenses – writing prescription to the lab.	**9**
4	Contact lens – modifications of finished lenses (RGP). Checking the parameters. Recent advances in contact lenses.	**9**

	Follow up examinations Contact lens complications and their management. Prosthetic eye fitting procedures & conformers.	
	TOTAL	**36**

DETAILED SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Fitting and assessment of contact lenses – steep, flat, optimum on spherical cornea	**3**
2	Fitting and assessment of contact lenses – steep, flat, optimum on toric cornea with spherical lenses.	**3**
3	Fitting and assessment of contact lenses – steep, flat, optimum on toric cornea with toric lenses.	**3**
4	Teaching the patient to insert and remove contact lenses. Writing Contact Lens prescriptions	**3**
	TOTAL	**12**

TEXTBOOK:

Agarwal S, 2005, Dr. Agarwals' Textbook on Contact Lenses, Jaypee Brothers Medical Publishers.

Sinha R, 2017, Textbook of Contact Lenses, Jaypee Brothers Medical Publishers.

Reference Books

1. **Nathan Efron.** *Contact Lens Practice*, 4th edition, Elsevier, 2013. ISBN: 978-0702042508
2. **Milton Hom, Adrian Bruce.** *Manual of Contact Lens Prescribing and Fitting*, 3rd edition, Butterworth-Heinemann, 1995. ISBN: 978-0750600405
3. **Edward S. Bennett, Craig W. Borovoy.** *Clinical Contact Lens Practice*, 2nd edition, Lippincott Williams & Wilkins, 2006. ISBN: 978-0781740589
4. **Ruth B. Peters.** *Contact Lens Complications*, 3rd edition, Butterworth-Heinemann, 2006. ISBN: 978-0750687751

SYLLABUS (6TH SEM)

PAPER /SUBJECT NAME: LOW VISION AIDS & VISUAL REHABILITATION + LOW VISION AIDS & VISUAL REHABILITATION LAB
SUBJECT CODE: OPT242M605/OPT242M613
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C =3-0-2-4**

Course Objective:

The objective of the subject is to study the definition of low vision, its magnification, grades, assessments, refraction, and low vision prescription.

Course outcome:

On successful completion of the course, the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the Components of low vision evaluation, Contrast sensitivity and color vision assessment, Importance of patient history and counseling.	**BT 1**
CO 2	**To interpret** the Principles and goals of visual rehabilitation and training in using low vision aids.	**BT 2**
CO 3	**To determine** the resources and support services of low vision.	**BT 3**
CO 4	**To explain** the prescription and fitting of low vision aids.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	**Low Vision Assessment:** Components of a low vision evaluation, Visual acuity and visual field testing, Contrast sensitivity and color vision assessment, Importance of patient history and counseling.	16
2	**Visual Rehabilitation:** Principles and goals of visual rehabilitation, Training in using low vision aids, Strategies for improving visual skills: Scanning and visual search techniques, Eccentric viewing, Lighting and glare management; Importance of self-advocacy and independent living skills	16
3	**Resources and Support Services:** Government programs and community resources for individuals with low vision, Support groups and peer counseling, Assistive technology training and support centers, Ethical considerations	17

	in low vision care, Role of optometrists, ophthalmologists, occupational therapists, and orientation and mobility specialists, Team-based approach to assessment and intervention planning, Communication and coordination among healthcare professionals.	
4	**Prescribing and Fitting Low Vision Aids:** Prescription guidelines and calculations, Demonstration and trial of aids, Adjustment and customization of aids, Follow-up and troubleshooting, Aids prescription based on different anomalies. **Visual Rehabilitation Training:** Techniques for using optical aids effectively, Developing compensatory strategies for specific tasks, Orientation and mobility training, Psychosocial support and adjustment counseling, Counseling of low vision patient/ parents/ guardians/relatives.	17

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

Textbook:

"Low Vision Rehabilitation: A Practical Guide for Occupational Therapists" by Mitchell Scheiman and Bruce Rosenthal.

Reference Books –

1. **Janet Marsack, James R. Wolf, Gerard E. Fischmann.** *Low Vision Rehabilitation: A Practical Guide for Occupational Therapists*, 1st edition, Slack Incorporated, 2017. ISBN: 978-1630911900
2. **Mark S. Wilkinson, Christina M. Lewis.** *Low Vision Rehabilitation: A Guide for Occupational Therapy Practice*, 2nd edition, AOTA Press, 2013. ISBN: 978-1569003671
3. **Richard B. Ruth.** *Low Vision and Vision Rehabilitation*, 1st edition, Mosby, 1996. ISBN: 978-0815163565
4. **Janet L. Weiss, Bruce E. Spivey.** *Vision Rehabilitation: Multidisciplinary Care of the Patient with Visual Loss*, 1st
5. edition, Springer, 2013. ISBN: 978-1461454191

SYLLABUS (7TH SEM)	
PAPER /SUBJECT NAME: PEDIATRIC CLINIC SPECIALITY AND GERIATRIC CLINIC SPECIALITY **SUBJECT CODE: OPT242M711** **SCHEME OF EVALUATION: (P)**	
Total Credits: 4	**L-T-P-C=0-0-8-4**

Course Objective:

To provide hands-on clinical exposure to students in core optometric departments, enabling them to apply theoretical knowledge and diagnostic skills in real patient care environments.

Course Outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Demonstrate effective communication skills for counseling patients and caregivers	BT 3
CO2	Evaluate ocular disorders in pediatric and geriatric patients using age-appropriate diagnostic tools.	BT 4
CO3	Design individualized treatment plans for refractive errors, amblyopia, and age-related eye diseases	BT 5

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Pediatric Optometry: Vision development, amblyopia, strabismus, and learning-related vision issues	**15**

2	Geriatric Optometry: Cataracts, ARMD, glaucoma, diabetic retinopathy, and low vision rehabilitation	**15**
3	Clinical Skills: Case history taking, specialized tests (e.g., retinoscopy for children, Amsler grid for elderly)	**15**
4	Ethical & Communication Skills: Counseling patients/caregivers, interdisciplinary referrals	**15**
	TOTAL	**60**

SYLLABUS (7TH SEM)	
PAPER /SUBJECT NAME: LOW VISION SPECIALITY **SUBJECT CODE: OPT242M712** **SCHEME OF EVALUATION: (P)**	
Total Credits: 4	**L-T-P-C=0-0-8-4**

Course Objective:

To provide hands-on clinical exposure to students in core optometric departments, enabling them to apply theoretical knowledge and diagnostic skills in real patient care environments.

Course Outcome:

On successful completion of the course the students will be able to:		
CONo	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Analyze visual function data to classify low vision severity.	BT 4
CO2	Appraise patient outcomes post-rehabilitation	BT 5
CO3	Create rehabilitation plans using optical/non-optical aids.	BT 6

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Introduction to Low Vision: Causes, classifications, and impact on daily life	**15**
2	Assessment Techniques: Visual acuity, visual fields, and contrast sensitivity testing	**15**
3	Low Vision Aids: Optical/non-optical devices, assistive technologies	**15**
4	Rehabilitation Strategies: Orientation/mobility training, patient counseling	**15**
	TOTAL	**60**

SYLLABUS (7TH SEM)	
PAPER/SUBJECT NAME: CONTACT LENS SPECIALITY **SUBJECT CODE: OPT242M713** **SCHEME OF EVALUATION: (P)**	
Total Credits: 4	**L-T-P-C=0-0-8-4**

Course Objective:

To provide hands-on clinical exposure to students in core optometric departments, enabling them to apply theoretical knowledge and diagnostic skills in real patient care environments.

Course Outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Apply fitting principles for soft, rigid, and specialty lenses.	BT 3
CO2	Diagnose contact lens-related complications (e.g., dry eye,	BT 4

	infections).	
CO3	Design patient education protocols for lens hygiene.	BT 6

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Basics of Contact Lenses: Materials, designs, and indications/contraindications	**15**
2	Clinical Fitting: Corneal topography, tear film assessment, trial lens fitting	**15**
3	Complications & Management: GPC, microbial keratitis, and solution allergies	**15**
4	Specialty Lenses: Scleral, hybrid, and ortho-k lenses	**15**
	TOTAL	**60**

SYLLABUS (7TH SEM)	
PAPER/SUBJECT NAME: BINOCULAR VISION SPECIALITY **SUBJECT CODE: OPT242M714** **SCHEME OF EVALUATION: (P)**	
Total Credits: 4	**L-T-P-C=0-0-8-4**

Course Objective:

To provide hands-on clinical exposure to students in core optometric departments, enabling them to apply theoretical knowledge and diagnostic skills in real patient care environments.

Course Outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Interpret diagnostic tests (cover test, AC/A ratio) for binocular vision disorders.	BT 4
CO2	Assess therapy outcomes using evidence-based criteria.	BT 5
CO3	Develop vision therapy programs for strabismus/amblyopia.	BT 6

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Binocular Vision Basics: Fusion, stereopsis, and suppression	**15**
2	Assessment: NPC, vergence testing, accommodative facility	**15**
3	Disorders & Management: Strabismus, amblyopia, and diplopia	**15**
4	Vision Therapy: Exercises, prism adaptation, and patient compliance	**15**
	TOTAL	**60**

SYLLABUS (8TH SEM)	
PAPER/SUBJECT NAME: CLINICAL EVALUATION **SUBJECT CODE: OPT242M811** **SCHEME OF EVALUATION: (P)**	
Total Credits: 6	**L-T-P-C=0-0-12-6**

Course Objective:

To deepen the student's clinical expertise by involving them in advanced optometric care including specialty clinics and interdisciplinary eye care approaches.

Course Outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Correlate ocular findings with systemic diseases (e.g., diabetes).	BT 4
CO2	Integrate advanced diagnostic tools (OCT, visual fields) into clinical practice.	BT 5
CO3	Formulate comprehensive management plans	BT 6

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Advanced Diagnostics: Electrophysiology, advanced imaging techniques	
2	Systemic & Ocular Disease Correlation	
3	Case Presentation & Documentation	
4	Conduct full eye exams with adaptations for elderly patients.	

SYLLABUS (8TH SEM)	
PAPER/SUBJECT NAME: COMPREHENSIVE CLINICAL OPTOMETRY **SUBJECT CODE: OPT242M812** **SCHEME OF EVALUATION: (P)** **Total Credits: 6**	**L-T-P-C=0-0-12-6**

Course Objective:

To deepen the student's clinical expertise by involving them in advanced optometric care including specialty clinics and interdisciplinary eye care approaches.

Course Outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Respond to ocular emergencies (trauma, infections).	BT 3
CO2	Collaborate with healthcare teams for patient-centered care.	BT 5
CO3	Synthesize knowledge to manage complex multi-specialty cases.	BT 6

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Integrated Case Management	30
2	Emergency Optometry	30

3	Interprofessional Collaboration	30
	TOTAL	90

SYLLABUS (8TH SEM)
PAPER/SUBJECT NAME: PROJECT DISSERTATION **SUBJECT CODE: OPT242M823** **SCHEME OF EVALUATION: (P)** **Total Credits: 12**

Course Objective:

To deepen the student's clinical expertise by involving them in advanced optometric care including specialty clinics and interdisciplinary eye care approaches.

Course Outcome:

On successful completion of the course the students will be able to:		
CO No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Respond to ocular emergencies (trauma, infections).	BT 3
CO2	Collaborate with healthcare teams for patient-centered care.	BT 5
CO3	Synthesize knowledge to manage complex multi-specialty cases.	BT 6

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Research Methodology & Proposal Writing	**60**
2	Data Collection	**60**
3	Data Analysis	**60**
4	Dissertation Submission & Viva	**60**
	TOTAL	**180**