MOHAN BABU UNIVERSITY

Sree Sainath Nagar, Tirupati – 517 102

MBU
MOHAN BABU
UNIVERSITY
DREAM. BELIEVE. ACHIEVE

SCHOOL OF PARAMEDICAL, ALLIED AND HEALTH CARE SCIENCES

B.Sc. Optometry

CURRICULUM AND SYLLABUS

(From 2022-23 Admitted Batches)

FULLY FLEXIBLE CHOICE BASED CREDIT SYSTEM (FFCBCS)

MOHAN BABU UNIVERSITY

Vision

To be a globally respected institution with an innovative and entrepreneurial culture that offers transformative education to advance sustainability and societal good.

Mission

- Develop industry-focused professionals with a global perspective.
- Offer academic programs that provide transformative learning experience founded on the spirit of curiosity, innovation, and integrity.
- Create confluence of research, innovation, and ideation to bring about sustainable and socially relevant enterprises.
- Uphold high standards of professional ethics leading to harmonious relationship with environment and society.

SCHOOL OF PARAMEDICAL ALLIED AND HEALTH CARE SCIENCES

Vision

To be the global center of excellence for paramedical and allied health science education, research, innovation, incubation, consultancy and public service.

Mission

- Inspire the experts of paramedical and allied health sciences of tomorrow to take on the public health challenges of our society.
- Train the students with fundamental knowledge of paramedical and allied health sciences, skills set and positive attitude for creating innovative solutions to serve industry and community through congenial learning environment with contemporary academic programs, state of the art infrastructure facilities and community health programs.
- Facilitate budding paramedical and allied health science experts with the best research-innovation-incubation-start-up ecosystem to realize their fullest potential for sustainable businesses.
- Encourage faculty and staff to excel in their respective domains of expertise and demonstrate the best of their abilities by way of continuing education, research support and consultancy.

B.Sc. Optometry

Program Outcomes

On successful completion of the Programs, the graduates of B.Sc. Optometry will be able to:

PO1. **Knowledge:** Study and apply concepts, theories, and practices of health care system to gain fundamental knowledge.

PO2. **Analysis:** To identify, analyze and evaluate various experiences and perspectives using knowledge of paramedical & Allied Health sciences for substantiated conclusions.

PO3. **Development;** Individual or teamwork skills to support shared goals with the interdisciplinary healthcare team to improve societal health

PO4. **Tools & Techniques:** To create, select, and apply appropriate techniques, resources and modern tools with an understanding of the limitations in Health care system.

PO5. **Environment and Sustainability:** Understand the impact of Health care professionals in environmental contexts and demonstrate the knowledge for sustainable development.

PO6. **Ethics and Society:** Apply the ethical principles of health care practices for sustainable development of society

PO7. **Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, to manage projects and finance in multidisciplinary settings.

PO8. **Effective Communication:** Communicate effectively on Paramedical & allied Health care activities with the treating patient, community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO9. **Entrepreneurship:** Entrepreneur and leadership skills to practice independently as well as in collaboration with the interdisciplinary healthcare team.

PO10. **Life-long learning:** Adapt to the changes and advancements in technology and engage in independent and lifelong learning

B.Sc. Optometry

Basket Wise - Credit Distribution

S. No.	Basket	Credits (Min. - Max.)
1	SCHOOL CORE	60-80
2	PROGRAM CORE	80-110
3	PROGRAM ELECTIVE	10-36
4	UNIVERSITY ELECTIVE	3-12
	TOTAL CREDITS	**Min. 195**

School Core (60-80 Credits)

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
		L	T	P	S	C	
22DF102001	Medical Terminology and Record Keeping	4	1	2	-	6	-
22DF102002	Introduction to Quality and Patient Safety	4	1	2	-	6	-
22CS102402	Basic Computers and Information Sciences	3	-	2	-	4	-
22DF105001	Biomedical Waste Management	-	1	2	-	2	-
22LG101406	Professional English	2	-	-	-	2	-
22MG101006	Principles of Management	3	-	-	-	3	-
22PT102006	Human Anatomy	4	1	2	-	6	-
22PT102007	Human Physiology	4	1	2	-	6	-
22PT101004	National Health Care Delivery System	2	-	-	-	2	-
22DF102009	Pathology	3	-	2	-	4	-
22CC111001	Clinical Posting-I	-	-	-	-	4	-
22CC111002	Clinical Posting-II	-	-	-	-	4	Clinical Posting-I
22CC111003	Clinical Posting-III	-	-	-	-	4	Clinical Posting-II
22CC111004	Clinical Posting-IV	-	-	-	-	4	Clinical Posting-III
22DF102025	Research Methodology and Biostatistics	3	-	2	-	4	-
22DF101001	Research Methodology and Biostatistics for Health Professionals	4	-	-	-	4	-

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
Mandatory Courses (Min. 4 Credits to be earned, Earned Credits will not be considered for CGPA)							
22CE107601	Environmental Science	2	-	-	-	2	-
22LG101402	Telugu	2	-	-	-	2	-
22LG101404	Sanskrit	2	-	-	-	2	-

Program Core (80-110 Credits)

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
		L	T	P	S	C	
22DF102003	Medical Biochemistry	3	-	2	-	4	-
22RT102001	Optical Physics	3	-	2	-	4	-
22RT102002	Geometrical Optics-I	3	-	2	-	4	-
22RT101007	Ocular Biochemistry	3	-	-	-	3	-
22RT102004	Ocular Microbiology	2	-	2	-	3	
22RT101008	Ocular Anatomy	2	1	-	-	3	-
22RT102003	Ocular Physiology	2	-	2	-	3	-
22RT101009	Geometrical Optics-II	3	-	-	-	3	Geometrical Optics-I
22RT102005	Visual Optics	4	-	2	-	5	-
22RT102006	Clinical Examination of Visual System	3	-	2	-	4	Ocular Anatomy
22RT101010	Optometric Optics	3	-	-	-	3	Geometrical Optics-II
22RT102007	Dispensing Optics	4	-	2	-	5	Optical Physics
22RT101011	Ocular Disease–I	4	-	-	-	4	-
22RT101012	Optometric Instruments-I	3	1	-	-	4	Optical Physics
22CC101006	Basic Pharmacology and Drug Administration	3	-	-	-	3	-
22CC101015	Medical Psychology	3	-	-	-	3	-
22RT101022	Ocular Disease –II	3	-	-	-	3	Ocular Disease–I

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
22RT102013	Binocular Vision	4	-	2	-	5	-
22RT101023	Optometric Instrument-II	3	1	-	-	4	Optometric Instruments-I
22RT102017	System for ophthalmic dispensing	5	-	2	-	6	Optical Physics
22RT111001	Clinical Internship-I	-	-	-	-	20	-
22RT111002	Clinical Internship-II	-	-	-	-	20	Clinical Internship-I
22RT102018	Optometric Instruments	5	-	2	-	6	-
22RT102020	Ocular Anatomy and Physiology	4	-	2	-	5	-

Program Elective (10-36 Credits)

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
		L	T	P	S	C	
22RT101025	Visual Psychophysics	2	-	-	-	2	-
22RT101026	Advance Dispensing	2	-	-	-	2	-
22RT105001	Myopia Control	-	1	2	-	2	-
22RT105002	Advanced Orthoptics	-	1	2	-	2	-
22RT101028	Law in Optometry Practice	2	-	-	-	3	-
22RT101033	Academic Research Writing and Intellectual Property Rights	2	-	-	-	2	
22RT101029	Paediatric Optometry and Geriatric Optometry	4		-	-	4	-
22RT101030	Public Health, Community and Occupational Optometry	4	-	-	-	4	-
22RT102016	Low Vision Management	4	-	2	-	5	-
22RT102014	Contact Lens	5	-	2	-	6	-
22RT101024	Ocular Pharmacology	3	-	-	-	3	Basic Pharmacology and Drug Administration

University Elective (3-12 Credits)

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
		L	T	P	S	C	
22EC101701	AI in Healthcare	3	-	-	-	3	-
22DS101701	Bioinformatics	3	-	-	-	3	-
22SS101701	Constitution of India	3	-	-	-	3	-
22CM101702	Cost Accounting and Financial Management	3	-	-	-	3	-
22MG101701	Entrepreneurship for Micro, Small and Medium Enterprises	3	-	-	-	3	-
22CB101703	Forensic Science	3	-	-	-	3	-
22SS101704	Indian History	3	-	-	-	3	-
22SS101705	Indian Tradition and Culture	3	-	-	-	3	-
22ME101704	Managing Innovation and Entrepreneurship	3	-	-	-	3	-
22LG201701	Personality Development	3	-	-	-	3	-
22CS101702	Web Design Fundamentals	3	-	-	-	3	-
22SS101706	Women Empowerment	3	-	-	-	3	-

Note:

1. If any student has chosen a course or equivalent course from the above list in their regular curriculum then, he/she is not eligible to opt the same course/s under University Elective.
2. The student can choose courses from other disciplines offered across the schools of MBU satisfying the pre-requisite other than the above list.

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF102001	**MEDICAL TERMINOLOGY AND RECORD KEEPING**	4	1	2	-	6

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on word roots, prefixes, suffixes basic medical terms, medical abbreviations to human body systems and record-keeping methods in health care and medical ethics and law.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate basic knowledge on roots, prefixes and suffixes to form medical terms in health care system

CO2. Use procedural terms and medical abbreviations to human body for improving communication and reporting between health care providers effectively

CO3. Apply advanced tools and techniques to maintain patient health details in medical system.

CO4. Design a standard protocol by applying medical law and ethics apply to avoid sentinel events.

CO5. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	3	-
CO3	3	1	3	-	-	-	-	-	-	1
CO4	2	1								1
CO5	3	-	-	-	-	3	1	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**3**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION OF MEDICAL TERMINOLOGY ***(12 Periods)***

Derivation of medical terms, define word roots, prefixes, and suffixes, Conventions for combined morphemes and the formation of plurals, Basic medical terms, Form medical terms utilizing roots, suffixes, prefixes, and combining roots.

Module 2: INTRODUCTION OF MEDICAL TERMINOLOGY-1 ***(12 Periods)***

Interpret basic medical abbreviations/symbols, utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system and musculoskeletal system

Module 3: INTRODUCTION OF MEDICAL TERMINOLOGY-2 ***(12 Periods)***

Interpret basic medical abbreviations/symbols, utilize diagnostic, surgical, and procedural terms and abbreviations related to the Respiratory system, cardiovascular system, nervous system, and endocrine system.

Module 4: RECORD KEEPING ***(12 Periods)***

Standard procedures in record keeping, interpret medical orders/reports, Data entry and management on electronic health record system, Advanced tools to maintain records in Health care.

Module 5: MEDICAL ETHICS AND LAW ***(12 Periods)***

Medical ethics – Definition, Basic principles of medical ethics – Confidentiality, Malpractice and negligence – Rational and irrational drug therapy, Autonomy and informed consent – Right of patients, Care of the terminally ill- Euthanasia, Development of a standardized protocol to avoid sentinel events

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of role of paramedic in health care system
2. Demonstration of Central Sterile Supply Department (CSSD)
3. Observation and understanding of incinerator complex
4. Demonstration of Immunization section
5. Demonstration of working respective department in health care.

RESOURCES

TEXT BOOKS:

1. Adam Brown "Medical Terminology Easy Guide for Beginners"CreateSpace Independent Publishing Platform, Edition 1, 2016.
2. GD Mogli "Medical records organization and management" Jaypee Brothers Medical Publishers, Edition2, 2016.

REFERENCE BOOKS:

1. Stedmans "Stedmans pocket Medical Dictionary" Wolters Kluwer India Pvt. Ltd, Edition 1, 2009.
2. Rampi Gupta "CM Francis Medical Ethics" Jaypee Brothers Medical Publishers, Edition 4, 2020.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=_bDatJxhfkQ
2. https://www.youtube.com/watch?v=9iMhc2OU-go
3. https://www.youtube.com/watch?v=sQTrPIwtWaw

WEB RESOURCES:

1. https://blog.ipleaders.in/medical-laws-conflict-ethic
2. https://www.gponline.com/medico-legal-importance-good-records/article/89
3. https://openmd.com/guide/medical-terminology

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF102002	**INTRODUCTION TO QUALITY AND PATIENT SAFETY**	4	1	2	-	6

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course is designed to provide an overview on Quality assurance and management, infection control and prevention, Antibiotic resistance and disaster management.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Apply NABH guidelines to improve the quality of patient care in the health care system.
CO2. Identification of suitable evidence-based infections control principles and techniques to control and prevent to disease in the healthcare environment
CO3. Identify barriers and opportunities in the health care system based on contextual knowledge on microbial antibiotic resistance.
CO4. Demonstrate knowledge on different disaster management techniques to make patient health safety
CO5. Work independently or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	2	-	-	2
CO2	3	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	1
CO4	3	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	1	-	-	-	-
Course Correlation Mapping	**3**	**-**	**-**	**-**	**-**	**3**	**2**	**-**	**-**	**2**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: QUALITY ASSURANCE AND MANAGEMENT ***(15 Periods)***

Quality assurance and management - The objective of the course is to help students understand the basic concepts of quality in health care and develop skills to implement sustainable quality assurance programs in the health system: Concepts of Quality of Care, Quality Improvement Approaches, Standards and Norm, Quality Improvement Tools, Introduction to NABH guidelines.

Module 2: INFECTION CONTROL AND PREVENTION ***(15 Periods)***

The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital-acquired infections and improve health outcomes. Concepts taught should include a. Evidence-based infection control principles and practices [such as Sterilization, Disinfection, Effective hand hygiene and use of Personal Protective Equipment (PPE)], Prevention & control of common healthcare-associated infections, Components of an effective infection control program, and Guidelines (NABH and JCI) for Hospital Infection Control

Module 3: ANTIBIOTIC RESISTANCE ***(15 Periods)***

Antibiotic Resistance: History of antibiotics, way of resistance happens and spreads, Types of resistance- intrinsic, acquired, passive, Trends in drug resistance & Actions to fight resistance, Bacterial persistence, Antibiotic sensitivity, Consequences of antibiotic resistance & Antimicrobial Stewardship – Barriers and opportunities, tools and models in hospitals.

Module 4: DISASTER PREPAREDNESS AND MANAGEMENT ***(15 Periods)***

The principles of on-site disaster management, Fundamentals of emergency management, psychological impact management, Resource management, Preparedness and risk reduction, Key response functions (including public health, logistics, and governance, recovery, rehabilitation and reconstruction), information management, incident command, and institutional mechanisms

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXERCISES:

1. Demonstration of NABH guidelines
2. Demonstration of Vital signs
3. Demonstration of proper use of Personal protective equipment (PPE)
4. Demonstration of evidence-based infection control principles and practices [such as Sterilization, Disinfection, Effective hand hygiene, and use of Personal Protective Equipment (PPE)
5. Discussion on various types of Antibiotics
6. Demonstration of how Resistance Happens and Spreads

RESOURCES

TEXT BOOKS:

1. Y. Anjaneyuluand R Marayya "Quality Assurance and Quality Management" BSP Books Private Limited, 2018.
2. Deepak Tripathi "Quality management" Jaico Publishing House, Edition 1, 2009.
3. Apurba S Sastry, Deepa shree "Essentials of Hospital infection control" Jaypee Brothers Medical Publisher, Edition 1, 2019.
4. Nidhi Gauba Dhawan and Ambrina Sarar Khan "Disaster management and preparedness" CBS Publisher, 2014.

REFERENCE BOOKS:

1. Alan R. Hauser "Antibiotics for Clinicians" LWW Exclusive NP, Standard Edition, 2019.
2. Gireesh Kumar KP and Eng "Handbook of antibiotics" Paras Medical Books, Edition 1, 2014.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=zSyICkGZ6iM
2. https://www.youtube.com/watch?v=LZapz2L6J1Q
3. https://www.youtube.com/watch?v=yHs0GyLNSLg
4. https://www.youtube.com/watch?v=KwAKjtkpdP4

WEB RESOURCES:

1. https://www.sciencedirect.com/science/article/pii/B9780123735935000227
2. https://www.who.int/teams/integrated-health-services/infection-prevention-control
3. https://www.uicc.org/what-we-do/thematic-areas-work/antimicrobial-resistance-amr-and-its-impact-cancer-care
4. https://www.techtarget.com/searchsoftwarequality/definition/quality-assurance

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22LG101406	**PROFESSIONAL ENGLISH**	2	-	-	-	2

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course deals with selected literary works of eminent writers, exercises on speaking, reading comprehension skimming and scanning, vocabulary, grammar, pronunciation, and conversation practice.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate knowledge of literary works of various pieces of eminent writers.

CO2. Adapt general and technical vocabulary in communication.

CO3. Apply grammatically correct English in writing.

CO4. Analyze texts using reading techniques.

CO5. Apply different communication styles in various situations.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	2	-	-	-
CO2	2	2	-	-	-	-	2	-	3	-
CO3	2	2	-	-	3	-	2	-	3	-
CO4	2	3	2	-	2	-	2	-	3	-
CO5	2	2	-	-	3	-	2	-	3	-
Course Correlation Mapping	**2**	**2**	**2**	**-**	**3**	**-**	**2**	**-**	**3**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: BE THE BEST OF WHATEVER YOU ARE BY DOUGLAS MALLOC ***(06 Periods)***

Be the Best of Whatever You Are– A motivational poem, Reading Comprehension, Grammar, Vocabulary, Pronunciation, Language Games, and Conversation Practice, Letter writing.

Module 2: 'ON SAYING PLEASE' SHORT ESSAY BY A. G. GARDINER ***(06 Periods)***

On Saying Please – A Short Essay, Reading Comprehension, Grammar Vocabulary, Pronunciation, Language Games, and Conversation Practice, Email writing.

Module 3: 'IF YOU FORGET ME' POEM BY PABLO NERUDA ***(06 Periods)***

If you Forget Me-A Poem, Reading Comprehension, Grammar, Pronunciation, Language Games and Conversation Practice, essay writing.

Module 4: 'AFTER THE SUNSET' SHORT STORY BY BHOOPAL ***(06 Periods)***

After the Sunset–A Short Story, Reading Comprehension, Grammar, Pronunciation, Language Games, and Conversation Practice, case studies.

Module 5: 'MAN'S PERIL' ESSAY BY BERTRAND RUSSEL ***(06 Periods)***

Man's Peril - An Essay, Reading Comprehension, Vocabulary, Grammar, Pronunciation, Language Games, and Conversation Practice, report writing.

Total Periods: 30

EXPERIENTIAL LEARNING

1. Discuss the role of Health care in nation-building?
2. List out the important vocabulary used most in Health care.
3. Small courtesies play a major role in creating an impression on other people. List out a few examples.
4. Prepare a PowerPoint presentation on the present scenario in higher education and jobs in India.
5. Being a shopkeeper and persuading a customer to buy a product which is introduced newly in the market. Prepare a conversation.
6. The English language has a rich vocabulary. List out the homophones and homonyms and write down the pronunciation and meaning of those words.
7. Describe a situation in your college where teamwork is needed and explain the strategies to manage the team effectively.
8. Write about the importance of IELTS and TOEFL exams.
9. Prepare a report on the medical camp conducted on your campus.
10. Write a letter to the concerned asking permission to attend clinical classes.
11. Prepare a E mail to justify the need of new medical equipment to your hospital.

RESOURCES

TEXT BOOKS:

1. G. Damodar "English Language for Undergraduate Students", Cambridge University-2019.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeetha Sharma, *Technical Communication*, Oxford University Press, New Delhi, 2012.
2. Ashraf Rizvi*, Effective Technical Communication*, McGraw-Hill Education (India) Pvt. Ltd., New Delhi, 2018

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=WnOOKO0CdaM
2. https://www.youtube.com/watch?v=H6Nlz8qmcFc
3. https://www.youtube.com/watch?v=-lTliZO85YM
4. https://www.youtube.com/watch?v=048YjXwgHWE
5. https://www.youtube.com/watch?v=XLLQm7Grmcc

WEB RESOURCES:

1. https://www.researchgate.net/publication/331773456_RK_Narayan's_A_Snake_in_the_Gra ss_and_Stephen_Leacock's_With_the_Photographer_-_A_Comparative_Study
2. https://smartenglishnotes.com/2020/07/17/on-saying-please-summary-analysis-and-questions-and-answers/
3. http://www.emcp.com/product_catalog/school/litLink/Grade09/U09-04forgetme/
4. https://englishlanguage-lit.blogspot.com/2021/05/after-sunset-short-story-by-bhoopal.html
5. https://www.taylorfrancis.com/chapters/mono/10.4324/9781003090359-31/man-peril-bertrand-russell?context=ubx&refId=1d767e2d-ceb1-4537-9de5-6417eab47d1e

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22MG101006	**PRINCIPLES OF MANAGEMENT**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course enables the students to study the evolution of management; functions and principles of management; application of the principles in an organization; the system and process of effective controlling in the organization.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand managerial functions of business organization.

CO2. Understand the planning process in the organization.

CO3. Describe the principles of Organization.

CO4. Understand the concept and process of staffing.

CO5. Demonstrate the ability to direct, leadership and communicate effectively.

CO6. Work independently or in team to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	1	-	-
CO2	3	1	-	1	-	-	-	1	1	-
CO3	3	1	-	1	-	-	-	1	1	-
CO4	3	1	-	-	-	-	-	1	1	-
CO5	3	1	-	-	-	1	-	-	1	-
CO6	3	-	-	-	-	-	-	1	-	-
Course Correlation Mapping	**3**	**1**	**-**	**1**	**-**	**1**	**-**	**1**	**1**	**-**

Correlation Levels: ***3: High;*** ***2: Medium; 1: Low***

COURSE CONTENT

Module 1: INTRODUCTION TO MANAGEMENT ***(09 Periods)***

Meaning, Definition, Concept, Scope And Principles of Management; Evolution of Management Thought- Management Theories – Classical, Behaviour, System, Contingency and Contemporary Perspectives on Management. Management Art or Science And Management as Profession. Process And Levels of Management. Introduction to Functions [POSDCORB] of Management.

Module 2: PLANNING – IMPORTANCE ***(11 Periods)***

Planning- Importance, Objectives, Process, Policies, Types of Planning, Decision Making- Process of Decision Making, Types of Decision, Problems involved in Decision Making.

Module 3: ORGANISING ***(09 Periods)***

Meaning, Importance, Principles of Organizing, Spam of Management, Patterns of Organization- Formal And Informal Organizations, Common Organizational Structures; Departmentalization, Authority- Delegation, Centralization Decentralization, Responsibility- Line and Staff Relationship.

Module 4: STAFFING ***(07 Periods)***

Sources of Recruitment, Selection Process, Training, Directing, Controlling- Meaning And Importance, Function, Span of Control, Process And Types of Control, Motivation, Coordination- Need and Types And Techniques Of Coordination- Distinction between Coordination And Cooperation- Requisites for Excellent Coordination-Systems Approaches and Coordination.

Module 5: EMERGING ISSUES IN MANAGEMENT ***(09 Periods)***

Total Quality Management, Technology Management, Talent and Knowledge Management, Leadership, Organizational Change and Development, Corporate Social Responsibility.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXERCISES:

1. Students will be given case studies on management theory and its relevance to contemporary business practices.
2. Case study of Amazon India on planning and staffing personnel for its timely delivery in rural area.
3. Group discussion on technology, organization and management.

   The above all will be detailed in CHO

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1 Charles W.L. Hill And Steven L. McShane, Principles Of Management, Tata Mc-Craw-Hill Company, Edition 1, 2006.

2 Griffin, Ricky W., Management. AITBS Publishers and Distributors, Edition 1, 2010.

REFERENCE BOOKS:

1. Neeru Vasishth, Principles of Management text and cases, Taxmann Publishers, Edition 5, 2019.

2. Robbins, Fundamentals of Management, Pearson Education India, Edition 9, 2016.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=tUrjAn24ZiA

2. https://www.youtube.com/watch?v=vtVJOg_tW4o

WEB RESOURCES:

1. https://byjus.com/commerce/henri-fayol-14-principles-of-management/

2. https://education.stateuniversity.com/pages/cw1ev9e9ib/An-Introduction-to-the-Principles-of-Management.html

3. https://open.lib.umn.edu/principlesmanagement/chapter/1-1-introduction-to-principles-of-management/

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CS102402	**BASIC COMPUTERS AND INFORMATION SCIENCES**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion and hands-on experience on basics of computer science and information science concepts of the I/O devices, CPU (central processing unit) memory, Storage devices and Introduction of windows operating systems and MS office and having the knowledge of computer networks, Internet and its applications.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate knowledge on Basics of computer I/O devices, Processor and memory.

CO2. Prepare the Documents using the word processors.

CO3. Prepare the work sheet and Slide Presentations using the Excel and presentation tool.

CO4. Demonstrate the knowledge on Operating Systems usage and its types.

CO5. Interconnect two or more computers for Information sharing and access the Internet.

CO6. Work independently or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-
CO3	3	2	3	-	-	-	-	-	-	-
CO4	2	2	3	-	-	-	-	-	-	-
CO5	3	2	2	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	3	-
Course Correlation Mapping	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**3**	**3**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT:

Module 1 INTRODUCTION TO COMPUTERS ***(09 Periods)***

Introduction, characteristics of computers, block diagram of computers, generations of computers, computer languages, Input-output devices: Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices (monitors, pointers, plotters, screen image projector, voice response systems),Processor and memory: Central Processing Unit (CPU), main memory.

Module 2 STORAGE DEVICES AND WORD PROCESSOR ***(09 Periods)***

Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices, Introduction to word processor: Introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

Module 3 INTRODUCTION TO SPREADSHEET AND PRESENTATIONS ***(09 Periods)***

Introduction to Excel: Introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs, Introduction to PowerPoint: Introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

Module 4 COMPUTER NETWORKS AND INTERNET APPLICATIONS ***(09 Periods)***

Computer networks: Introduction, types of networks (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network, Internet and its Applications: Definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet, Application of Computers in clinical settings.

Module 5 INTRODUCTION OF OPERATING SYSTEM ***(09 Periods)***

Introduction to Operating System, Characteristics of Operating System, Types of Operating System and its components, Installation of windows OS, History of OS and features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXERCISES

1. Demonstrate of basic hardware of Computers and laptops.
2. Demonstrate about the I/O Devices and CPU.
3. Create and Design Admission/Enquiry Forms.
4. Create Student Id Card using shapes, text and colors.
5. Create Chart and show the product price comparison between years.
6. Insert the Image into various shapes
7. Calculate student's marks percentage using spreadsheet.
8. Create slides about yourself using with all the details.
9. What are the steps to connect Internet
10. How to send an Email? Explain the steps in detail.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXTBOOKS:

1. Priti Sinha and Pradeep K "Computer Fundamentals" BPB Publications, Edition 6, 2004.
2. James Bernstein "Office for the WebMade Easy" Independently published, Edition 1, 2021.

REFERENCE BOOKS:

1. Pete Matheson "Microsoft Office 365 for Beginners" Microsoft, 2021.
2. Dr Sabah Sayed "Fundamentals of Computer Science" Imperial College Press, 2009.

SOFTWARE/TOOLS:

1. Software: MS Office/ Window Operating System

VIDEO LECTURES:

1. Computer Fundamentals - Basics for Beginners - Bing video
2. https://youtu.be/-AP1nNK3bRs

WEB RESOURCES:

1. https://www.udemy.com/**computer**-**basics**/online-course
2. *https://www.educba.com/excel/courses/ms-office-course*

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CE107601	**ENVIRONMENTAL SCIENCE**	2	-	-	-	2

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on natural resources, ecosystems, biodiversity, environment pollution and control, social issues and environment, human population and environment.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Analyze natural resources to solve complex environmental problems and natural resource management considering society, environment and sustainability.

CO2. Analyze ecosystems and biodiversity to solve complex environmental problems by following environmental ethics considering society, environment and sustainability besides communicating effectively in graphical form.

CO3. Analyze various types of pollution and their control measures to solve environmental problems through appropriate tools and techniques following latest developments considering society, ethics, environment and sustainability.

CO4. Analyze social issues and its impact on environment, environmental acts to solve complex environmental problems considering society, environment and sustainability besides communicating effectively in graphical form.

CO5. Analyze human population and its impact on environment to solve complex environmental problems through team work and using appropriate tools and techniques considering ethics, society, environment and sustainability.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	-	2	-	-	1	-	1
CO2	3	2	-	-	2	2	1	1	-	1
CO3	3	2	2	1	2	2	2	-	-	-
CO4	3	2	2	2	2	-	-	2	-	1
CO5	3	2	2	2	2	2	2	-	-	1
Course Correlation Mapping	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**1**		**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: NATURAL RESOURCES *(07 Periods)*

Multidisciplinary nature of environment; Natural Resources: Renewable and non-renewable resources; Forest, Water, Mineral, Food and Energy resources -Causes, Effects, Remedies, Case studies; Role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

Module 2: ECOSYSTEMS AND BIODIVERSITY *(07 Periods)*

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem - Producers, Consumers, Decomposers; Food chains, Food webs, Ecological pyramids – Types; Characteristic features, Structure and functions of forest ecosystem, Desert ecosystem, Aquatic ecosystem.

Biodiversity: Concept and value of biodiversity, Role of biodiversity in addressing new millennium challenges, Hot spots of biodiversity, Threats to biodiversity, Man-wild life conflicts, Endemic, Endangered and extinct species of India, Conservation of biodiversity – In-situ and ex-situ.

Module 3: ENVIRONMENTAL POLLUTION AND CONTROL *(06 Periods)*

Causes, Adverse effects and control measures of pollution - Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Nuclear pollution, Solid waste management – Urban waste, industrial waste; Latest developments in pollution control, Hazards and disaster management – Floods, Earthquakes, Tsunamis, Case studies.

Module 4: SOCIAL ISSUES AND THE ENVIRONMENT *(06 Periods)*

Sustainable development, Urban problems related to energy, Environmental ethics –Issues, Solutions; Global warming, Acid rain, Ozone layer depletion, Nuclear accidents and case studies, Wasteland reclamation, Consumerism and waste products, Concept of green technologies, Environment justice: National Green Tribunal and its importance; Environment protection act, Air act, Water act, Wildlife protection act, Forest conservation act, Issues involved in enforcement of environmental legislation, Public environmental awareness.

Module 5: HUMAN POPULATION AND THE ENVIRONMENT *(04 Periods)*

Population growth, Population characteristics and variation among nations, Population explosion, Family welfare program, Environment and human health, Human rights, Value education, HIV/AIDS, Women and child welfare, Role of information technology in environment and human health; Case studies - Field Work/Assignment/Seminar on Environmental assets – Water bodies/Forest/Grassland/Hill/Mountain.

Total Periods: 30

EXPERIENTIAL LEARNING

1. Visit a nearby villages and know the status of availability of local resources that can be improved through proper education.
2. Make an awareness program in the villages for the development of natural resources, ecosystems and biodiversity.
3. Prepare a document by visiting a local urban waste dumping yard near to the Tirupati city.
4. Visit a local village and find a barren land and make the land into a useful land by planting plants or providing the soil and fertilizers required to improve the soil.
5. Visit a local zoological park and identify the species variety and variability.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. AnubhaKaushik and Kaushik, C.P., *Perspectives in Environmental Studies*, New Age International (P) Ltd. Publications, 6th Edition, 2018.
2. ErachBarucha, *Environmental Studies,* Orient Blackswan, 3rd Edition, 2021.

REFERENCE BOOKS:

1. Cunningham, W. P. and Cunningham, M. A., *Principles of Environmental Science*, Tata McGraw-Hill Publishing Company, New Delhi, 8th Edition, 2016.
2. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2nd Edition, 2009.
3. Anji Reddy, M., *Text Book of Environmental Science and Technology*, BS Publications, Revised Edition, 2014.
4. Rajagopalan, R., *Environmental Studies*, Oxford University Press, 3rd Edition, 2015.

VIDEO LECTURES:

1. http:// nptel.ac.in/courses/109/104/109104047
2. https://www.youtube.com/watch?v=mIPBPG-5dUw

WEB RESOURCES:

1. https://nptel.ac.in/courses/122102006
2. https://www.flame.edu.in/academics/ug/program-structure/major-minor courses/environmental-studies
3. https://www.tutorialspoint.com/environmental_studies/environmental_studies_environment.htm

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF105001	**BIOMEDICAL WASTE MANAGEMENT**	-	1	2	-	2

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION: This course deals with biomedical waste management and environmental safety. Experimental learning on types of biomedical waste in health care system, waste minimization, General waste control and personal care in health care.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Analyze biomedical waste materials by applying decontamination and disposal techniques to prevent harm to health care professionals.
CO2. Work individually or Teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	1								1
CO2	3	1	2	-	-	-	-	-	-	1
Course Correlation Mapping	**3**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

EXPERIENTIAL LEARNING:

COURSE CONTENT AND LIST OF EXERCISES

Biomedical waste management and environment safety- The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:

1. Definition of Biomedical Waste, Types of waste generated from Health Care Facility
2. Demonstration of various procedures for minimization of Biomedical Waste.
3. Demonstration of Biomedical Waste Segregation, collection, transportation, treatment and disposal (including color coding)
4. Study of Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
5. Study of BMW Management & methods of disinfection
6. Demonstration of Modern Technology for handling BMW
7. Use of Personal protective equipment (PPE)
8. Monitoring & controlling cross-infection (Protective devices)

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOK:

1. Shishir Basarkar "Hospital waste management A guide for self-assessment and review, Jaypee brothers Medical Publication, Edition 1, 2009.
2. R. Radhakrishna "Biomedical waste management" Sumit Enterprises, 2007.

REFERENCE BOOKS:

1. Anantpreet Singh and Sukhjit "Biomedical waste disposal" Haypee Brothers Medical Publishers (P) Ltd, 2012
2. Dr. Shalini Sharma and Prof. SVS Chauhan "An Analysis of Bio-Medical Waste Management" LAP Lambert Academic Publishing, 2010.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=qsclvnPvr18
2. https://www.youtube.com/watch?v=gKSPSKiB9PE
3. https://www.youtube.com/watch?v=SxkZdmBSkWo

WEB RESOURCES:

1. https://byjus.com/current-affairs/biomedical-waste/
2. https://www.aiims.edu/en/departments-and-centers/central-facilities/265-biomedical/7346-bio-medical-waste-management.html

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22PT102006	**HUMAN ANATOMY**	4	1	2	-	6

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on the Macroscopic & Microscopic structure and functions of human body and its Development which is essential for clinical studies.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate the anatomical terms & positions used in clinical practice.

CO2. Apply the anatomical knowledge of bones, muscles, and joints of human body in clinical studies.

CO3. Demonstrate the organs of circulatory, digestive, and respiratory system in human body.

CO4. Analyze the structure and functions of uro-genital system, and endocrine system.

CO5. Identify the structure and functions of nervous system, and sense organs.

CO6. Work independently or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	1	1	-	-	1	1	-	-	1
CO2	3	2	1	-	-	1	1	-	-	1
CO3	3	2	1	-	-	1	1	-	-	1
CO4	3	2	1	-	-	1	1	-	-	1
CO5	3	2	1	-	-	1	1	-	-	1
CO6	3	-	-	-	-	-	-	-	-	1
Course Correlation Mapping	**3**	**2**	**1**	**-**	**-**	**1**	**1**	**-**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE 1: INTRODUCTION TO HUMAN ANATOMY ***(12 Periods)***

Subdivisions of Anatomy, History of Anatomy, Anatomical terms, Positions, Planes& Axis, Movements, Epithelium – Classification, Tissue – Classification, and Applied anatomy.

MODULE 2: SKELETAL, ARTICULATORY AND MUSCULAR SYSTEM ***(12 Periods)***

Skeletal system: Skeleton, Bone - Classification, Young bone, adult bone, Blood supply, Nerve supply, Ossification, Bones of – Head & Neck, Upper limb, Thorax, Vertebral column, Bony Pelvis, and Lower limb; Cartilage & its Types. **Articulatory system:** Joint – Classification, Synovial joint, Joints of – Head & Neck, Upper limb, Thorax, Vertebral column, Pelvis, and Lower limb. **Muscular system**: Muscle – Parts, Types, Structure, Architecture, Nomenclature, Nerve supply, Muscle action, Muscles of – Head & Neck, Upper limb, Thorax, Vertebral column, Pelvis, and Lower limb and Applied anatomy.

MODULE 3: CIRCULATORY SYSTEM, DIGESTIVE SYSTEM, AND RESPIRATORY SYSTEM ***(12 Periods)***

Circulatory system: Circulation – Components, Types, Anastomoses, End – Arteries, Heart & Pericardium, Major blood vessels; Lymphatic system - Components, Major Lymphatic vessels; Lymphoid organs - Lymph node, Spleen, Thymus, and Palatine tonsil; Reticulo-Endothelial system, and Applied anatomy. **Digestive system:** Oral cavity, Teeth, Tongue, Salivary glands, Pharynx, Oesophagus, Stomach, Small intestine – Duodenum, Jejunum, Ileum, Liver & Gall bladder, Extra-Hepatic Biliary Apparatus Pancreas, Large Intestine – Caecum, Appendix, Colon, Rectum & Anal canal and Applied anatomy. **Respiratory system:** External Nose, Nasal cavity, Paranasal air sinuses, Nasopharynx, Oropharynx, Larynx, Trachea, Pleura, Lungs, Diaphragm, and Applied anatomy.

MODULE 4: URO-GENITAL AND ENDOCRINE SYSTEM ***(12 Periods)***

Urinary system: Organs - Kidney, Ureter, Urinary bladder, and Urethra; Skin & Its Appendages - Thick skin, and Thin skin, Hair, and Nail. **Male reproductive system: Organs –** Scrotal sac &Testis, Epididymis, Vas deferens, Seminal vesicle, Prostate, and Urethra. **Female reproductive system: Organs -** Ovary, Uterus, Fallopian tube, Cervix, Vagina, and Mammary gland. **Exocrine glands:** Salivary glands, Lacrimal gland, Pancreas, Liver, Mammary gland, Sweat and Sebaceous gland. **Endocrine glands:** Hypothalamus, Pineal gland, Pituitary gland, Thyroid gland, Parathyroid gland, Pancreas, Adrenal gland, and Gonads.

MODULE 5: NERVOUS SYSTEM AND SENSE ORGANS **(12 Periods)**

Nervous system: Neuron, Neuroglia, Classification, Autonomic Nervous system; Brain - Cerebrum, Cerebellum, Basal Ganglia, Limbic system, Thalamus, Hypothalamus, Ventricles, Cerebro-Spinal fluid, and Spinal cord. **Sense organs**: Tongue – Taste pathway, Nose – Olfactory pathway, Eye – Visual pathway, Ear – Auditory pathway.

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of anatomical terms, positions, planes, axis, movements, and tissues.
2. Demonstration of bones, joints, and muscles in human body.
3. Demonstration of heart, blood vessels, lymphoid organs, digestive system, and respiratory system in human body.
4. Demonstration of organs of urogenital system, and endocrine system in human body.
5. Demonstration of parts of nervous system, and sense organs in human body.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

BOOKS:

1. B.D Chaurasia's Human Anatomy-Regional and applied; CBS publishers, Vol 1,2,3,4 Edition 9(2022).
2. Snell [Richard S], Clinical Anatomy for medical students; 6th Edition, 2021
3. Inderbir Singh's book of Anatomy; Vol 1,2,3, 3rd Edition, 2020
4. Inderbir Singh's Text book of Human Histology, Jaypee Publishers, 10th Edition, 2022
5. Inderbir Singh's Text book of Human Embryology, Jaypee Publishers, 12th Edition, 2022

REFERENCE BOOKS

1. A. k. Datta, Essentials of human anatomy; Current books international publishers; Volume: 1,2,3,4; 10th Edition 2019.
2. Richard Tunstall and Susan Standring, Gray's Anatomy - The anatomical basis of clinical practice, Elsevier publishers, 42nd Edition 2020.
3. Rachel koshi, Cunningham's manual of practical Anatomy, Oxford University Press publishers, Volume - 1,2,3; 16thEdition 2017.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=UzPafAvoYH0.
2. https://www.youtube.com/watch?v=Nr6a7kqh4ZM
3. https://www.youtube.com/watch?v=bL_fg1St7Cg
4. https://www.youtube.com/watch?v=aV1cNPJAByo
5. https://www.youtube.com/watch?v=_l-NS4Q3bv0
6. https://www.youtube.com/watch?v=upqjWIElahs
7. https://www.youtube.com/watch?v=849IL6HSMd4
8. https://www.youtube.com/watch?v=mcmUWYzhdzA
9. https://www.youtube.com/watch?v=IvK-UGOI5ZQ

10. https://www.youtube.com/watch?v=-sDoYJOQMFw

WEB RESOURCES:

1. https://medicostimes.com/mbbs-first-year-books-pdf/
2. https://worldofmedicalsaviours.com/anatomy-books-pdf/
3. https://enarm.com.mx/catalogo/31.pdf
4. https://www.freebookcentre.net/medical_books_download/Clinical-Anatomy.html
5. https://www.academia.edu/42079859/ESSENTIAL_CLINICAL_ANATOMY
6. https://emedicodiary.com/book/view/47/kulkarni-clinical-anatomy-a-problem-solving-approach
7. https://textbookequity.org/Textbooks/anatomy+phys+vol2a.pdf
8. https://openstax.org/details/books/anatomy-and-physiology
9. https://www.pdfdrive.com/clinical-anatomy-books.html
10. https://www.goodreads.com/en/book/show/51790563

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22PT102007	**HUMAN PHYSIOLOGY**	4	1	2	-	6

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on Basic structure and detailed physiology of cell, body fluids, muscles, digestive system, respiratory system and renal system.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the basic concepts of cell physiology, haematology and nerve muscle physiology.

CO2. Analyse the various mechanisms of digestive and renal system.

CO3. Analyse various mechanisms of hormonal action.

CO4. Understand the concepts of cardiovascular and respiratory physiology.

CO5. Understand the nervous physiology and its significance.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	2	-	-	-	-	-	-
CO2	3	-	-	1	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-
CO5	3	2	-	2	-	-	-	-	-	-
CO6	3	-	-	-	-	-	3	3	-	3
Course Correlation Mapping	**3**	**2**	**-**	**2**	**-**	**-**	**3**	**3**	**-**	**3**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE 1: GENERAL PHYSIOLOGY, BLOOD AND NERVE MUSCULE PHYSIOLOGY ***(12 Periods)***

Concept of Homeostasis, Cell structure and functions, Transports across membranes, Body fluid volumes, compartments and composition, Blood composition and functions, Plasma proteins – Types and functions, Erythrocytes – functions, Erythropoiesis ,anaemia's, Leucocytes – classification and functions, Platelets – morphology and functions, Blood coagulation – Mechanism and name of anticoagulants, Blood groups – Basis of ABO & Rh grouping, Erythroblastosis Fetalis. Muscles – Classification & structure of striated, non-striated &cardiac muscle, Neuromuscular junction& Transmission, Mechanism of skeletal muscle contraction

MODULE 2: DIGESTIVE SYSTEM AND EXCRETORY SYSTEM ***(12 Periods)***

Salivary glands, functions of saliva, Parts of stomach, composition & functions of gastric juice, Pancreatic Juice – composition &functions, Bile – composition & functions of bile &bile salts, Functions of Small intestine &large intestine, Kidney: Basic physiological anatomy (Including JGA), Nephron : structure, types and functions, Formation of urine –GFR, Reabsorption &secretion, Micturition Reflex, Dialysis – Principle, types, Structure & Functions of skin.

MODULE 3: ENDOCRINE SYSTEM AND REPRODUCTIVE SYSTEM ***(12 Periods)***

Hypothalamo-hypophyseal interrelationship, Posterior pituitary hormones and its actions, Anterior pituitary hormones, Growth hormone –Actions ,Dwarfism, gigantism, acromegaly, Thyroid hormones –Actions, Cretinism, Myxoedema, Grave's disease (clinical features), Parathyroid hormones – Functions, Tetany, Insulin, Glucagon's – Actions, Diabetes mellitus, Adrenal medullary hormones &their actions, Adrenal cortex hormones & their actions., Male reproductive organs – Spermatogenesis, Testosterone actions, Female reproductive organs – menstrual cycle (endometrial and ovarian cycles) and its hormonal control, Contraceptive methods in male and female

MODULE 4: RESPIRATORY AND CARDIOVASCULAR SYSTEM ***(12 Periods)***

Basic physiological anatomy, Surfactant, Mechanics of respiration, Oxygen transport, Carbon-di-oxide transport, Nervous and chemical regulation, Pulmonary function tests, Basic physiological anatomy, innervations of heart, ECG – normal waves, intervals and their significance, Cardiac cycle – mechanical events, Heart sounds, Blood pressure – Definition, measurement, normal values, factors maintaining BP Regulation.

MODULE 5: NERVOUSSYSTEM AND SPECIAL SENSES ***(12 Periods)***

Structure of neuron, neuroglial cells, synapse and transmission across it, Reflex – Components of reflex arc, examples, Functions of ascending tracts – anterior, lateral spino-thalamic tracts, Dorsal column, Functions of Cortico-spinal (Pyramidal) tract-Descending tract, Functional areas of cerebral cortex, Functions of basal ganglia, thalamus, hypothalamus, limbic system and cerebellum, Receptors for various special senses.

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Study of Microscope and its uses
2. Collection of blood sample
3. Determination of RBC count
4. Determination of WBC count
5. Differential leukocyte count
6. Estimation of haemoglobin
7. Determination of blood groups
8. Determination of bleeding time clotting time
9. Determination of ESR
10. Determination of PCV
11. Clinical Examination of cardiovascular system
12. Clinical examination of reflexes
13. Clinical examination respiratory system
14. Determination of Pulse
15. Demonstration of Blood Pressure

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES
BOOKS

1. Guyton & Hall, Text book of Medical Physiology, 13th Edition, Saunders publisher, 2015.
2. K Sembulingam, Essentials of Medical Physiology, 9th Edition, Jaypee Medical Publishers, 2022.
3. G.K. Pal and G.K Pravati, Textbook of Practical Physiology, Orient Longman, 2003

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=xyhbIPSLBsA
2. https://www.youtube.com/watch?v=0f9p9JX4qJk
3. youtube.com/watch?v=JZhJI6rfFzg

WEB RESOURCES:

1. https://books.google.co.in/books?id=CcJvIiesqp8C&lpg=PP1&pg=PP1#v=twopage&q&f=false
2. https://books.google.co.in/books?id=KNpN_jvbmAIC&lpg=PP1&pg=PP1#v=onepage&q&f=false

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22PT101004	**NATIONAL HEALTH CARE DELIVERY SYSTEM**	2	-	-	-	2

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on Health care system, AYUSH, vital events of life and epidemiology in India.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand the basic concepts in health care delivery system.

CO2 Acquire knowledge on various AYUSH systems.

CO3 Analyse the Vital events of life and its impact on demography.

CO4 Understand the principles and methods of epidemiology.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	1	-		-	-	-
CO2	3	1	-	-	2	-	1	-	-	-
CO3	3	2	-	-	1	-	1	-	-	-
CO4	3	-	-	-	1	-		-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**-**	**1**	**-**	**1**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE 1: National Healthcare delivery system ***(07 Periods)***

Healthcare delivery system in India at primary, secondary and tertiary care Community participation in healthcare delivery system, Health system in developed countries, Private Sector

MODULE 2: AYUSH system of medicine ***(08 Periods)***

Introduction to Ayurveda, Naturopathy, Unani, Siddha, Homeopathy, Need COURSE for integration of various system of medicine.

MODULE 3: Demography and Vital Statistics ***(07 Periods)***

Demography & its concept, Vital events of life & its impact on demography, Significance and recording of vital statistics, Census & its impact on health policy.

MODULE 4: National Health Policies ***(08 Periods)***

National Health Mission, National Health Policy Issues in Health Care Delivery System in India achievements and constraints in various National Heath Programme. National Health Programme-Background objectives, action plan, targets, operations,

Total Periods: 30

EXPERIENTIAL LEARNING

1. Demonstration of various levels of health care system.
2. Presentation of health care programs.
3. Illustration on ayush system of medicine and it's practice.
4. A clinical overview on demography and vital statistics.
5. A clinical based epidemiological study and survey of communicable and non-communicable diseases.

Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

BOOKS:

1. Francis, Hospital Care Management, Jones & Bartleft Learning, Edition 4, 2019.
2. Sharon B .Buchbinder, Introduction to Health Care Management, Jones & Bartleft Learning, Edition 2, 2011.
3. Fandis S, Health Service Management, Analysis& Management, Wasworth publishing, Edition 2, 2019.

VIDEO LECTURES:

1. https://youtu.be/It_cV56Dxtk
2. https://youtu.be/VIrdH_3RKKk

WEB RESOURCES:

1. https://library.medschl.cam.ac.uk/e-books/
2. https://www.ncbi.nlm.nih.gov/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102003	**MEDICAL BIOCHEMISTRY**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on basic concepts of Biochemistry and understand the structural, functional and metabolic properties of biomolecules.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the Basic knowledge of carbohydrates and lipids and its metabolisms

CO2. Acquire basic knowledge on proteins and DNA structure

CO3. Analyse the functional and structural concepts of Vitamins and Minerals

CO4. Analyze different types of enzymes and nutrients

CO5. Understand the nature and types of Acid base Balance and Clinical Chemistry

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	1	-	-	-	-
CO4	3	2	-	2	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-
CO6	3	-	-	1	-	-	-	-	-	2
Course Correlation Mapping	**3**	**2**	**-**	**1**	**-**	**1**	**-**	**-**	**-**	**2**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE 1 CARBOHYDRATE AND LIPIDS ***(12 Periods)***

Introduction, Cell structure, Cell membrane structure and function, Carbohydrate Chemistry – Definition, general classification with examples, Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides. Metabolism of carbohydrates Lipid Chemistry – Definition, general classification and functions of Lipids, Definition, classification, properties and functions of Fatty acids, Triacylglycerol, Phospholipids, Cholesterol, Essential fatty acids and their importance, Lipoproteins: Definition, classification, properties, Sources and function Ketone bodies. Metabolism of lipids.

MODULE 2: PROTEINS AND NUCLEIC ACID ***(10 Periods)***

Amino-acid Chemistry – Amino acid chemistry: Definition, Classification, Peptide bonds, Peptides: Definition, biologically important peptides, Protein chemistry: Definition, Classification, Functions of proteins, properties and structure of proteins. Metabolisms Proteins. Nucleotide and Nucleic acid Chemistry - Nucleic acids: Purines and pyrimidine-Structure of DNA – Watson & Crick model of DNA Structure of RNA – Types of RNA

MODULE 3: VITAMINS AND MINERALS ***(10 Periods)***

Fat soluble vitamins(A,D,E,K) – Water soluble vitamins – B-complex vitamins. Definition, classification - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity. Mineral -Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper.

MODULE 4: ENZYMES AND NUTRITION ***(08 Periods)***

Enzymes – Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity, Enzyme inhibition and significance, Isoenzymes, Diagnostic enzymology (clinical significance of enzymes) Nutrition – Introduction, Importance of nutrition Calorific values, Respiratory quotient Definition, and its significance Energy requirement of a person - Basal metabolic rate: Definition, Normal values, factor affecting BMR Special dynamic action of food. Balanced diet, Nutritional disorders. Marasmus – Kwasoirkar

MODULE 5: ACID BASE BALANCE AND CLINICAL CHEMISTRY ***(05 Periods)***

Acid-Base balance – Definition of Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system Role of lungs and kidneys in acid base balance, Acid base imbalance. Clinical Biochemistry - Normal levels of blood and urine constituents, Relevance of blood and urine levels of Glucose, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

QUALITATIVE TESTS OF MONOSACCHARIDES (GLUCOSE AND FRUCTOSE)

1. Molisch's test
2. Fehling's test
3. Benedict's test
4. Seliwanoff's test

QUALITATIVE TESTS OF LIPIDS

5. *Solubility tests*
6. *Emulsification tests*
7. *Saponification tests*

QUALITATIVE TESTS OF PROTEINS

8. Isoelectric precipitation tests
9. Heat coagulation tests

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. U. Satyanarayana, U. Chakrapani, Biochemistry, Elsevier, Edition 3, 2020.
2. Vasudevan DM, Textbook of Biochemistry for Medical Students, Jaypee Brothers Medical Publishers, Edition 1, 2019
3. Indumati V, Sowbhagya Lakshmi, Integrated Textbook of Biochemistry, Paras Medical Publishers, Edition 1, 2021.
4. Naik Pankaja, Essentials of Biochemistry, Jaypee Brothers Medical Publishers, 3rd Edition, 2017.
5. Agrawal Poonam, Concepts In Biochemistry With Clinical Approach For Undergraduate Medical Students, CBS Publishers & Distributors Pvt Ltd, Edition 1, 2020.

REFERENCE BOOKS:

1. MN Chatterjee and Rana Shinde, Textbook of Medical Biochemistry, JPB, Edition 8, 2012.
2. Denise R Ferrier, Lippincott's Illustrated Reviews Biochemistry, Lippincot Williams and Wilkins, Edition 7, 2016
3. Prasad R Manjeshwar, Textbook of Biochemistry for Physiotherapy Students, Sheetal Distributors, Edition 1, 2020.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=F59RwK9hya8
2. https://www.youtube.com/watch?v=OKLxwCdkBn8
3. https://www.youtube.com/watch?v=jcz99_-JcZ8

WEB RESOURCES:

1. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_science_students/medicalbiochemistry.pdf
2. https://www.qmul.ac.uk/library/media/library/using-the-library/media-folder-images-library/Principles-Of-Biochemistry-Introductory-Series.pdf
3. https://rajneeshrajoria.weebly.com/uploads/4/9/0/6/49069889/biochemistry_bicm101.pdf

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102001	**OPTICAL PHYSICS**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on 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 OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the nature of light.

CO2. Analyse the light intensity and law birefringence

CO3. Understand various concept of coherence

CO4. Apply resolution and photometric techniques

CO5. Acquire basic knowledge on radiometry

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	1	-	-	-	-	-	-
CO2	3	-	-	1	-	-	-	-	-	-
CO3	3	-	-	1	-	-	-	-	-	-
CO4	3	-	-	1	-	-	-	-	-	-
CO5	3	2	-	2	-	-	-	-	-	-
CO6	3	-	-	1	-	-	-	-	-	3
Course Correlation Mapping	**3**	**2**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**3**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module1: NATURE OF LIGHT ***(09 Periods)***

Nature of light – light as electromagnetic oscillation – wave equation; ideas of sinusoidal oscillations – simple harmonic oscillation; transverse nature of oscillation; concepts of frequency, wavelength, amplitude and phase.

MODULE 2: LIGHT SOURCES, INTENSITY AND LAWS AND INTRODUCTION TO BIREFRIGENCE ***(09 Periods)***

Sources of light; Electromagnetic Spectrum. Polarized light; linearly polarized light; and circularly polarized light. Intensity of polarized light; Malus' Law; polarizers and analyzers; Methods of producing polarized light; Brewster's angle Birefringence; ordinary andextraordinary rays.Relationship between amplitude and intensity.

MODULE 3: INTERFERENCE ***(09 Periods)***

Coherence- interference; constructive interference, destructive interference; fringes; fringe width. Double slits, multiple slits, gratings. Concept of Diffraction by a circular aperture; Airy's disc Resolution of an instrument (telescope, for example); Raleigh's criterion Concept of Diffraction by a circular aperture; Airy's disc.

MODULE 4: RESOLUTION OF INSTRUMENT ***(09 Periods)***

Resolution of an instrument (telescope, for example); Raleigh's criterion and efficacy curves; photometric units. Scattering; Raleigh's scattering; Tyndall effect. Fluorescence and Phosphorescence Basics of Lasers – coherence; population inversion; spontaneous emission; Einstein's theory of lasers.

MODULE 5: RADIOMETRY ***(09 Periods)***

Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and efficacy curves; Photometric units. Inverse square law of photometry; Lambert's law. Other units of light measurement; retinal illumination; Trolands

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Gratings – determination of grating constant using Sodium vapour lamp; determination of wavelengths of light from Mercury vapour lamp
2. Circular Apertures – measurements of Airy's disc for apertures of various sizes
3. Verification of Malus' Law using a polarizer – analyzer combination
4. Demonstration of birefringence using Calcite crystals
5. Measurement of the resolving power of telescopes
6. Newton's rings
7. Demonstration of fluorescence and phosphorescence using crystals and paints

Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. Hecht, Optics-Hecht, Pearson India, International Edition 4, 2020.
2. Ernst Mach, The principles of Physical optics-Ernst mach, Dover Publications Inc, Edition 1, 2003.
3. Akhmanov & S. Yu. Nikitin, Physical optics-S.A, Clarendon Press, Edition 1, 2022.
4. John McClure Stone, Radiation & Optics, McGraw-Hill Inc, Edition 1, 1963.
5. David A. Atchison, George Smith, The eye & visual optical Instruments, Cambridge University Press, Edition 1, 1997.

REFERENCE BOOKS:

1. Subrahmanyan N, BrijLal, A text book of Optics, S. Chand Co Ltd, Edition 1, 2012.
2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, Edition 1, 1998.
3. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, Edition 1,, 2002

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=RM7Ijt9q4_I
2. https://www.youtube.com/watch?v=rmg1XyOSAk0
3. https://www.youtube.com/watch?v=2gQWfe2VJMo

WEB RESOURCES:

1 https://www.vedantu.com/iit-jee/malus-law

2 https://www.sciencefacts.net/newtons-rings.html

3 http://hyperphysics.phy-astr.gsu.edu/hbase/phyopt/biref.html

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102002	**GEOMETRICAL OPTICS – I**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on study of light and its behaviour as it propagates in a variety of media. Specifically, the phenomena of reflection and refraction of light at boundaries between media and subsequent image formation will be dealt with in detail. Reflections at plane and spherical surfaces and refractions at plane, spherical, cylindrical.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand basic principles of nature of the light

CO2. Analyse various mirrors images

CO3. Apply various nature of prism for designing the lens.

CO4. Apply formulae to calculate the sight of the eyes.

CO5. Apply Prentice's rule for understanding the image properties

CO6. Work individually or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	2	-	-	-	-	-	-
CO2	3	-	-	1	-	-	-	-	-	-
CO3	3	-	-	2	-	-	-	-	-	-
CO4	3	-	-	3	-	-	-	-	-	-
CO5	3	-	-	2	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	2
Course Correlation Mapping	**3**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**2**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module1: NATURE OF LIGHT ***(10 Periods)***

Nature of light – light as electromagnetic oscillation; ideas of sinusoidal oscillations; amplitude and phase; speed of light in vacuum and other media; refractive index. Wavefronts – spherical, elliptical and plane; Curvature and vergence; rays; convergence and divergence in terms of rays and vergence; vergence at a distance Refractive index; its dependence on wavelength, Fermat's and Huygen's Principle – Derivation of laws of reflection and refraction (Snell's law) from these principles. Plane mirrors – height of the mirror; rotation of the mirror Reflection by a spherical mirror – paraxial approximation; sign convention; derivation of vergence equation.

MODULE 2: DIFFERENT TYPES OF MIRROR ***(08 Periods)***

Imaging by concave mirror, Imaging by convex mirror. Reflectivity; transmittivity, Snell's Law; refraction at a plane surface Glass slab; displacement without deviation; displacement without dispersion. Thick prisms; angle of prism; deviation produced by a prism; refractive index of the prism. Prisms; angular dispersion; dispersive power; Abbe's number. Definition of crown and flint glasses; materials of high refractive index.

MODULE 3: THE PRISM ***(09 Periods)***

Thin prism – definition; definition of Prism diopter; deviation produced by a thin prism; it dependence on refractive index. Refraction by a spherical surface; sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; sag formula. Paraxial approximation; derivation of vergence equation. Imaging by a positive powered surface Imaging by a negative powered surface.

MODULE 4: VERGENCE AT DISTANCE FORMULA ***(09 Periods)***

Vergence at a distance formula; effectivity of a refracting surface. Definition of a lens as a combination of two surfaces; different types of lens shapes. Image formation by a lens by application of vergence at a distance formula; definitions of front and back vertex powers; equivalent power; first and second principal planes/points; primary and secondary focal planes/points; primary and secondary focal lengths. Newton's formula; linear magnification; angular magnification and Nodal Planes.

MODULE 5: THIN LENS AND THICK LENS ***(09 Periods)***

Thin lens as a special case of thick lens; review of sign convention Imaging by a thin convex lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions Prentice's Rule, System of two thin lenses; review of front and back vertex powers and equivalent power, review of six cardinal points. System of more than two thin lenses; calculation of equivalent power using magnification formula

Total Periods 45

EXPERIENTIAL LEARNING

LISTOFEXPERIMENTS:

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

Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

BOOKS:

1. M Swaminathan, Hand book of Food and Nutrition, Bangalore printing & publishing Co.Ltd, Bangalore, Edition 5, 2004.
2. Gopalan, BV Rama Sastri, SC Balasubramanian, Nutritive Value of Indian Foods, National Institute of Nutrition, ICMR, Standard Edition, 2004.
3. Frank Eperjesi & Stephen Beatty, Nutrition and the Eye A practical Approach, Elsevier Butterworth- Heinemann, Edition, 2006.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=7JGqLC0OifY
2. https://www.youtube.com/watch?v=kIRn1AIEd38
3. https://www.youtube.com/watch?v=EV_nUsAT4ZI&t=183s

WEB RESOURCES:

1. https://byjus.com/jee/prism/
2. https://www.toppr.com/guides/physics/light-reflection-and-refraction/image-formation-by-spherical-mirrors/
3. //www.aao.org/Assets/e7131c2d-217b-43bb-937a64976243356/637151349560970000/bo1r-pdf?inline=1

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22LG101402	**తెలుగు**	2	-	-	-	2

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION: తుమ్మల సీతారామమూర్తి-**ఎక్కట్లు,** తిక్కన-**నాడీజంఘోపాఖ్యానం,** పోతన-**ధ్రువోపాఖ్యానం,** దువ్వూరి రామిరెడ్డి - **కృషీ వలుడు, మరియు తెలుగు వ్యాకరణం మీద అవగాహన.**

COURSE OUTCOMES: కోర్సు విజయవంతంగా పూర్తిచేసిన తర్వాత ,విద్యార్థులు వీటిని చేయగలరు:

CO1. విద్యార్థులలో మానవీయ విలువలు పెరిగి నైతిక వలువలతో జీవించడం

CO2. సమాజంలో మనకు చేతనైన సాయం చెయ్యడం ప్రతి మనిషి బాధ్యత అనే సందేశం

CO3. త్రికరణ శుద్ధితో కృషి చేస్తే ఏదైనా సాధించ వచ్చు అనే సందేశం

CO4. వ్యవసాయ రంగం గూర్చి విద్యార్థులలో అవగాహన కలగడం

CO5. తెలుగు వ్యాకరణం

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

పాఠ్య ప్రణాళిక

Module 1: **ఎక్కట్లు** – తుమ్మల సీతారామమూర్తి ***(06 Periods)***

సత్ప్రవర్తన, సచ్ఛీలత, సన్మార్గం, సమసమానత్వం గూర్చి వివరించడం.

Module 2: **నాడీజంఘోపాఖ్యానం** – తిక్కన ***(06 Periods)***

సహాయం చేసినివారిని మరచి పోరాదు. చేసిన మేలు మరచిన వారి జీవితం ఎంత హీనంగా ఉంటుందో తెలియజేయడం.

Module 3: **ధ్రువోపాఖ్యానం** – పోతన ***(06 Periods)***

ఎటువంటి కష్టాలకు సమస్యలకు కుంగి పోకుండా దీక్షతో పట్టుదలతో కృషితో అనుకున్నది సాధించాలని తెలియజేయడం.

Module 4: **కృషీ వలుడు** – దువ్వూరి రామిరెడ్డి ***(06 Periods)***

సమాజానికి వెన్నెముక అయిన రైతు యొక్క కష్టాలను త్యాగాలను వివరించడం.

Module 5: **సంధులు, సమాసాలు, అలంకారాలు.** ***(06 Periods)***

తెలుగు భాష యొక్క మూలాలను తెలుసుకోవడం.

Total Periods: 30

RESOURCES

TEXT BOOKS:

1. **ఎక్కట్లు – కవి తుమ్మల సీతారామమూర్తి చౌదరి.**
2. **నాడీజంఘోపాఖ్యానం – కవి తిక్కన. (మహాభారతం – శాంతి పర్వం – తృతీయా శ్వాసం – 472 నుండి 511 పద్యాల** వరకు).
3. **ధ్రువోపాఖ్యానం** – కవి పోతన (ఆంధ్ర మాహాభాగవతం – చతుర్థ స్కంధం – 216 నుండి 277 పద్యాల వరకు)
4. కృషీ వలుడు – కవి దువ్వూరి రామిరెడ్డి

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=5jX20h6HWzg
2. https://www.youtube.com/watch?v=FFtPSPByBmk
3. https://www.youtube.com/watch?v=nQHF_pgTfL8
4. https://www.youtube.com/watch?v=IEERKL3Q2Cs

Web Resources:

1. http://teluguvignanamvinodam1.blogspot.com/2021/06/maha-bharatam-in-telugu-pdf-free-download_25.html
2. https://www.freegurukul.org/blog/ramayanam-pdf/

EXPERIENTIAL LEARNING

The experiential learning components will be detailed in CHO.

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT101007	**OCULAR BIOCHEMISTRY**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course typically focuses on giving a basic understanding of Biochemical processes and components related to the eye's structure and function.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the biochemical composition of the cornea, Sources of nutrients crucial for ocular health, metabolic pathways that sustain its functions, and common corneal abnormalities

CO2. Understand functions, composition, and abnormalities of tear film, and do tests for tear film adequacy.

CO3. Explain the biochemical composition, protein types, and metabolic processes in the lens and will understand the link between lens biochemical defects like cataracts, as well as the role of antioxidant mechanisms in Crystalline lens health.

CO4. Learn about the visual pigments found in photoreceptor cells and their role in the visual transduction cascade.

CO5. Gain knowledge of retinal structure, photoreceptor cell metabolism, and functions, with a focus on their biochemical implications in retinal diseases.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	-	-	-	-	-
CO2	3	2	-	1	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-
CO5	3	2	-	1	-	-	-	-	-	-
CO6	3	2	-	2	-	-	-	2	-	-
Course Correlation Mapping	**3**	**2**	**-**	**1**	**-**	**-**	**-**	**2**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE 1 BIOCHEMISTRY OF CORNEA ***(10 Periods)***

Biochemical composition of the cornea, Sources of Nutrients - Oxygen, Glucose, Amino acid, Metabolic pathway in the cornea – Glycolysis, HMP shunt and Corneal Abnormalities.

MODULE 2: TEAR FILM& IT'S BIOCHEMICAL VIEW ***(05 Periods)***

Functions of Tear film, Different layers of Tear film, Chemical composition of tears, Tear film abnormalities and Tests for film Adequacy.

MODULE 3: LENS & IT'S BIOCHEMICAL PROPERTY ***(10 Periods)***

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.

MODULE 4: BIOCHEMISTRY OF THE VISUAL PROCESS ***(10 Periods)***

Photopigments – Rhodopsin & Iodopsin, Chemical nature of Rhodopsin, Visual cycle (Bleaching of Rhodopsin, Transducing cycle and Role of Phosphodiesterase).

MODULE 5: RETINA AND NEUROCHEMISTRY ***(10 Periods)***

Retina structure composition photoreceptor cell metabolism and functions - phagocytosis; Retinal neurochemistry - Monoamines acetylcholine GABA amino acids taurine neuropeptides – Biochemical correlates of retinal diseases.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Present case studies of patients with ocular disorders and have students analyze the biochemical aspects of these cases.
2. Offer free eye screenings and use these opportunities to explain the biochemical aspects of common eye conditions.
3. Teach students how to handle and process these samples for biochemical analysis.
4. Simulate scenarios such as oxidative stress in the retina or the formation of cataracts.
5. Collaborate with local clinics or research facilities to provide students with the opportunity to analyze actual ocular samples, such as tears, vitreous humor, or lens proteins.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. U. Satyanarayana, U. Chakrapani, Biochemistry, Elsevier, Edition 4, 2013.
2. D R Whikehart, Biochemistry of the Eye - Butterworth Heinemann, Pennsylvania, Edition 2, 2003

REFERENCE BOOKS:

1. S. Ramakrishnan, Essentials of Biochemistry and Ocular Biochemistry, Publications Division, Edition 1, 1992
2. Elaine R. Berman Biochemistry of the Eye, Springer, Edition 1, 2013.

VIDEO LECTURES:

1. lens anatomy | structures | physiology and biochemistry | eye ball - YouTube
2. Vitamin A: Steps in Light Detection – Biochemistry | Lecturio - YouTube
3. Special Senses | The Phototransduction Cascade - YouTube

WEB RESOURCES:

1. Ocular Biochemistry - Happy Learning. - UNIT 18 BIOCHEMISTRY OF THE EYE Structure 18 Objectives - Studocu
2. Unit-18.pdf (egyankosh.ac.in)

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102004	**OCULAR MICROBIOLOGY**	2	-	2	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides an in-depth exploration of the microbiological aspects related to ocular health and ocular diseases. It offers a comprehensive understanding of microorganisms that can affect the eye and visual system.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand fundamentals of microbiology and basic laboratory techniques

CO2. Acquire basic knowledge about sterilization and disinfection in relation to ophthalmic practice

CO3. Demonstrate an understanding of different aspects of ocular immunology

CO4. Gain knowledge on various microbial ocular infections and their pathological mechanism

CO5. Acquire knowledge of hospital-borne ocular infections and laboratory diagnostic tests involved in ocular infections

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	1	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-
CO5	3	2	-	2	-	-	-	-	-	-
CO6	3	-	-	-	-	-	-	1	-	-
Course Correlation Mapping	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**1**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module1: INTRODUCTION TO MICROBIOLOGY ***(05 Periods)***

History and scope of Medical Microbiology, Prokaryotic Cell structure and functions; Eukaryotic Cell structure and functions; Overview of Bacteriology. Mycology, Virology and Protozoology, Ocular microbiology- Normal ocular flora; Control of Microbial Growth-Antimicrobial methods and Chemotherapy, Basic Laboratory techniques.

MODULE 2: STERILIZATION IN OPHTHALMIC PRACTICE ***(05 Periods)***

Heat (dry & wet heat steam under pressure autoclaving), radiation, filter, chemicals; control of efficacy of sterilization. Disinfection procedure-glutaraldehyde (2%), chlorhexidine, alcohol, iodine; preventive methods - hand, washing, needle stick/slash policy, methods to disinfect tonometer and Slit lamp biomicroscope; Preventative method in operation theatre attire, caps & masks, hand washing, cleaning procedure.

MODULE 3: OCULAR IMMUNOLOGY ***(05 Periods)***

Innate and adaptive immunity. Hypersensitivity responses Anaphylactic hypersensitivity, cytotoxic hypersensitivity, Complex-mediated hypersensitivity. Delayed hypersensitivity: Autoimmunity, Host parasite relationship

MODULE 4: OCULAR BACTERIOLOGY, MYCOLOGY, VIROLOGY & PARASITOLOGY ***(10 Periods)***

Ocular Bacteriology**:** Ocular Bacterial diseases, Pathological mechanisms, Immunity. Laboratory diagnosis., Ocular Mycology**:** Ocular Mycotic diseases. Laboratory diagnosis., Ocular Virology**:** Ocular Viral infections, Immunity, Laboratory diagnosis., Ocular Parasitology: Acanthamoeba, Toxoplasma. Onchocerciasis, Toxocariasis. Cysticercus cellulose (larval form of Taenia solium), Phthiriasis

MODULE 5: HOSPITAL-BORNE OCULAR INFECTIONS ***(05 Periods)***

Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and postoperative endophthalmitis, conjunctivitis, infections transmitted through corneal transplantations, hepatitis. HIV: high-risk areas and staff: preventive methods. AIDS protocol, infective waste disposal. Laboratory Diagnostic tests involved in ocular Infections Ocular specimens - collection, transportation, processing and reporting on ocular specimens - External ocular Infections; Intraocular infections; Miscellaneous ocular specimens.

Total Periods: 30

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of Sterilization and disinfection procedures and quality control
2. Perform Collection of specimens from the conjunctiva, and lid margin (using sterile cotton swabs). Specimen processing
3. Visit the Lab and orientation to the PCR facility in the diagnosis of ocular infections
4. Demonstration of characterization & Identification microorganism.
5. Perform Staining-Gram staining, Acid fast staining, Spore Staining and Flagella

6. Understand procedure and identification motile bacteria by Hanging drop method

7. Understand Principles of Biochemical tests

8. Demonstrate the Antibiotic sensitivity test

9. Isolation and identification of various fungal strains in the laboratory

10. Video demonstration of collection of specimens from common intraocular specimens (Aqueous humor and Vitreous aspirate) processing and reporting on bacterial and fungal cultures and reporting.

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. P. K Mukherjee, P. Bandyopadya, Ocular Microbiology, Jaypee Brothers Medical Publishers, Edition 1, 2010.
2. C. Rajalakshmi, L. Prajna, Ocular Microbiology, Jaypee Digital, Edition 1, 2010.
3. S. Ramakrishnan and K. N. Sulochana, Manual of Medical Laboratory techniques, Jaypee Brothers Medical Publishers, Edition 1, 2012.

REFERENCE BOOKS:

1. M. J. Pelczar, E.C.S Chan, N. R. Krieg, Microbiology, Tata McGraw-Hill, Edition 5, 1916
2. Finegold and E. J. Baron, Diagnostic Microbiology (DM), St. Louice Mosby publishers, Edition 9, 1994.
3. K. J. Ryan, C. G. Ray, Sherris Medical Microbiology: An Introduction to Infectious Diseases, McGraw Hill Professional, Edition 4, 2003.

VIDEO LECTURES:

1. https://www.youtube.com/youtube.com/OphthalmicEducation
2 https://www.youtube.com/live/RsYFvtI_eMs?si=HwG87LCp2xMTdKYQ
3. https://youtu.be/WlcSxqlUTMw?si=OuIGzvXmdeUuC5YI

WEB RESOURCES:

1. http://www.limm.org/documents/ocular.pdf
2. http://v2020eresource.org/content/files/equip sterilise.pdf
3. http://elte.prompt.hu/sites/default/files/tananyagok/PracticalMicrobiology/ch02.html

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT101008	**OCULAR ANATOMY**	2	1	-	-	3

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION: This course provides a comprehensive exploration of the anatomical structures and functions of the human eye and its related visual pathways.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the processes and milestones that culminate in the creation of the human eye and its associated structures.
CO2. Comprehend the structure of the eyebrows, eyelids, and conjunctiva, collectively forming the ocular surface.
CO3. Describe the anatomy of the orbit and the lacrimal apparatus.
CO4. Explain the structural peculiarities of the Cornea, Sclera, lens, and Anterior chamber
CO5. Understand Structures of the uvea, retina, and Visual Pathway.
CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-
CO6	3	2	-	3	-	-	-	1	-	-
Course Correlation Mapping	**3**	**2**	-	**3**	**-**	**-**	**-**	**1**	**-**	-

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE 1: EMBRYOLOGY ***(03 Periods)***

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, ciliary body, iris, vitreous. Development of accessory structures of eyeball – eyelids, lacrimal apparatus, extra-ocular muscles, orbit. Milestones in the development of the eye.

MODULE 2: ANATOMY OF THE OCULAR ADNEXA & GLANDS ***(05 Periods)***

Eyebrows: Gross Anatomy, Structure, Blood and Nerve Supply of eyebrows., Lids: Structures of the lids (Skin, Subcutaneous Areolar Layer, Layer of Striated muscle, Submuscular Areolar Tissue, Fibrous Layer, Conjunctiva), Glands of the Lids (Meibomian Glands, Glands of Zeiss and Glands of Moll), Blood Supply of the Lids, Lymphatic Drainage of the Lids, Nerve Supply of the Lids., Conjunctiva: Parts of the conjunctiva (Palpebral Conjunctiva, Bulbar Conjunctiva, Conjunctival Fornix), Caruncle, Plica Semilunaris, 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.

MODULE 3: ORBIT &THE LACHRYMAL APPARATUS ***(04 Periods)***

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 (oculomotor, Trochlear, Abducent, Trigeminal, facial nerves - their functional components, course & distribution, clinically applied aspects)., The lachrymal apparatus: Lachrymal gland, Palpebral part, Ducts of lachrymal gland, structure of the lachrymal gland, Blood supply & nerve supply of the lachrymal gland, lachrymal passages.

MODULE 4: CORNEA, SCLERA, LENS & ANTERIOR CHAMBER ***(09 Periods)***

Cornea: Layers & peculiarities, Blood supply & nerve supply of cornea Corneal Transparency., Sclera &Limbus: Scleral Apertures, microscopic structure, Nerve Supply, Surgical and anatomical Limbus, Cataract incision., Lens & Zonules: Structure. of lens (capsule, Ant. Epithelium, lens fibers structured & zonal arrangement). Ciliary zonules: structure gross appearance, Arrangement of zonules fibers., Anterior chamber and it's angle: angle of the anterior chamber, Trabecular meshwork, Canal of Schlemm, Schwalbe's line, Drainage of aqueous humor.

MODULE 5: UVEA, VITREOUS, RETINA & VISUAL PATHWAY **(09 Periods)**

Uveal Tract & its vascular supply: Iris- macroscopic & microscopic appearance, Anatomy of sphincter & Dilator muscle., ciliary body- Macroscopic structure. Anatomy of Ciliary muscle & its types., choroid- Macroscopic structure., Blood supply to uveal structure- short & Long Posterior artery & Anterior Artery. Venous drainage., Vitreous: General Features, Structure of vitreous (Hyaloid membrane, cortical vitreous, medullary vitreous) , Attachments, Base of the vitreous., Retina & its vascular supply: Gross anatomy, microscopic structure, Blood retinal barrier, Blood Supply., Visual Pathway: Anatomy of Different components of Visual pathway, Lesions of Visual pathway, Arrangement of nerve fibers, Blood supply of visual pathways (Arterial circle of wills & its branches).

Total Periods: 30

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of Ocular anatomical terms, positions, movements, and tissues
2. Identification of projection slides of Ocular Anatomy.
3. Identification of structure & related viva.

(Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES BOOKS:

1. A K Khurana and Indu Khurana, Anatomy and Physiology of Eye, CBS, Edition 1, 2017.
2. Albert Alm, James Ver Hoeve, Adler's Physiology of the Eye, Saunders, Edition 11, 2011.

VIDEO LECTURES:

1. http://www.tedmontgomery.com/the_eye
2. http://eyeguru.org/
3. The Structure of the Eye (video) | Khan Academy

WEB RESOURCES:

1. List View: Anatomy: The Eyes Have It (umich.edu)
2. Atlas of Ophthalmology (atlasophthalmology.net)
3. Orbits and eyes Illustrations: normal anatomy| e-Anatomy (imaios.com)
4. Bassett Anatomy (Collection of Stereoscopic Images of Human Anatomy) - Lane Medical Library - Stanford University School of Medicine
5. Welcome To Netter Images

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102003	**OCULAR PHYSIOLOGY**	2	-	2	-	3

Pre-Requisite

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This Course typically focus on the knowledge and understanding students are expected to gain regarding the functioning of the visual system and the physiological processes related to vision

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Identify and describe the histology of all three coats of the eyeball and its functions.

CO2. Understanding the concepts of the protective mechanism of the eye-lacrimal system and extraocular muscles

CO3. Understanding the concepts of physiology of vision, visual acuity, neurophysiology

CO4. Gain the knowledge on concepts of brain's interpretations of visual stimuli, visual acuity, color vision, depth perception, and visual field processing

CO5. Understanding how the visual cortex functions and interprets electrophysiological tests

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	-	-	-	-	-
CO2	3	3	-	1	-	-	-	-	-	-
CO3	3	2	-	2	-	-	-	-	-	-
CO4	3	3	-	1	-	-	-	-	-	-
CO5	3	3	-	1	-	-	-		-	-
CO6	3	-	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**3**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE 1: COATS OF THE EYEBALL ***(12 Periods)***

Cornea: introduction, histology, Corneal transparency and its theories, hydration and its regulation, Corneal vascularization; Uveal tissue: introduction. Iris (Pupil – Normal pupil, Physiological changes in pupil size (Isocoria, Pupillary unrest, Hippies). Pupillary Light reflex, Near reflex, Darkness reflex, Psycho sensory reflex, Lid closure reflex; Uveal meshwork. Uveo-scleral drainage. Schlemm's canal switch; Lens & Accommodation: introductions, function, transparency, Lens culture, Age related changes, Cataract, far point and near point, Mechanism of accommodation and its theories, Stimulus for accommodation, Ocular changes in accommodation, Nervous mechanism for accommodation; Aqueous humor: Formation, Drainage & circulation, Rates of production & flow, Functions, intra-ocular pressure regulation; Vitreous Humor: Composition & distribution & function; Retina: Retinal structural physiology, function; Optic Nerve: Physiology of the optic nerve. Papilledema of the optic nerve. Optic atrophy; Ocular Circulation: Vascular structure of the eye – ocular circulation and its regulation, blood-ocular barrier.

MODULE 2: PROTECTIVE MECHANISM AND OCULOMOTOR SYSTEM ***(06 Periods)***

Protective Mechanism of the eye: Blinking muscles, blinking reflexes; Lacrimation: Lacrimal glands, Pre corneal tear film & Tear film dynamics (secretion, formation, retention & redistribution, displacement phenomena, evaporation from tear film, drying & breakup of the tear film, dynamic events during blinking, elimination of tear.) The ocular motor system: Extraocular muscles' function & nerve supply, Physiology of ocular movement (position of gaze, Fick's axes) Ocular Movement (monocular and Binocular).

MODULE 3: PHYSIOLOGY OF VISION ***(06 Periods)***

Vision – general aspects of sensation, Visual acuity – visual angle, Components of Visual acuity (Minimum visible, Resolution, Recognition Hyperacidity, Factors affecting, Measurement of visual acuity, refractive errors; Visual perception – Higher integrative activity, Binocular perception, stereoscopic depth perception. b. Neurophysiology of perception – Higher visual pathways (primary visual Pathway to cerebral center, Lateral Geniculate body, non-geniculate targets for retinofugal input, visual center) c. Neurophysiology of perception – Spatial analysis, Double pathway to higher visual centers.

MODULE 4: COLOR AND CONTRAST ***(04 Periods)***

Color vision: Physiological, Photochemical & neurological basis of color vision b. Electrophysiology of color vision c. Granit's modulator and dominator theory, Purkinje phenomenon. Young-Helmholtz theory d. Types of color defects e. Color blindness f. Neural analysis., Contrast Sensitivity: Types- (spatial & Temporal contrast sensitivity), Neural Mechanism, Measurement of contrast sensitivity (Arden gratings, Cambridge low contest gratings, Pelli – Robson chart)

MODULE 5: ELECTROPHYSIOLOGY ***(02 Periods)***

Electrophysiology: geniculate cortex, Retinal projection, Detailed idea about visual cortex & function of visual cortex; Electrodiagnostic tests – ERG, EOG, VEP.

Total Periods: 30

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. LIDS: Observation of lashes and eyebrows under magnification, Measurement of the palpebral fissure- vertical and horizontal Rate of blinking, Observation-Menace and dazzle reflex-Aural blinking
2. TEARS: Observation of the tear film and marginal fear strip Observation of tear glands and puncta, Tear break up time, Schirmer's test, Syringing ROPLAS
3. EXTRA OCULAR MUSCLES: Assessment of the action of LPS, Assessment of ocular motility (Ductions, versions, and vergence)
4. CORNEA: Examination of Cornea, Measurement of corneal diameter-Horizontal visible iris diameter (HVID), To test for corneal sensitivity
5. IOP: Tonometry
6. IRIS and PUPIL: Examination of the iris, Measurement of pupillary diameter, Assessing pupillary reflexes
7. LENS: Examination of the crystalline lens
8. Stereopsis
9. COLOR VISION: A screening test for detecting color vision defects

(Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES BOOKS:

1. A K Khurana and Indu Khurana, Anatomy and Physiology of Eye, CBS, Edition 1, 2017.
2. Albert Alm, James Ver Hoeve, Adler's Physiology of the Eye, Saunders, Edition 11, 2011.

VIDEO LECTURES:

1. https://youtu.be/fYwm4Ccj4Bs?si=1GYOdS7GvpHofH2S
2. https://youtu.be/-bJQ9aOEECU?si=UDV2gy-mIxc7miy8
3. https://youtu.be/_xKbjYBnHhc?si=TLQOYBhWBnck9CYN

WEB RESOURCES:

1. Statpearls -https://www.ncbi.nlm.nih.gov/books/NBK470322/
2. https://www.aao.org/eye-health/anatomy/parts-of-eye

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT101009	**GEOMETRICAL OPTICS–II**	3	-	-	-	3

Pre-Requisite 22RT102002 Geometrical Optics-I

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on the study of light and its behaviour as it propagates in a variety of media. Specifically, the phenomena of reflection and refraction of light at boundaries between media and subsequent image formation will be dealt with in detail.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the concepts of vergence

CO2. Understanding the concept of vision and its assessment

CO3. Applying power calculation for various refractive errors of the eye

CO4. Understanding the Natural Lens of the eye and associated Optical Conditions.

CO5. Explain the principle of Basic Optical Instruments & aberration

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	3	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-
CO3	3	2	-	3	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
CO6	3	-	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module1: VERGENCE TECHNIQUES REVISED ***(05 Periods)***

Vergence and vergence techniques revised (Convergence, divergence); lens maker formula, and its application in spectacle lens production, Mirror Formula.

MODULE 2: SCHEMATIC EYE & VISION ***(10 Periods)***

Gullstrand's schematic eyes, Listing's Reduced Eye, Donder's Reduced Eye; Visual acuity (Components of Visual Acuity, Designations of Visual Acuity, Clinical Testing of Visual Acuity, Purpose); Spatial distribution of optical information- modulation transfer functions- Spatial filtering applications; Blur retinal Imaginary, Stile Crawford.

MODULE 3: REFRACTIVE ERRORS ***(10 Periods)***

Emmetropia and ametropia, Correction of spherical ametropia, vertex distance, and effective power, dioptric power of the spectacle, to calculate the dioptric power, angular magnification of spectacles in aphakic, Astigmatism. - To calculate the position of the line image in a sphere-cylindrical lens.

MODULE 4: CRYSTALLINE LENS AND ACCOMMODATION ***(10 Periods)***

Visual optics of aphakia and pseudophakia. Presbyopia- Spectacle magnification, angular magnification of spectacle lens, near point, calculation of add, depth of field; Accommodation – Accommodation formulae and calculations.

MODULE 5: OPTICAL INSTRUMENTS AND ABERRATIONS ***(10 Periods)***

Optical Instruments – The Camera, simple magnifier, compound microscope, and telescopes; Thin lens model of the eye –angular magnification –spectacle and relative spectacle magnification; Aaberration - Spherical, Coma, astigmatism, Curvature of field, Distortion, Chromatic Aberrations; Aperture stops-entrance and exit pupils.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Making a Schematic model of the eye
2. Log MAR chart construction
2. Vergence and its calculation in relation to the retinoscopy principle
3. Calculation of Magnification of the Eye
4. Vertex Distance calculation
5. Aberration and Aperture stop
6. Telescope and its optics

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES BOOKS:

1. Tunna cliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, Edition 1, 2021.
2. Pedrotti L.S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, Edition 1, 1998.
3. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Edition 1, 2015.
4. Schwartz S. H., Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, Edition, 2013.

VIDEO LECTURES:

1. https://youtu.be/ayEL1dywjgw?si=a3K8LLFJrwlqLQ2l
2. https://youtu.be/eji8zKa7H7s?si=ICRpDi6BCResGem_
3. https://youtu.be/ML7HcZo6IaE?si=VzsoWC9uVrRPAVwQ

WEB RESOURCES:

1. http://eyeguru.org/
2. http://www.tedmontgomery.com/the_eye/
3. https://www.aao.org/education/resident-course/geometric-optics-2

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102005	**VISUAL OPTICS**	4	-	2	-	5

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides students with a comprehensive understanding of the principles of visual optics and their applications in the field of optometry, ophthalmology, and vision science.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Develop a deep understanding of the optics of ocular structures, and measurements of optical constants of the eye.

CO2. Gain a comprehensive understanding of the etiology and distribution of refractive anomalies, as well as the relationship between eye growth and refractive errors.

CO3. Understand and access accommodation, and convergence, including mechanisms, age-related changes, and their clinical implications for vision.

CO4. Excel in vision fundamentals to evaluate visual performance in clinical optometry.

CO5. Understand effective power, magnification, and factors affecting refractive error, accommodation, and retinal image quality, essential for precise optical corrections and clinical assessments.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	2	-	-	-	-	-	-
CO2	3	2	-	2	-	-	-	1	-	-
CO3	3	2	-	2	-	-	-	1	-	-
CO4	3	2	-	3	-	-	-	-	-	-
CO5	3	-	-	2	-	-	-	-	-	-
CO6	3	2	-	-	-	-	-	1	-	-
Course Correlation Mapping	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**1**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE1: OPTICS OF OCULAR STRUCTURE AND ITS MEASUREMENTS ***(12 Periods)***

Optics of Ocular Structure: Cornea and aqueous, Crystalline lens, Vitreous. Schematic and reduced eye; Measurements of Optical Constants of the Eye: Corneal curvature and thickness Keratometry, Curvature of the lens and ophthalmophakometry, Axial and axis of the eye.

MODULE 2: REFRACTIVE ERROR ***(12 Periods)***

Refractive anomalies and their causes: Etiology of refractive anomalies, Contributing variability and their ranges, Populating distributions of anomalies.Growth of the eye in relation to refractive errors., subjective and objective refraction.

MODULE 3: OPTICAL CHANGES IN ACCOMMODATION AND CONVERGENCE ***(12 Periods)***

Accommodation & Presbyopia: Far and near point of accommodation, Range, and amplitude of accommodation, Mechanism of accommodation, Variation of accommodation with age, Anomalies of accommodation, Presbyopia, Hypermetropia, and accommodation; Convergence: Type, Measurement and Anomalies, Relationship between accommodation and convergence-AC/A ratio.

MODULE 4: BASIC ASPECTS OF VISION ***(12 Periods)***

Basic Aspects of Vision, Visual Acuity, Light and Dark Adaptation, Color Vision, Spatial and Temporal Resolution, Science of Measuring visual performance and application to Clinical Optometry.

MODULE 5: EFFECTIVE POWER & MAGNIFICATION RELATED TO OPTICAL CORRECTIONS OF EYE ***(12 Periods)***

Effective Power & Magnification: Ocular refraction vs. Spectacle refraction, Spectacle magnification vs. Relative spectacle magnification, Axial vs. Refractive ametropia, Knapp's law, Ocular accommodation vs. Spectacle accommodation, Retinal image blur-Depth of focus and depth of field.

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Study of Purkinje images I & II, III & IV
2. Mathematical models of the eye- Emmetropia, Hyperopia, & Myopia
3. Effect of trial lenses & accessories in front of the eye
   Visual acuity, Measurement & recording (Distance & Near)
4. Retinoscopy – Practice of retinoscopy (Dry & wet) in Emmetropia, Myopia, Hypermetropia, Astigmatism, Anisometropia, Presbyopia, Aphakia, Pseudophakia, media opacities, strabismus & Eccentric fixation
   Interpretation of retinoscopic findings
   Dynamic retinoscopy – Methods
   Subjective verification
   Prescription writing
   Methods of differentiating axial vs. refractive ametropia
5. Measurement of range & Amplitude of accommodation, Measurement of Near & Far point of Convergence

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.

RESOURCES

TEXTBOOKS

1. Michael P. Keating ,Geometric, Physical and visual optics, Butterworth-Heinemann Ltd, Edition 1, 2002
2. William J. Benjamin ,Borish's Clinical Refraction , Butterworth-Heinemann Ltd, Edition 2, 2006

REFERENCE BOOKS

1. Troy E. Fannin, Clinical Optics, Butterworth-Heinemann, Edition 2, 1996.
2. Theodore P. Grosvenor, Primary Care Optometry, Butterworth-Heinemann, Edition 4, 2000.

VIDEO LECTURES:

1. Optics - The physics of the eye (Accommodation) - https://www.youtube.com/watch?v=pd8Z19OzTEw YouTube
2. Dr. Hunter's 2022 Worldwide Optics and Refraction https://www.youtube.com/watch?v=pd8Z19OzTEw Review - Livestream - YouTube
3. Important Concepts in RETINOSCOPY! - YouTube https://www.youtube.com/watch?v=Sdai6Nfw6LY

WEB RESOURCES:

1. Visual Optics (spie.org) https://archive.org/details/b21287582/page/14/mode/2up
2. https://archive.org/details/b21287582

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF102009	**PATHOLOGY**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on basic pathology of cell injury, inflammation, Immunopathology, Environmental and nutritional disorders, and Neoplasia.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate the concept of cell Injury and events in cell injury

CO2. Understand Basic knowledge on Inflammation

CO3. Gain knowledge on concept of Immune System & Immunity Disorders.

CO4. Learn the different types of Environmental and Nutritional Disorders.

CO5. Understand the nature and types of Neoplasia and its evolution.

CO6. Work individually or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	3	-
CO3	3	1	3	-	-	-	-	-	-	1
CO4	2	1	-	-	-	-	-	-	-	1
CO5	3	-	-	-	-	3	1	-	-	-
CO6	3	-	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**3**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: CELL INJURY ***(09 Periods)***

Cellular adaptation, Cell injury & cell death. Introduction to pathology. Overview: Cellular response to stress and noxious stimuli. Cellular adaptations of growth and differentiation. Overview of cell injury and cell death. Causes of cell injury. Mechanisms of cell injury. Reversible and irreversible cell injury. Examples of cell injury and necrosis.

Module 2: INFLAMMATION ***(09 Periods)***

General features of inflammation, Acute inflammation, Chemical mediators of inflammation Outcomes of acute inflammation, Morphologic patterns of acute inflammation, Chronic inflammation. Granulomatous Inflammation, Healing By Repair, Scar formation And Fibrosis, Cutaneous Wound Healing, Healing By First Intention, Healing By Second Intention, Edema, Hemostasis and Thrombosis, Infarction, Shock

Module 3: IMMUNE SYSTEM & IMMUNITY DISORDERS ***(11 Periods)***

Immunopathology – a. Immune system: General concepts. b. Hypersensitivity: type and examples, antibody and cell mediated tissue injury with examples. Secondary immunodeficiency including HIV infection. Auto-immune disorders: Basic concepts and classification, SLE. c. AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education.

Module 4: ENVIRONMENTAL AND NUTRITIONAL DISORDERS & INFECTIOUS DISEASE ***(09 Periods)***

Environmental and nutritional disorders. Occupational Hazards, Radiationinjury, Marasmus Kwashiorkar, Immunopathology –Infectious diseases –Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis. b. Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery. c. Viral diseases: Poliomyelitis, Herpes, Rabies, Measles, Rickttsia, Chlamydial infection, HIV infection. d. Fungal disease and opportunistic infections. e. Parasitic diseases: Malaria, Filaria, Amoebiasis, Kala-azar, Cysticercosis, Hydatid cyst.

Module 5: NEOPLASIA ***(07 Periods)***

Neoplasia: Definition, classification, Biological behaviour : Benign and Malignant, Carcinoma and Sarcoma. d. Malignant Neoplasia: Grades and Stages, Local & Distant spread. e. Carcinogenesis: Environmental carcinogens, chemical, viral, occupational. Benign & Malignant epithelial tumoursEg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumoursEg: Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdo-myosarcoma, Teratoma

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Collection of blood and anticoagulants used.
2. Discussion different types of microscopic disease conditions in pathology.
3. Staining of slide by Leishman method.
4. Studies of peripheral blood smear.
5. Estimation of hemaglobin by Sahli's method and discussion of other methods used.
6. Erythrocyte sedimentation Rate
7. Identification of various instruments in pathology lab & their uses
8. Bleeding Time, Clotting Time.
9. Demonstration of Pathological specimens

RESOURCES

TEXT BOOKS:

1. Harsh Mohan "Textbook of Pathology with Pathology Quick Review" Jaypee Brothers Medical Publishers, 8th Edition, 2019.
2. Ramadas Nayak " Textbook of Pathology for Allied Health Sciences" Jaypee Brothers Medical Publishers, 1st Edition, 2018
3. Ramadas Nayak, Sharada Rai "Essentials in Hematology and Clinical Pathology" Jaypee Brothers Medical Publishers, Second Edition, 2018

REFERENCE BOOKS:

1. David J. Magee, James E. Zachazewski, William S. Quillen, Robert C. Manske, "Pathology and Intervention in Musculoskeletal Rehabilitation" Saunders Publisher Pvt. Ltd. 2nd Edition, 2018.
2. Vinay Kumar, Abul K. Abbas, Jon C. Aster, Manoj K. Singh. Robbins and Cotran Pathologic Basis of Disease (Two Vol Set), 10e, Publisher Elsevier Health Science, South Asia Edition, 2020.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=-Ph2uhw9BhE
2. https://www.youtube.com/watch?v=JcGKDDvk5AQ
3. https://www.youtube.com/watch?v=LaG3nKGotZs

WEB RESOURCES:

1. https://www.aai.org/AAISite/media/Education/HST/Archive/Riina_Caroline_Presentation.pdf
2. https://drnaitiktrivedi.com/wp-content/uploads/2020/04/1.-CELL-INJURY-AND-CELLULAR-ADAPTATION.pdf
3. https://www.pearson.com/content/dam/one-dot-com/one-dot-com/us/en/higher-ed/en/products-services/course-products/fremgen-6e-info/pdf/Sample_ch04_final.pdf

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CC111001	**CLINICAL POSTING-I**	-	-	-	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides basic knowledge on hospital setup, care of patient, primary illness observation, and handling basic clinical instruments at training hospital.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Develop communication skills to deal with patients and health care professionals.

CO2. Apply appropriate medical devices and techniques to diagnose the patient illness.

CO3. Develop skills in formulating various medical documentation procedures.

CO4. Work individually and in teams following ethical practice.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	2	-	1
CO2	3	1	1	3	-	-	-	-	-	1
CO3	3	-	-	2	-	-	3	1	-	-
CO4	3	-	1	2	-	1	1	1	-	1
Course Correlation Mapping	**3**	**1**	**1**	**3**	**-**	**1**	**2**	**2**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

Note:

1. Students will attend to clinical posting weekly two days in 3rd semester.
2. The Evaluation process is day to day, based on logbook and viva.

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102006	**CLINICAL EXAMINATION OF VISUAL SYSTEM**	3	-	2	-	4

Pre-Requisite 22RT101008 Ocular Anatomy

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment examination, neuro-ophthalmic examination, pediatric optometry examination, and Glaucoma evaluation.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Summarize the overview of clinical eye examination and gain knowledge on history taking in different eye conditions.

CO2. Identify the Visual Acuity, refractive error, Color Vision, and Contrast sensitivity of an individual at practice.

CO3. Evaluate the anterior segment of the eye and gain knowledge about the steps involved in estimating Intraocular pressure measurement.

CO4. Evaluate the posterior segment of the eye and interpret different test reports.

CO5. Understand the basic Neuro-ocular tests and can perform them whenever necessary.

CO6. Work individually or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	-	3	-	-	-	2	-	-
CO2	3	3	-	3	-	-	-	2	-	-
CO3	3	3	-	3	-	-	-	2	-	-
CO4	3	3	-	3	-	-	-	2	-	-
CO5	3	-	-	-	-	-	-	-	-	-
CO6	3	-	-	3	-	-	-	2	-	-
Course Correlation Mapping	**3**	**3**	**-**	**3**	**-**	**-**	**-**	**2**	**-**	**-**

Correlation Levels: 3: High;2: Medium;1: Low

COURSE CONTENT

Module 1: HISTORY OF THE OPHTHALMIC SUBJECT ***(10 Periods)***

Introduction and importance of history taking, general history, Ocular history, medical history, Family history, Systemic history, birth history, squint history, contact lens history, headache history, low vision history.

Module 2: TEST FOR VISUAL ACUITY, REFRACTIVE ERROR ESTIMATION ***(10 Periods)***

Assessment of visual acuity (Distance & near visual acuity)-using trial set or phoropter, assessment of Refractive error, Colour vision Test, Contrast sensitivity estimation. Recent advancement. FRACT.

Module 3: EXTERNAL EXAMINATIONS OF THE EYE ***(10 Periods)***

Slit lamp biomicroscope, corneal color coding, Van Herrick, ROPLAS, Schirmer's, TBUT, tear meniscus level, NITBUT (keratometry). Horizontal visible iris diameter (HVID) measurement procedure Pupillary distance measurement using PD ruler and Pupillometer. Corneal sensitivity Measurement available techniques, swinging flashlight test-RAPD. blink test. Recent advancement.

Module 4: RETINAL AND OPTIC NERVE EXAMINATIONS ***(05 Periods)***

Ophthalmoscopy, Retinal Color Coding, Retinal and Disc Optical Coherence Tomography, Visual Field test, RNFL, confrontation, Amsler grid.

Module 5: NEURO-OCULAR EXAMINATIONS ***(10 Periods)***

Extraocular motility, Cover test, Alternating cover test, Hirschberg test, Modified Krimsky, Maddox Rod, Synaptophore, Phoria measurement

Total Periods: 45 hours

EXPERIENTIAL LEARNING

EXPERIENTIAL LEARNING

1 History taking for different eye related problems

2 Demonstrating visual acuity testing

3 Demonstrating the techniques in slit lamp

4 Measurement of tear film

5 Measurement of pupil

6 Color coding for cornea and retina

7 Demonstrating neurological examination related to eye

8 Understating the uses of color and contrast sensitivity test

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES

TEXTBOOKS:

1. Doshi, S., & Harvey, W., Assessment and investigative techniques, Elsevier Health Sciences, Edition 1, 2005.
2. Grosvenor, T. P., Primary care optometry, Elsevier Health Sciences, Edition 5, 2007.
3. Eskridge, J. B., Amos, J. F., & Bartlett, J. D. Clinical procedures in optometry. Lippincott Williams & Wilkins, Edition 1, 1991.

REFERENCE BOOKS:

1. Thomas David Duane, Duane's Clinical Ophthalmology, J. B. Lippincott Company, Volume 3, 1994.
2. Anderson, D. R., & Patella, V. M., Automated static perimetry, Mosby, Edition 1, 1998.
3. Birch, J, Diagnosis of defective colour vision, Butterworth-Heinemann Medical Edition 4, 2001

VIDEO LECTURES:

1. www.youtube.com/@SKOptics_OOLS
2. www.youtube.com/@optometry-with-samir
3. www.youtube.com/@DoctorEyeHealth

WEB RESOURCES:

1. https://www.ncbi.nlm.nih.gov/book
2. Stat Pearls. https://www.ncbi.nlm.nih.gov/books/NBK430685/?term=diabetic%20retinopathy
3. Eye wiki.

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT101010	**OPTOMETRIC OPTICS**	3	-	-	-	3

Pre-Requisite 22RT101009 Geometrical Optics-II

Anti-Requisite -

Co-Requisite -

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

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Master different lens forms, and understand concepts like lens blanks, base curves, cylindrical axis notation, spherical and Toric transposition, and spherical equivalent.

CO2. Acquire expertise in power and other dimension specifications & measurements.

CO3. Gain in-depth knowledge of lens materials, manufacturing processes.

CO4. Understand the concept of prisms, their power units, and develop knowledge about rotary prisms, effective prism power in near vision, Prentice's rule, and differential prismatic effects.

CO5. Explore the types of special lenses, their construction, characteristics, and applications.

CO6. Work individually or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	-	2	-	-	-	-	-	-
CO2	3	3	-	2	-	-	-	-	-	-
CO3	3	3	-	2	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	-	-	-
CO5	3	3	-	2	-	-	-	-	-	-
CO6	3	3	-	2	-	-	-	-	-	-
Course Correlation Mapping	**3**	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: 3:High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: CHARACTERISTICS OF OPHTHALMIC LENSES ***(05 Periods)***

Lens forms - Spherical lenses, Cylindrical and Toric lenses; Lens Blanks and Base curves; Cylindrical axis direction and notation; Spherical and Toric Transposition; The spherical Equivalent; Obliquely crossed cylinders

Module 2: POWER SPECIFICATION AND MEASUREMENTS ***(10 Periods)***

Introduction, Approximate power, back and Front vertex power, Equivalent and effective power Hand neutralization, Sagittal formula, centre thickness measurements
Inspecting the quality of lenses, faults in lens material and faults on lens surface

Module 3: OPHTHALMIC LENS MATERIALS AND MANUFACTURING ***(10 Periods)***

Characteristics, manufacturing process, varieties of Optical lens Characteristics, and manufacturing process of Ophthalmic lenses.

Module 4: OPHTHALMIC PRISMS AND DECENTRATION ***(10 Periods)***

Definition of prisms, units of prism power, Thickness difference and base – apex notation, Dividing, compounding, and resolving prisms, Rotary prisms and effective prism power in near Vision, Prismatic effect, decentration, Prentice's rule, Prismatic effect of Sphero cylinders and Plano cylinders, Differential prismatic effects.

Module 5: SPECIAL LENSES ***(10 Periods)***

Lenticulars, aspheric, Fresnel lenses and prisms, aniseikonic lenses, photochromatic, Polaroids, tinted lens-tints, and filters.

Total Periods: 45

EXPERIENTIAL LEARNING

1 Demonstration of lens materials
2 Calculating the vertex distance
3 Learning the hand neutralization procedure
4 Video demonstration of manufacturing process of lenses
5 Calculation based on prism
6 Video demonstration of various types of prisms
7 Demonstration of special lenses

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES

TEXTBOOKS:

1. Brooks, C. W., & Borish, I. System for ophthalmic dispensing. Elsevier Health Sciences, Edition 1, 2006.
2. Jalie, M., The principles of ophthalmic lenses, Butterworth-Heinemann, Edition 2, 2016.
3. Jalie, M. Ophthalmic lenses and dispensing, Butterworth-Heinemann Edition 1, 2008.

REFERENCE BOOKS:

1. Fannin, T. E., & Grosvenor, T. . Clinical Optics. Butterworth-Heinemann.2013
2. Hodges, I. . Basic principles of ophthalmic lens and dispensing optics.2020

VIDEO LECTURES:

1. www.youtube.com/@SKOptics_OOLS
2. www.youtube.com/@optometry-with-samir
3. www.youtube.com/@DoctorEyeHealth

WEB RESOURCES:

1. ools.co.in
2. Zeiss-pathasala
3. American academy of ophthalmology

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102007	**DISPENSING OPTICS**	4	-	2	-	5

Pre-Requisite 22RT102001 Optical Physics

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: The course covers spectacle lenses and frames theory, materials, types, advantages and disadvantages, calculations involved in prescribing, and lens construction and design application. It also covers the role of optometrists in optical set-up.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Learn about the manufacturing process and materials of ophthalmic lenses, as well as how to record, order, and select lenses according to safety standards.

CO2. Recognize and suggest various types of spectacle lenses as per the patient's need.

CO3. Gain expertise in lens coatings and protective lenses.

CO4. Learn about spectacle frame manufacturing and materials and can recommend suitable frames as per patients' requirement.

CO5. Proficiently inspect lens quality, minor spectacle adjustments as per needs, and counsel on wearing and maintaining spectacles.

CO6. Work individually or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	-	3	-	-	-	2	-	-
CO2	2	3	-	-	-	-	-	3	-	-
CO3	3	2	2	-	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	3	-	-
CO5	2	-	-	3	-	2	-	3	-	-
CO6	3	3	-	3	-	-	-	-	-	-
Course Correlation Mapping	**3**	**3**	**2**	**3**	**-**	**2**	**-**	**3**	**-**	**-**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: SPECTACLE LENSES ***(15 Periods)***

Manufacture of glass, Lens materials, Faults in lens material, Lens surfacing, Faults on lens surface. Principle of surface generation and Glass Cements, Terminology used in Lens workshop, Lens properties, Lens quality. Recording and ordering of lenses, Selection of lenses, Safety standards for ophthalmic lenses (FDA, ANSI, ISI, Others)

Module 2: Multifocal and Miscellaneous Lenses ***(10 Periods)***

Introduction, History and Development, Types - Bifocal lenses, Trifocal & Progressive addition lenses. Miscellaneous Spectacle - Iseikonic lenses, Spectacle magnifiers, Recumbent Prisms, Fresnel Prism and Lenses, Lenticular & Aspherical Lenses.

Module 3: COATING, TINTS & PROTECTIVE LENSES ***(10 Periods)***

Reflection from spectacle lenses - ghost images, Reflections in bifocals at the dividing line, Antireflection coating, Mirror coating, Hard Multi Coating [HMC], Hydrophobic coating. Characteristics of tinted lenses Absorptive Glasses. Polarizing Filters, Photochromic & Reflecting filters. Safety Lenses-Toughened lenses, Laminated Lenses, CR 39, Polycarbonate lenses. Industrial safety glasses, Welding glasses

Module 4: SPECTACLE FRAMES ***(15 Periods)***

Types and parts -Classification of spectacle frames -material, weight, temple position, Coloration, Frame construction, Frame selection - based on spectacle prescription, lens choice, professional requirements, age group, and face shape. Frame availability in the Indian market. Special types of spectacle frames - Monocles, Ptosis crutches, Frame measurement system, Progressive marking.

Module 5: SPECTACLE QUALITY CHECK, ADJUSTMENT AND DISPENSING: ***(10 Periods)***

Spectacle repairs –Tools, methods, soldering, riveting, Methods of Inspecting the quality of lenses, frame adjustments, Final Verification & dispensing of spectacles. Counseling on wearing & maintaining spectacle.

Total Periods: 60

EXPERIENTIAL LEARNING

1. Components of spectacle prescription & interpretation, transposition, Add and near power relation
2. Frame selection –based on spectacle prescription, professional requirements, age group, face shape
3. Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height
4. Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments –facial wrap, pantoscopic tilt
5. Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements)
6. Faults in spectacles (lens fitting, frame fitting, patients' complaints, description, detection, and correction)
7. Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories –Bands, chains, boxes, slevets, cleaners, screwdriver kit
8. Neutralization –Hand &lensometer, axis marking, prism marking
9. FAQs by customers and their ideal answers.

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.

RESOURCES

BOOKS:

1. C. W. Brooks and I. M. Borish, System for Ophthalmic Dispensing, Butterworth- Heinemann, Edition 3, 2007.
2. T. E. Fannin and T. Grosvenor, Clinical Optics, Butterworth-Heinemann, Edition 3, 2013
3. B. Milder, M. Rubin, The Fine Art of Prescribing Glasses, Triad Scientific Publishers, Edition 3, 2004
4. M. Jalie, The Principles of Ophthalmic Lenses, Association of British Dispensing Opticians, Edition 5, 2016

VIDEO LECTURES:

1. Online optometry learning series-OOLS
2. www.youtube.com/@EssilorUSA
3. www.youtube.com/@optometry-with-samir

WEB RESOURCES:

1. https://www.jaypeedigital.com/eReader
2. Zeiss-pathasala
3. https://www.aurosiksha.org/lica/ebook/refraction_chapter13

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT101011	**OCULAR DISEASE-I**	4	-	-	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a comprehensive exploration of the etiology, ophthalmic pathology, clinical manifestations, and management strategies for ocular diseases affecting the lids, conjunctiva, cornea, sclera, uvea, pupils, orbit, lacrimal system, and lens.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Diagnosing and treating or providing management plans for the diseases of lashes, lids, and conjunctiva. Students can do disease-related patient counseling, and ethical practice ophthalmic care in diverse clinical settings.

CO2. Diagnosing and treating or providing management plans for the diseases of Cornea and Sclera. Students can do disease-related patient counseling, and ethical practice ophthalmic care in diverse clinical settings.

CO3. Diagnosing and treating or providing management plans for the diseases of the Uvea and Pupillary reaction. Students can do disease-related patient counseling, and ethical practice ophthalmic care in diverse clinical settings.

CO4. Diagnosing and treating or providing management plans for the diseases of Orbit and Lachrymal apparatus. Students can do disease-related patient counseling, and ethical practice ophthalmic care in diverse clinical settings.

CO5. Diagnosing and treating or providing management plans for the diseases of Lens and Accommodative condition. Students can do disease-related patient counseling, and ethical practice ophthalmic care in diverse clinical settings.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	-	3	-	2	-	3	-	-
CO2	3	3	-	3	-	2	-	3	-	-
CO3	3	3	-	3	-	2	-	3	-	-
CO4	3	3	-	3	-	2	-	3	-	-
CO5	3	3	-	3	-	2	-	3	-	-
CO6	3	2	-	3	-	2	-	3	-	-
Course Correlation Mapping	**3**	**3**	**-**	**3**	**-**	**2**	**-**	**3**	**-**	**-**

Correlation Levels: 3: High;2: Medium;1: Low

COURSE CONTENT

Module 1 DISEASES OF LIDS & CONJUNCTIVA ***(12 Periods)***

Disorders of lashes, 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. Neoplasms of the Lids. Injuries of the Lids. 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. Trachoma.

Module 2: DISEASE OF THE CORNEA AND SCLERA ***(12 Periods)***

Disease of the Cornea –Congenital Anomalies. Inflammation of the Cornea (Keratitis). Corneal Ulcer (Bacterial, Viral, Fungal). Vascularisation of Cornea. Opacities of the Cornea. Corneal Degenerations and Dystrophies. Corneal Pigmentation. Corneal Injuries. Corneal Surgeries. SCLERA- blue sclera. Scleral Degenerations -Ectasia and staphyloma. Scleral Inflammations - Scleritis and episcleritis. Toxic and traumatic injuries of sclera

Module 3: DISEASE OF UVEA & PUPIL ABNORMALITIES ***(12 Periods)***

Inflammations of Uvea, Classification of uveitis -Etiology and pathogenesis, Clinical approach to uveitis, Endophthalmitis and pan ophthalmitis, Pars Planitis. Complications of uveitis, Ocular involvement in AIDS, Tumors of the uvea, Congenital Anomalies of Pupil – Heterochromia, Aniridia, coloboma, Correctopia, Polycoria, Pupillary membrane. Anomalies of pupillary reactions.

Module 4: ORBIT & LACRIMAL SYSTEM ***(12 Periods)***

Evaluation of orbital disorders. Congenital and developmental anomalies of Orbit- Anophthalmos, Microphthalmos, Nanophthalmos, Cryptophthalmos, Hypertelorism,
Craniofacial anomalies- Craniosynostosis. Orbital tumors -Dermod's, Hemangiomas, Rhabdomyosarcoma, Optic nerve glioma, Meningiomas. Orbital inflammations -
Preseptal cellulitis, Orbital cellulitis, Orbital periostitis, cavernous sinus thrombosis, Sinus related disorders. Orbital trauma -Blow-out fractures. Proptosis -Etiology, Classifications, Clinical Evaluation, and Management. Graves Ophthalmopathy -Etiology, Examination, and Management Enophthalmos -Etiology, Evaluation and Management. Diseases of the Lachrymal Apparatus-. Dry Eye. The watery eye. Disease of the Lachrymal Gland. Disease of the Lachrymal Passages. Operations for Chronic Dacryocystitis

Module 5: LENS ***(12 Periods)***

Congenital and Developmental defects-Aphakia, Lenticonus, Lentiglobus, Coloboma, Peters anomaly, Microspherophakia, Cataract. Acquired lenticular defects- Morphological cataract, Drug-induced cataract, Traumatic cataract, Metabolic cataract, Complicated cataract, Association with other ocular disorders and syndromes. Cataract Management- Surgical and non-surgical management, pre-operative evaluation, Complications of cataract surgery. Lens displacement - Lens subluxation and dislocation

Total Periods: 60

EXPERIENTIAL LEARNING:

1 Photographic Demonstration of different Anterior segment disease.
2 Group discussion on case studies.
3 Videographic presentation of diseases and related procedures
4 Case based learning

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES BOOKS

1. Salmon. Kanski's Clinical Ophthalmology International Edition: A Systematic Approach. Standard Edition, 2019
2. Ophthalmology, A. a. O. basic and clinical science course, complete print set, Edition 1, 2022
3. Albert, D. M., Miller, J. W., Azar, D. T., & Young, L. H. Albert and Jakobiec's Principles and Practice of Ophthalmology. Springer, Edition 2, 2022
4. Sihota, & Tandon, R. Parsons' diseases of the eye, Elsevier Health Sciences, Edition 1, 2019
5. Khurana, A., Khurana, A. K., & Khurana, B. P. Comprehensive Ophthalmology: With Ophthalmology Logbook Plus Practical Ophthalmology. Jaypee Brothers Medical Publishers Pvt Limited. Standard edition, 2023

VIDEO LECTURES:

1. www.youtube.com/@OptometryClub92
2. OOLS-ONLINE OPTOM LEARNING SERIES
3. www.youtube.com/@DoctorEyeHealth

WEB RESOURCES:

1. https://www.ncbi.nlm.nih.gov/book
2. Stat Pearls.
3. Eye wiki.
4. https://www.aao.org/eye-health/a-z

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT101012	**OPTOMETRIC INSTRUMENTS-I**	3	1	-	-	4

Pre-Requisite 22RT102001 Optical Physics

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: The principal objective of this course is to gain in-depth knowledge of the instrumentation and functioning of the instruments that are routinely used in optometric practice

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the construction principle of different test charts, and designs of trail frames, ensure optimal room illumination, and gain knowledge to operate a phoropter considering optical considerations.

CO2. Understand the construction and principle of different refractive instruments and will be able to operate those instruments in clinical scenario.

CO3 Gain knowledge about different instruments for measuring corneal dimensions and properties along with handling of those.

CO4. Demonstrate utilization of various instruments that are related to anterior segment evaluation.

CO5. Master the application and interpretation of specialized ophthalmic instruments for comprehensive and accurate clinical assessments.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-
CO3	2	2	-	3	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
CO6	3	2	-	3	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: INSTRUMENTATION FOR REFRACTION (PART 1) ***(05 Periods)***

Construction of Test chart, Choice of test charts; Projection charts, Illumination of the consulting room. Trial frame design; Trial case lenses design and applications, Phoropter and its optical considerations. Near vision difficulties with phoropter and trial frame,

Module 2: INSTRUMENTATION FOR REFRACTION (PART 2) ***(10 Periods)***

Retinoscope types, optics and procedure, interpretation of the objective finding; Autorefractors. Lensometer types, construction, procedure, and interpretation of results

Module 3: CORNEAL MEASUREMENT ***(10 Periods)***

Javal Schiotz Keratometry construction and optics, Bausch, and Lomb keratometry construction, optics, calibration, procedure, and interpretation of results; Corneal Topography uses and applications, Placido disc, pachymetry, pentacam, aberrometer

Module 4: INSTRUMENTS FOR ANTERIOR SEGMENT ***(10 Periods)***

Construction and Optics of slit lamp, illumination set up, slit lamp manipulations, meniscometry. Confocal microscope, specular microscope, tonometer-principle, types, calibration, procedure, interpretations of results, AS-OCT,

Module 5: SPECIAL INSTRUMENTS ***(10 Periods)***

Brightness acuity tester, Potential acuity meter, Pupillometer, Colour vision testing devices, contrast sensitivity testing, glare testing. A-scan

Total Periods: 45

EXPERIENTIAL LEARNING

1 Demonstration of visual acuity charts and procedure
2 Video demonstration of parts and usage of phoropter
3 Explaining on types and procedure of retinoscopy
4 Demonstration of usage of manual and auto lensometer
5 Interpretation of keratometry reading
6 Interpretation of pachymetry, corneal topography, pentacam reading
7 Video demonstration on A Scan, BAT, PAM.
8 Demonstration of slit lamp construction and techniques
9 Video demonstration on confocal and specular microscope

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES

TEXTBOOKS:

1. Henson, D. B. . Optometric instrumentation. Elsevier Science & Technology Book, Edition 1, 1993.
2. Ichhpujani, P., & Singh, M., *Ophthalmic instruments and surgical tools*, Springer, Edition 2, 2019
3. Eskridge, J. B., Amos, J. F., & Bartlett, J. D, Clinical procedures in optometry, Lippincott Williams & Wilkins, Edition 1, 1991

REFERENCES BOOKS

1. Herrin, M. P., Instrumentation for eyecare paraprofessionals. SLACK Incorporated. Grosvenor, Edition 1, 1999
2. Theodore P. Grosvenor., Primary care optometry, Elsevier Health Sciences, Edition 1, 2007

VIDEO LECTURES:

1. www.youtube.com/@SKOptics_OOLS
2. www.youtube.com/@optometry-with-samir
3. www.youtube.com/@DoctorEyeHealth

WEB RESOURCES:

1. aurosiksha.org
2. Eye wiki
3. American Academy Ophthalmology

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22CC101006	**BASIC PHARMACOLOGY AND DRUG ADMINISTRATION**	3	-		-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: The Course will cover General Pharmacology with Special Emphasis on common drugs used, Route of Administration, Type of formulations, Dose and frequency of administration, Side effects and Toxicity, Management of Toxic effects, Drug interactions, Knowledge of chemical and trade names, Importance of Manufacturing and expiry dates and instruction about handling each drug.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Acquire knowledge on principles of basic pharmacology.

CO2. Understand the General considerations of Cholinergic Drugs

CO3. Gain knowledge on anesthetic and Analgesics drugs.

CO4. Identify the mechanism of various drugs related to Cardiovascular& Respiratory system.

CO5. Learn about various drugs related to microbial infections and other diseases

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	-	-
CO3	3	1	3	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	3	1	-	-	-
CO6	3	-	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION ***(10 periods)***

General pharmacological principles - Definition - Routes of drug administration Pharmacokinetics, Pharmacodynamics - Adverse drug effects, Drugs acting on Autonomic Nervous System, Peripheral Nervous System and Drugs acting on Central Nervous system.

Module 2: CHOLINERGIC DRUGS ***(05 Periods)***

General considerations-Cholinergic system & drugs-Anticholinergic drugs-Adrenergic drugs-antiadrenergic drugs.

Module 3: ANAESTHETICS & ANALGESICS ***(10 periods)***

Skeletal muscle relaxants-Local anaesthetics, General anaesthetics-Ethyl & Methyl alcohol-Sedatives - Hypnotics- Antiepileptics - Drugs used in mental illness - Opioid analgesics and Non opioid Analgesics - Nonsteroidal Anti inflammatory drugs.

Module 4: CARDIOVASCULAR & RESPIRATORY DRUGS ***(10 periods)***

Cardiovascular drugs - Cardiac glycosides, Antiarrhythmic drugs, Antianginal drugs, Antihypertensives and Diuretics, Erythropoietin, Drugs affecting-coagulation, Fibrinolytic and Antiplatelet drugs, Treatment of cough and Antiasthmatic drugs. Drugs on Respiratory system.

Module 5: ANTIMICROBIAL AND OTHER DRUGS ***(10 periods)***

General consideration-Antibiotics-Antibacterial agents- -Antifungal- -Antiviral- Antiseptic-Disinfectant-.Corticosteroids, Antithyroid drugs and Drugs for Diabetes Mellitus, Treatment of Vomiting, Constipation, Diarrhoea and Treatment of peptic ulcer, Vitamins, Vaccines.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Understanding of inculcate knowledge on various drugs.
2. Understanding the terminologies and basic principles of pharmacokinetic.
3. Observation and understanding the pharmacological action and mechanism of action of common drugs used for different disease conditions.
4. Understanding therapeutic uses and adverse effects of common drugs.
5. Demonstrate the intended to discuss the various modalities of drug delivery and instruments.

RESOURCES

TEXT BOOKS:

1. Tara V Shanbag, Pharmacology: Prep Manual for Undergraduates, Elsevier Publications, Edition 2, 2012.
2. Padmaja Uday kumar, Pharmacology for Dental and Allied Health Sciences, Jaypee Brothers Medical Publishers, Edition 4, 2016.

REFERENCE BOOKS:

1. KD Tripathi, Essentials of Medical Pharmacology, Jaypee Brothers Medical Publishers, Edition 8, 2018.
2. R S Sataskar, Pharmacology and Pharmacotherapeutics, Popular Prakashan Ltd, Edition 21, 2015.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=LLv29S7Hm3U
2. https://www.youtube.com/watch?v=r-gJaMoMon0
3. https://www.youtube.com/watch?v=oKtIzV2T69Y

WEB RESOURCES:

1. https://www.slideshare.net/specialclass/antibiotics-2173921
2. http://www.harpercollege.edu/ls-hs/nur/120/sdolezal/lesson8_files/lesson8.ppt
3. https://repo.knmu.edu.ua/bitstream/123456789/10408/1/Anti-inflammatory

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22CC101015	**MEDICAL PSYCHOLOGY**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on various behavioral patterns of individuals, theories of development, normal and abnormal aspects of motor, social, emotional, and language development, and communication and interaction skills appropriate to various age groups.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand the fundamental concepts of psychology and its branches.

CO2 Acquire knowledge of basic concepts of growth and development of personality.

CO3 Apply the concepts of Attention, Perception, and Sensation to assess the psychology of humans.

CO4 Understand the fundamental concepts of conflicts, frustration, and its type.

CO5 Analyse the theoretical concepts of Intelligence and Emotions.

CO6 Acquire knowledge of basic theories of learning and types of personality.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	2	-	-	1	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-
CO3	2	3	1	-	-	1	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-
CO5	3	2	2	-	-	-	-	-	-	-
CO6	2	2	-	-	-	2	-	-	-	-
Course Correlation Mapping	**3**	**2**	**2**	-	**-**	**1**	-	-	-	**-**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: INTRODUCTION TO PSYCHOLOGY ***(07 Periods)***

Schools: Structuralism, functionalism, behaviourism, Psychoanalysis.
Methods: Introspection, observation, inventory, and experimental method.
Branches: pure psychology and applied psychology; Psychology and physiotherapy

Module 2: GROWTH AND DEVELOPMENT ***(08 Periods)***

Life span: Different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age).
Heredity and environment: Role of heredity and environment in physical and psychological development, "Nature v/s Nurture controversy

Module 3: ATTENTION, PERCEPTION AND SENSATION ***(08 Periods)***

Sensation: Vision, Hearing, Olfactory, Gustatory and Cutaneous sensation, movement, equilibrium, and visceral sense.
Attention: Types of attention, Determinants of attention (subjective determinants and objective determinants).
Perception: Gestalt principles of organization of perception (principle of figure-ground and principles of grouping), factors influencing perception (experience and context).
Illusion and hallucination: Different types.

Module 4: MOTIVATION, FRUSTRATION AND CONFLICT ***(08 Periods)***

Motivation: Motivation cycle (need, drive, incentive, reward), Classification of motives, Abraham Maslow's theory of need hierarchy
Frustration: sources of frustration
Conflict: types of conflict, Management of frustration, and conflict

Module 5: INTELLIGENCE AND EMOTIONS ***(08 Periods)***

Three levels of analysis of emotion (physiological level, subjective state, and overt behavior).
Theories of emotion
Stress and management of stress.
Intelligence: Theories of intelligence, Distribution of intelligence, Assessment of Intelligence
Reasoning: Deductive and inductive reasoning.
Problem-solving: Rules in problem-solving (algorithm and heuristic)
Creative thinking: Steps in creative thinking, traits of creative people.

Module 6: INTELLIGENCE AND EMOTIONS ***(06 Periods)***

Factors affecting learning.
Theories of learning: trial and error learning, classical conditioning, Operant conditioning, insight learning, social learning theory.
The effective ways to learn: Massed/Spaced, Whole/Part, Recitation/Reading, Serial/Free recall, Incidental/Intentional learning, Knowledge of results, association, organization, and mnemonic methods.
Personality
Approaches to Personality: type & trait, behaviouristic, psychoanalytic, and humanistic approach.
Personality Assessment: observation, situational test, questionnaire, rating scale, interview, and projective techniques.
Defence Mechanisms: denial of reality, rationalization, projection, reaction formation, identification, repression, regression, intellectualization, undoing, introjection, acting out

Total Periods: 45

EXPERIENTIAL LEARNING

1. Demonstration of various behavioral patterns and disorders.
2. Illustration on psychosocial disorders.
3. Demonstration of different personalities and disorders.
4. Analysis of intelligence quotient.
5. A clinical study on counselling the patient.
6. Demonstrating the concepts of problem-solving in psychosocial problems.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES BOOKS

1. Robert A Baron, Text Book Psychology, Jaypee Publishers, Edition 1, 2020
2. T.Ramalingam, Psychology for Physiotherapist, Jaypee Publishers, Edition 2, 2019
3. Niraj Ahuja, Text Book of Psychiatry, Jaypee Publishers, Edition 4, 2019.

VIDEO LECTURES:

1. www.britannica.com
2. www.alliant.edu

WEB RESOURCES:

1. www.psychology.com
2. http://www.guides.lib.uw.edu

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CC111002	**CLINICAL POSTING-II**	-	-	-	-	4

Pre-Requisite Clinical Posting-I

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides basic knowledge on hospital setup, care of patient, primary illness observation, and handling basic clinical instruments at training hospital.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO2. Develop case sheet of the concerned patient in the hospital.

CO3. Handled appropriate medical devices to generate patients' data.

CO4. Perform various instrumental handling techniques to analyse disorders.

CO5. Work individually and in teams following ethical practice.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	2	-	1
CO2	3	1	1	3	-	-	-	-	-	1
CO3	3	-	-	2	-	-	3	1	-	-
CO4	3	-	1	2	-	1	1	1	-	1
Course Correlation Mapping	**3**	**1**	**1**	**3**	**-**	**1**	**2**	**2**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

Note:

1. Students will attend to clinical posting weekly two days in 4th semester.
2. The Evaluation process is day to day, based on logbook and viva.

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22LG101404	**SANSKRIT**	2	-	-	-	2
Pre-Requisite	-					
Anti-Requisite	-					
Co-Requisite	-					

COURSE DESCRIPTION: अस्मिन् पाठ्यक्रमे संस्कृत गद्य, पद्य, व्याकरमेन सह महाभारतम् अपि च रामायणस्य कान्श्चन खण्डानां मेलनं भवति। अयं पाठ्यक्रमः छात्राणां कृते विभिन्न संस्कृत ग्रन्थानां अपि च साहित्यस्य समालोचनात्मक विश्लेषण करणमपि शिक्षयति। संपूर्ण पाठ्यक्रमे अस्मिन्, छात्राः देवनागरी लिपेः लिखनं अधिगच्छति, संस्कृतस्य शब्दानां उच्चारणं तथा हृदिस्थं करिष्यति, अपि च प्राथमिक व्याकरण पठिष्यति तेन ते संस्कृते सरल वाक्यानां निर्माणं कर्तुं प्रभवन्ति।

COURSE OUTCOMES: पाठ्यक्रमस्य सफलसमाप्तेः अनन्तरं छात्राः

CO-PO Mapping Table:

Course Outcomes	Program Outcomes								
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
CO1	3	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-

CO1 कर्तव्यपरक शैक्षणिक वृत्तिपरक तथा शोधकर्तृणां निर्माणार्थं छात्राणां संज्ञानात्मक, प्रभावशाली तथा व्यवहारिक क्षमतानां आकार प्रदानार्थं सहायतां करोति।

CO2 सामाजिक परिवर्तने भागग्रहणार्थं सक्षमाः भवितुं छात्रेषु सेवायाः धारणा संचारः करोति।

CO3 समकालीन समस्या-समाधान स्थितिषु प्राचीन भारतीय ज्ञानस्य अनुप्रयोगस्य ज्ञानप्राप्तिः। सामान्य रूपेण तथा विशेष रूपेण अभ्यसने तथा तस्य मूल्यांकनस्य संदर्भे च नैतिक उपयुक्ततायाः एकः दृढतर भावनायाः विकासनार्थम्।

CO4 प्राचीन साहित्यतः प्राथमिक जीवनं तथा अवधारणानां ज्ञानप्रदानं यत् कालातीतः जातः तथापि इदानीमपि समाजाय अनुवर्तते।

आवेदनस्य प्रमुख क्षेत्रेषु प्राथमिक कौशलस्य अधिग्रहणे सुगमकरणम् उदा- नेतृत्वे, संचारे, अनुसंधान योग्यतायां, व्यवहार संशोधने इत्यादि।

CO5 सामाजिक विविधतायाः कृते सम्मान-विकसितं करनं तथा सामाजिक अपि च सांस्कृतिक प्रासंगिकतायाः अध्ययने अभिवृद्धि करनम्।

CO5	3	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module-1: प्राचीन पद्यसाहित्यम् **(06 Periods)**

1.आर्य पादुका पट्टाभिषेकः - वल्मीकिः – श्रीमदामायणम्

Module-2: चम्पूकाव्यम् & आधुनिक पद्यकाव्यम् **(06 Periods)**

3.गङ्गावतरणम् - भोजराजः - चम्पूरामायणम्

4. मोहापनोदः - श्री पमिडिपाटि पट्टाभिरामारावः – मूलकथा-'धर्मसौहृदम्' इति संस्कृत पद्यकाव्यम्

Module-3: गद्यसाहित्यम् **(06 Periods)**

5. अत्युत्कटैः पापपुण्यैः इहैव फलमश्नुते - नारायणपण्डितः - हितोपदेशः

6. शूद्रकवीरवरकथा - हितोपदेशः

Module-4: शब्दाः **(6 Periods)**

देव, कवि, भानु, पितृ, धातृ, गो, रमा, मति

Module 5: महाकवि, शास्त्रकाराः **(6 Periods)**

1.पाणिनिः 2.कौटिल्यः 3.भरतमुनिः 4.भारविः 5.माघः 6.भवभूतिः 7.शङ्कराचार्यः 8.दण्डी

Total Periods: 30

EXPERIENTIAL LEARNING:

The experiential learning components will be detailed in CHO.

RESOURCES

TEXT BOOKS:

1.विश्वभारती 2,संस्कृत भारती 3.अमृतवाणी

REFERENCE BOOKS:

1.रामायणम् 2.महाभारतम् 3.अष्टाध्यायी 4.अमरकोशः

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=bh-14xfMeYk
2. https://www.youtube.com/watch?v=6xFkoOpzsvs

Web Resources:

1. https://www.forum.universityupdates.in/threads/ou-sanskrit-2nd-semester-study-material.33659/
2. https://cbpbu.ac.in/study_mat_sanskrit.php

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT101022	**OCULAR DISEASE-II**	3	-	-	-	3

Pre-Requisite 22RT101011 Ocular Disease–I

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION:

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Diagnosing and treating or providing management plans for the diseases vitreous and retina

CO2. Diagnosing and treating or providing management plans for the diseases and disorders of retina

CO3. Diagnosing and treating or providing management plans for glaucoma

CO4. Diagnosing and treating or providing management plans for neuro-related diseases

CO5. Diagnosing and treating or providing management plans for the nystagmus and syndrome related neurological defects.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	-	3	-	2	-	3	-	-
CO2	3	3	-	3	-	2	-	3	-	-
CO3	3	3	-	3	-	2	-	3	-	-
CO4	3	3	-	3	-	2	-	3	-	-
CO5	3	3	-	3	-	2	-	3	-	-
CO6	3	2	-	3	-	2	-	3	-	-
Course Correlation Mapping	**3**	**3**	**-**	**3**	**-**	**2**	**-**	**3**	**-**	**-**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1 DISEASES OF VITREOUS & RETINA ***(09 Periods)***

Applied Anatomy of Vitreous, Disorders of vitreous: liquefaction, Posterior vitreous detachment, vitreous opacities, Vitreous hemorrhage and Vitrectomy, Vitreous surgeries
Applied anatomy of the Retina, Congenital and Developmental Disorders of retina
Hereditary macular dystrophy -photoreceptor dystrophies, macular dystrophies, choroidal dystrophies, hereditary viterochoroidal retinopathis, albinism, cherry red spot at the macula.
Lattice degeneration. Acquired macular disorders -age-related macular degeneration, retinal angiomatous, proliferation polypoidal choroidal vasculopathy. Peripheral exudative hemorrhagic chorioretinopathy. Idiopathic choroidal neovascularization. vitreomacular interface disorders. Vitreomacular traction. central serous chorioretinopathy. idiopathic macular telangiectasia. occlusive telangiectasia. Cystoid macular oedema. microcystic macular oedema. degenerative myopia. angioid streaks. choroidal folds. hypotony maculopathy. solar retinopathy. focal choroidal excavation

Module 2: DISEASE OF THE RETINA ***(09 Periods)***

Vascular Disorders -Retinal artery occlusion, retinal vein occlusion, hypertensive retinopathy, pregnancy induced retinopathy, sickle cell retinopathy, Eales Disease. Diabetic retinopathy. Non-diabetic retinopathy. Retinal Detachment. thalassemia retinopathy, retinopathy of prematurity, retinal artery macroaneurysm, primary retinal telangiectasia, idiopathic macular telangiectasia, coats disease, radiation retinopathy, purtscher retinopathy, Valsalva retinopathy
lipemia retinalis, retinopathy in blood disorders. Retinal surgeries.

Module 3: GLAUCOMA ***(09 Periods)***

Applied anatomy and physiology of anterior segment, Clinical Examination, Definitions, and classification of glaucoma & Pathogenesis of glaucomatous ocular damage.
Types of Glaucoma: Congenital glaucoma, Primary open angle glaucoma, Ocular hypertension & Normal Tension Glaucoma. Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure). Secondary Glaucoma & Management of Glaucoma: common medications, laser intervention and surgical techniques
Glaucoma surgeries

Module 4: NEURO-OPHTHALMOLOGY-I ***(09 Periods)***

Applied anatomy of optic nerve- axoplasmic transport- optic atrophy-optic neuritis- non-arteritic anterior ischaemic optic neuropathy-Arteritic anterior ischaemic optic neuropathy - diabetic papillopathy- Leber hereditary optic neuropathy- hereditary optic atrophies- alcohol-tobacco Amblyopia-drug induced optic neuropathies-papilledema idiopathic intracranial hypertension- congenital optic nerve anomalies. Anatomy & Lesions of the visual pathway
Cortical blindness, miller fisher syndrome.

Module 5 NEURO-OPHTHALMOLOGY-II ***(09 Periods)***

Nystagmus &Malingering, Supranuclear disorders of ocular motility third, fourth, sixth nerve applied anatomy and clinical aspects chiasm, causes of chiasmal disease, pituitary adenoma, craniopharyngioma, meningioma optic tract, optic radiations, striate cortex- higher visual function- Migraine Intracranial aneurysms Myasthenia gravis chronic progressive external ophthalmoplegia - blepharospasm - neurofibromatosis - Mobius syndrome, Duane Syndrome, Brown Syndrome

Total Periods: 45

EXPERIENTIAL LEARNING:

1 Photographic Demonstration of different posterior segment disease.
2 Group discussion on case studies.
3 Videographic presentation of diseases and related procedures
4 Case based learning

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES BOOKS

1. Bowling Kanski's, Clinical Ophthalmology International Edition A systemic approach, Elsevier Health UK publications, Edition 8, 2015 .
2 Albert, D. M., Miller, Albert and Jakobiec's Principles and Practice of Ophthalmology, Springer, Edition 1, 2022.
3. Khurana, A., Khurana, A. K., & Khurana, B. P., Comprehensive Ophthalmology: With Ophthalmology Logbook Plus Practical Ophthalmology, Jaypee Brothers Medical Publishers Pvt Limited, Edition 1, 2023.

VIDEO LECTURES:

1. www.youtube.com/@OptometryClub92
2. OOLS-ONLINE OPTOM LEARNING SERIES
3. www.youtube.com/@DoctorEyeHealth

WEB RESOURCES:

1. https://www.ncbi.nlm.nih.gov/book
2. Stat Pearls.
3. Eye wiki.
4. https://www.aao.org/eye-health/a-z

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102013	BINOCULAR VISION	4	-	2	-	5
Pre-Requisite						
Anti-Requisite	-					
Co-Requisite						

COURSE DESCRIPTION: The objective of this course is to help the learner appreciate the working of the two eyes together and its neurophysiology. Leamers will learn the mechanisms by which the visual system extracts a single unified view of the extern visual world from the two disparate visual images that are formed retina of the two eyes. The course aims to help the understand the binocular vision related to clinically manifested binocular vision problems. The course intends to prepare the leamers in the clinical examination and care of patients with different types of Binocular vision anomalies.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1.	Understanding how binocular vision works and gain insights on theories of binocular summation
CO2.	Relate to the need for two eyes, advantages and disadvantages of binocular vision, visual axes, laws of binocular vision, visual directions, corresponding points.
CO3.	understand Optometric management of amblyopia and prescribing spectacles and prisms in amblyopia.
CO4.	Describe the interaction between accommodation.
CO5	Describe the interaction between vergence systems.
CO6	Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	-	-	-	2	-	3	-	-
CO2	3	-	-	-	-	2	-	3	-	-
CO3	3	3	-	3	-	2	-	3	-	-
CO4	3	3	-	3	-	2	-	3	3	3
CO5	3	3	-	3	-	2	-	3	-	-
CO6	3	2	-	3	-	2	-	3	-	-
Course Correlation Mapping	**3**	**3**	**-**	**3**	**-**	**2**	**-**	**3**	**3**	**3**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module1: GRADES OF BINOCULAR VISION ***(12 Periods)***

Definition binocular vision, simultaneous perception, fusion stereopsis, advantage of binocular vision, visual direction, retinal correspondence, theories of binocular vision, fixation disparity, horopter, physiological diplopia. Retinol motor values, egocentric location.

Module 2: EXTRA OCULAR MUSCLE AND OCULAR MOVEMENTS. ***(12 Periods)***

Anatomy of extraocular muscle, center of rotation and axes of flick, action of individual muscle, laws ocular motility: donder and listing law, Sherrington's law, herrings law. Uniocular and binocular movements -fixation, saccadic, pursuits.

Module 3: AMBLYOPIA AND ITS MANAGEMENT ***(12 Periods)***

Definition, neuropathology, classification, clinical features, occlusion, penalization, role of drugs, assessments of amblyopia, suppression.

Module 4: ACCOMMODATION AND ITS MANAGEMENT ***(12 Periods***

Definition and mechanism, methods of measurements, types of accommodation, anomalies of accommodation -etiology and management. Accommodation insufficiency, accommodation excess, ill sustained accommodation. accommodative in facility. diagnosis of accommodation.

Module 5: CONVERGENCE AND ITS MANAGEMENT. ***(12 Periods)***

Definition and mechanism, methods of measurements, types of components of convergence (tonic, accommodation, fusional, proximal), anomalies of convergence -etiology and management. convergence excess, convergence insufficiency, divergence excess, divergence insufficiency.

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS: PRACTICALS/ DEMONSTRATION:

1. Cover and uncover test
2. Saccadic and pursuits
3. Brock string
4. Occlusion method
5. Therapy instruments
6. Orthoptic evaluation
7. Orthoptic instruments

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. Mitchell Scheiman OD, Bruce Wick OD PhD-Clinical Management of Binocular Vision_ Heterophoric, Accommodative, and Eye Movement Disorders-LWW (2013)
2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
3. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.

REFERENCE BOOKS:

1. Gunter K. V. Mosby Company

VIDEO LECTURES:

1. https://youtu.be/p4d5cOY3xUo?si=xhL-mQF6GkO5zWsB
2. https://youtu.be/GTjc6UsrnJM?si=gdQFRYcj7GjPpngn
3. https://youtu.be/xStvGve99sA?si=omkPVwfx24hfOFRq

Web Resources:

1. https://www.youtube.com/live/I5AFfuwpqAw?si=14yw2MrzYXvfcanQ.
2. https://www.youtube.com/live/T7YufyWnAas?si=LpVV36QJAEZRLRZ1.
3. https://www.youtube.com/live/CyMo8BK9f7Y?si=I7Suiqz9Ws7s636H

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT102014	CONTACT LENS	5	-	2	-	6
Pre-Requisite						
Anti-Requisite	-					
Co-Requisite						

COURSE DESCRIPTION: The principal objective of this course is to gain in-depth knowledge of the different types of contact lens, complication of contact lens. Different fitting philosophies, advanced varieties of contact lens for complicated eye disease.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1.	Gain knowledge on nomenclature of contact lens.
CO2.	Summarize the concept of various manufacturing techniques of contact lens
CO3.	Gain expertise various fitting philosophies of RGP lenses
CO4.	Gain expertise various types soft contact lens
CO5	Comprehend about various contact lens fitting in different ocular condition.
CO6	Work individually or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	-	-	-	2	-	3	-	-
CO2	3	-	-	-	-	2	-	3	-	-
CO3	3	3	-	3	-	2	-	3	-	-
CO4	3	3	-	3	-	2	-	3	3	3
CO5	3	3	-	3	-	2	-	3	-	-
CO6	3	2	-	3	-	2	-	3	-	-
Course Correlation Mapping	**3**	**3**	**-**	**3**	**-**	**2**	**-**	**3**	**3**	**3**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module1: **Introduction of contact lens and its nomenclature.** ***(15 Periods)***

Definition and classification of contact lens, history of contact lens, tear film and contact lens interaction, terminology of contact lens contact lens, nomenclature of contact lens (British and American) and complication of contact lens.

Module 2: **optics and manufacturing of contact lens.** ***(15 Periods)***

Contact lens material, RGP material, soft lens material, manufacturing -lathe cutting, spin coasting, molding. stages in manufacture of contact lens, optics of contact lens: neutralization of cornea correction of ametropia by contact lens, power and magnification by contact lens, influence of tear lens.

Module 3: **RGP contact lens** ***(15 Periods)***

Types of contact lens, fitting producer of RGP (initial work up, selection of lens from trail set), evaluation of trail lens fit (position of the lens, base curve determination), insertion and removal RGP lens, extended wear RGP lens.

Module 4: **soft contact lens** ***(15 Periods***

Fitting of soft contact lens, evaluation of trail lens fit, hybrid lens, extended wear hydrogel soft contact lens, types of extended wear, care and maintenance of soft lens**.**

Module 5: **contact lens for different ocular condition** ***(15 Periods)***

Contact lens fitting for astigmatism, aphakia, keratoconus, myopia, presbyopia, orthokeratology, cosmetic contact lens.

Total Periods: 75

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS: PRACTICALS/ DEMONSTRATION:

1. Insertion and removal of contact lens.
2. Selection of base curve based on keratometry values
3. Assessing of steep of RGP lens
4. Care and maintenance of contact lens.
5. Flat fit assessment
6. Proper refraction after trail fit
7. Identifying different types of contact lens.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. Contact lenses in ophthalmic practice-MARK J. MANNIS KARLA ZADNIK CLEUSA CORAL-GHANEM NEWTON KARA -JOSE.
2. Contact lens primer -Monica Chaudhary

REFERENCE BOOKS:

1. A K KURANA text book of optics and refraction.

VIDEO LECTURES:

1. https://www.youtube.com/live/E852rtlLxbw?si=b3_nPzEW0U3v214W
2. https://www.youtube.com/live/E852rtlLxbw?si=b3_nPzEW0U3v214W
3. https://youtu.be/6Sck9cfz7Gc?si=rjZbw440TnjNsegx

Web Resources:

1. https://youtu.be/h9KyyZhHiWw?si=8KBC3z6ATMQK9iOi.
2. https://youtu.be/DyLR7ybPxhM?si=2VTn1Ebf52injjvv.
3. https://youtu.be/uHeSvePAqnI?si=ffwnN8TG3hcVp9Go.

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT101023	**OPTOMETRIC INSTRUMENTS-II**	3	1	-	-	4

Pre-Requisite 22RT101012 Optometric Instruments-I

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: The principal objective of this course is to gain in-depth knowledge of the instrumentation and functioning of the instruments that are routinely used in optometric practice

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the construction and principles of color vision testing and exophthalmometer

CO2. Understand the construction and principle of different refractive instruments and will be able to operate those instruments in clinical scenario.

CO3 Gain knowledge about different instruments for measuring corneal dimensions and properties along with handling of those.

CO4. Demonstrate utilization of various instruments that are related to posterior segment evaluation.

CO5. Master the application and interpretation of specialized ophthalmic instruments for comprehensive and accurate clinical assessments.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	2	-	-	-	2	-	-
CO2	3	-	-	2	-	-	-	2	-	2
CO3	2	2	-	3	-	-	-	2	-	2
CO4	2	3	-	3	-	-	-	2	-	2
CO5	3	-	-	3	-	-	-	2	-	-
CO6	3	2	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**2**	**-**	**2**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: COLOUR VISION AND EXOPHTHALMOMETRY ***(10 Periods)***

Theory on commonly available color vision tools, Advantage and disadvantage of each technique, documentation, and implication of color vision in clinical care. Principle and technique of Exophthalmometry, Clinical implication, documentation.

Module 2: GONIOSCOPY ***(10 Periods)***

Gonioscopy techniques, principle of Gonio methods & accessories, Advantage and disadvantage of each technique, Clinical implication, documentation

Module 3: VISUAL FIELD ***(10 Periods)***

Introduction to different types of perimetry, Perimetry techniques, principles & clinical uses, Documentation and Interpretation of reports, commercially available instruments with advancements.

Module 4: ASSESSMENT OF FUNDUS ***(10 Periods)***

Direct and indirect ophthalmoscopes-principle, instrumentation, clinical evaluation, clinical procedure, documentation. Fundus bio microscopy (+78D and +90D)- Condensing lens and slit lamp bio microscopy techniques, Use of filters in clinical evaluation, clinical procedure, and documentation

Module 5: ELECTROPHYSIOLOGY AND RECENT DEVELOPMENTS ***(05 Periods)***

electroretinography, electro oculogram and visually evoked potentials, OCT, Fundus photography, B Scan, Angiography

Total Periods: 45

EXPERIENTIAL LEARNING

List of Experiments

1 Color vision tests interpretation

2 Exopthalmometer documentation

3 Demonstration video of diagnosis

4 Demonstration of direct and indirect ophthalmoscope

5 Interpretation of perimetry

6 Interpretation of oct

7 Interpretation of FFA and fundus photography

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES

TEXTBOOKS:

1. Henson, D. B. . Optometric instrumentation. Elsevier Science & Technology Book, Edition 1, 1993.

2. Ichhpujani, P., & Singh, M., *Ophthalmic instruments and surgical tools*, Springer, Edition 2, 2019

3. Eskridge, J. B., Amos, J. F., & Bartlett, J. D, Clinical procedures in optometry, Lippincott Williams & Wilkins, Edition 1, 1991

REFERENCE BOOKS:

1. Herrin, M. P., Instrumentation for eyecare paraprofessionals. SLACK Incorporated. Grosvenor, Edition 1, 1999

2. Theodore P. Grosvenor., Primary care optometry, Elsevier Health Sciences, Edition 1, 2007

VIDEO LECTURES:

1. www.youtube.com/@SKOptics_OOLS
2. www.youtube.com/@optometry-with-samir
3. www.youtube.com/@DoctorEyeHealth

WEB RESOURCES:

1. aurosiksha.org
2. Eye wiki
3. American Academy Ophthalmology

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT101024	**OCULAR PHARMACOLOGY**	3	-	-	-	3

Pre-Requisite 22CC101006 Basic Pharmacology and Drug Administration

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Pharmacology being the basis of Therapeutics, the learners are taught the actions, uses, adverse effects and mode of administration of drugs for various diseases in this course

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Gain knowledge about general principles of pharmacology

CO2. Describe the actions of specific agents

CO3 Demonstrate an understanding of the essentials of ocular pharmacology

CO4. Gain knowledge on commonly used medications in eye care practice in India

CO5. Comprehend about autonomic drugs

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-
CO3	3	2	-	3	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
CO6	3	3	-	2	-	-	-	-	-	-
Course Correlation Mapping	**3**	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: GENERAL PHARMACOLOGY ***(09 Periods)***

Mechanisms of drug action Dose response relationships, tachyphylaxis and idiosyncrasy; Pharmacokinetics of drug absorption, distribution, biotransformation, excretion and toxicity. Factors influencing drug metabolism of drug action

Module 2: ACTION OF SPECIFIC AGENTS: ***(09 Periods)***

Depressants, Anti-coagulants, C.N.S. stimulants and antidepressants, Diuretics and hypertensive agents, cardiovascular drugs, Histamines and antihistamines, Serotonin, Prostaglandins

Module 3: PRINCIPLES OF OCULAR PHARMACOLOGY ***(09 Periods)***

Current optometric drug use- Preparation & packaging of ophthalmic Drugs- General principles of ocular pharmacology- Drug actions and effectiveness - Drug safety, Factors influencing the objectivity, demonstrated response - Ocular penetration - Routes of ocular administration

Module 4: OPTOMETRIC ANDOPHTHALMOLOGICAL DRUGS ***(09 Periods)***

Diagnostic Drugs-Optometric use of pharmaceuticals -classification of drug use, Topical ophthalmic drugs-References and drug indices, Hazards of ophthalmic drugs-surface active drugs; Physical agents - Germicides and sterilizing agent's Over-the-counter drugs - Dyes and stains, USE: Anti-glaucoma drugs - Drugs for ocular hypertensive, Drugs that enhance aqueous outflow - Inhibitors of aqueous secretion, Topical anesthetics, Steroids and NSAIDS

Module 5: AUTONOMIC DRUGS ***(09 Periods)***

Principles and classification of autonomic drugs, Sympathomimetics - Sympatholytic, Parasympathomimetic - Parasympatholytic, Diagnostic use of autonomic drugs,

-Sulfonamides, Antibiotics, Corticosteroids-Anesthetics-Proteolytic enzymes

Total Periods: 45

EXPERIENTIAL LEARNING

1 Case based learning

2 Hands on training for prescribing drugs

RESOURCES

TEXTBOOKS:

1. K. D. Tripathi, Essentials of Medical Pharmacology, Jaypee Brothers Medical Publishers (p) Ltd, Edition 8, 2018.

2. 2. S.K. Gupta, R. Agarwal, S. Srivastava, Textbook on Clinical Ocular Pharmacology & Therapeutics, Jaypee Brothers Medical Publishers (P) Ltd., Edition 1, 20150.

Reference Books:

1. T.J. Zimmerman, K.S. Kooner, Text Book of Ocular Pharmacology, Lippincott Williams and Wikins, Edition 3, 1999

2. J. D. Bartlett and S.D. Jaanus, Clinical Ocular Pharmacology, Butterworth-Heinemann, Edition 5, 2008

VIDEO LECTURES:

1. https://youtu.be/2Fz935_gC5s?si=tAcGavVWxY_WDrA6

2. https://youtu.be/OP0LR-r_Dtk?si=ATuoWKJRB-vzso5F

3. https://www.youtube.com/live/9-9sRHqgZhE?si=jNI7qm257oyeF-uk

WEB RESOURCES:

1. https://www.slideshare.net/laxmieyeinstitute/ocular-pharmacology-60484596

2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7122473/

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT101025	VISUAL PSYCHOPHYSICS	2	-	-	-	2

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: The principal objective of this course is to gain in-depth knowledge of the instrumentation and functioning of the instruments that are routinely used in optometric practice

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Outline basic psychophysical concepts. Explain threshold and its relationship with sensitivity

CO2. Outline various methods used to estimate threshold

CO3 Summarize the concept of signal detection theory

CO4. Identify various psychophysical tests used in clinical

CO5. Appraise the application of various psychophysical methods in clinical practice

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	-	2	2	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	2
CO5	3	-	2	2	-	-	-	-	-	-
CO6	3	-	-	2	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**2**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: INTRODUCTION TO PSYCHOPHYSICS ***(05 Periods)***

Outline the basic psychophysical concepts, Explain the concept of absolute, relative and supra threshold,

Explain the relationship between threshold and sensitivity

Module 2: METHODS OF MEASURING VISUAL PERCEPTION ***(05 Periods)***

Explain the magnitude estimation, matching, Detection / discrimination, Yes-No procedures and Forced Choice procedures, Fourier analysis

Module 3: SIGNAL DETECTION THEORY ***(10 Periods)***

Explain signal detection theory, d-prime value, and ROC curves, basic probability, and statistics

Module 4: CLASSICAL PSYCHOPHYSICAL METHODS ***(05 Periods)***

Combination of both staircase and Bayesian based adaptive psychophysical methods. Bayesian based, method of adjustment, constant stimuli. Staircase method and adaptive staircase method.

Module 5: PSYCHOPHYSICS IN OPTOMETRY PRACTICE ***(05 Periods)***

List various psychophysical procedures used in routine optometry practice, determine how various psychophysical methods can be utilized in various clinical tests.

Total Periods: 30

EXPERIENTIAL LEARNING

1 Demonstration of psychopy app
2 Video demonstration of psychophysical methods
3 Clinical usage of psychophysics

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES

TEXTBOOKS:

1. E. Bruce Goldstein, Sensation and perception, Wadsworth Pub Co, Edition 9, 2012.
2. David Marvin, Green -Signal Detection Theory and Psychophysics, Peninsula Publishing, Edition 1,1988.
3. Schwartz, Visual perception, McGraw-Hill Education / Medical, Edition 4, 2009

REFERENCE BOOKS:

1. Frederick A.A. Kingdom, Psychophysics: A practical introduction, Elsevier Publications, Edition 1, 2016.
2. George A. Schneider, The Fundamentals, A psychology press book publications, Edition 3, 1997.

VIDEO LECTURES:

1. https://youtu.be/ei-rUPn4Xyg?si=ueZdFC1zJL6jrVDg
2. https://youtu.be/-1e0uIS5j2Q?si=VjYIKgKG0CaAmh3E
3. OOLS-ONLINE OPTOM LEARNING SERIES

WEB RESOURCES:

1. https://color.psych.upenn.edu/brainard/PsychToolbox.pdf

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT101026	**ADVANCE DISPENSING**	2	-		-	2

Pre-Requisite

Anti-Requisite -

Co-Requisite

COURSE DESCRIPTION: Spectacle dispensing is a subspecialty of optometry which includes all procedures from the time the glass prescription is presented to the optician till the patient receives the pair of glasses satisfactorily.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Learn about Art and science of dispensing spectacle lens and frames based on the glass prescription.

CO2. Gain expertise in frame measurements.

CO3. Learn how to record Facial measurements - Interpupillary distance measurement and measuring heights (single vision, multifocal, progressives)

CO4. Apply various techniques for Troubleshooting complaints and handling patient's questions

CO5 Learn about various types of tinted lens

CO6 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-
CO3	3	2	-	3	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
CO6	3	2	-	3	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module1: ***(06 Periods)***

Lens material and its manufacture

Manufacture of glass, Lens materials, Lens surfacing, Principle of surface generation and glass cements, Terminology used in Lens workshop, Lens properties, Lens quality, Faults in lens material, Faults on lens surface.

Module 2: Spectacle frames ***(04 Periods)***

Types and parts, Classification of spectacle frames-material, weight, temple position, Coloration, Frame construction, Frame selection, Size, shape, mounting and field of view of ophthalmic lenses

Module 3: Multifocal Lenses: ***(07Periods)***

Different types of multifocal lens, bifocal lens, classification, PAL lenses of PAL lens, Symmetrical versus Asymmetrical design PALs, Dispensing of Progressive Lens, spectacle repair-tools, methods, soldering riveting, frame.

Module 4: Measurements of final dispensing of spectacles. ***(07 Periods)***

Components of spectacle prescription, interpretation, transposition, add and near power relation, frame selection (based on age, face shapes), lens and frame marking, pupillary centers, bifocal heights, progressive making and pantoscopic tilt, recording and ordering of lens, final checking and dispensing of spectacle to maintaining of spectacles.

Module 5: Tinted and protective lenses ***(06 Periods)***

Characteristics tinted lens and absorptive glasses, polarizing filters, photochromic and reflective filters, safety lens (CR 39,laminated lenses),high index glasses, lenticular and aspherical glasses, iseikonic lenses, antireflecting coating, mirror coating ,hard multi coating (HMC).

Total Periods: 30

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS: PRACTICALS/ DEMONSTRATION:

1. Frame selection –based on spectacle prescription, professional requirements, age group, face shape
2. Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height
3. Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments –facial wrap, pantoscopic tilt
4. Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements)
5. Faults in spectacles (lens fitting, frame fitting, patients' complaints, description, detection, and correction)
6. Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories –Bands, chains, boxes, slevets, cleaners, screwdriver kit.
7. Frame selection –based on spectacle prescription, professional requirements, age group, face shape.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. Alie MO: Ophthalmic lens and Dispensing, 3rd edition, Butterworth –Heinemann, 2008
2. Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth Heinemann, 1996.

REFERENCE BOOKS:

1. C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rdedition, Butterworth - Heinemann, 2007
2. Michael P Keating: Geometric, Phisical& Visual Optics, 2nd edition, Butterworth Heinemann, 2002

VIDEO LECTURES:

1. https://youtu.be/cYjQMpVcyoI?si=coTkIq-rqzQXoLLg
2. https://youtu.be/exX62tQCGk4?si=uOS3JbBaGq4D5JX4
3. https://youtu.be/QDFxUgz4trM?si=xJwv8B76ohtWt-Dp

Web Resources:

1. https://youtu.be/Dr46Y9jRruU?si=J89KWdcXdoW0Kb-j
2. https://www.youtube.com/live/bxtN79cCHdg?si=WpyQgcdA5Z7R7uX3
3. https://youtu.be/bRgBlD5XpGs?si=ZaMXp84PERhYbjJn

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CC111003	**CLINICAL POSTING-III**	-	-	-	-	4

Pre-Requisite 22CC111002 Clinical Posting-II

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides basic knowledge on hospital setup, care of patient, primary illness observation, and handling basic clinical instruments at training hospital.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Develop case sheet of the concerned patient in the hospital.

CO2 Handled appropriate medical devices to generate patients' data.

CO3 Perform various instrumental handling techniques to analyse disorders.

CO4 Work individually and in teams following ethical practice.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	2	-	1
CO2	3	1	1	3	-	-	-	-	-	1
CO3	3	-	-	2	-	-	3	1	-	-
CO4	3	-	1	2	-	1	1	1	-	1
Course Correlation Mapping	**3**	**1**	**1**	**3**	**-**	**1**	**2**	**2**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

Note:

1. Students will attend to clinical posting weekly two days in 5th semester.
2. The Evaluation process is day to day, based on logbook and viva.

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT102016	**LOW VISION MANAGEMENT**	4	-	2	-	5

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a comprehensive overview of low vision, offering insights into the challenges faced by individuals with visual impairments and strategies to enhance their quality of life.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Comprehend WHO definitions of low vision.

CO2. Acquire knowledge of common anterior and posterior segment disorders prevalent in both peadiatric and geriatric populations.

CO3 Gain insight into low vision examination techniques.

CO4. Gain knowledge of low vision aid optics.

CO5. understand assistive devices and technologies tailored for low vision and blindness.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	3	-	-	-	-	-	3
CO3	2	2	-	3	-	-	-	2	-	3
CO4	2	3	-	3	-	-	-	3	-	3
CO5	3	3	-	3	-	-	-	3	-	-
CO6	3	-	-	-	-	-	3	-	-	-
Course Correlation Mapping	**3**	**3**	**-**	**3**	**-**	**-**	**3**	**3**	**-**	**3**

Correlation Levels: 3: High;2: Medium;1: Low

COURSE CONTENT

Module 1: INTRODUCTION TO LOW VISION ***(10 Periods)***

WHO definition of low vision, blindness, disorder, impairment, disability and handicap Epidemiology (Incidence & prevalence), government policies and Acts, Optometrist's role in Low Vision management, Response to low vision – Denial, grief, anger, depression and acceptance, psychological factors for children and adults

Module 2: COMMON DISORDERS ***(05 Periods)***

Common anterior and posterior segment disorders, Disorders effecting geriatric and paediatrics.

Module 3: CLINICAL EXAMINATION ***(20 Periods)***

Examination of a Patient with Low vision, Case history, Visual acuity, Distant vision – Charts, measurement & Documentation, Near vision - Charts, measurement & Documentation, Refraction – Significance & Technique, Diagnostic procedures in low vision examination, Screening for vision disability., Functional vision assessment, A collaborative model of service delivery. Six sensory impairments, realistic simulations and performance sign, Impaired acuity, Impaired contrast sensitivity, Central field loss, Peripheral field loss, Oculomotor problems, Perceptual impairment

Module 4: LOW VISION AIDS ***(10 Periods)***

Optics & Characteristics of Low vision aids, Magnification, Galilean telescope Vs Keplerian Telescopes, Spectacle magnifiers, Hand Magnifiers, Stand Magnifiers, CCTV,Bioptic telescopes, Accessory low vision aids, Selection of low vision aids for Distance, Intermediate and Near., On-optical low vision devices.

Module 5: LOW VISION DEVICES ***(15 Periods)***

Rehabilitation of Children and Youth with vision Impairment, Rehabilitation of working –age Adults with Vision Impairment, Functional consequences of vision Impairment, Assistive Devices and Technology for Low Vision, Assistive Devices and Technology for Blind

Total Periods: 60

EXPERIENTIAL LEARNING

1 Case history
2 Optical devices
3 Non optical devices
4 Environmental changes
5 Low vision devices
6 Low vision apps
7 Recent advancement in low vision

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES BOOKS

1. Eleanor. E.Fay, Clinical Low vision, Lippincott Williams and Wilkins, Edition 1, 1984.
2. Richard L. Brilliant OD, Essentials of Low Vision Practice, Butterworth-Heinemann, Edition 1, 1998.
3. Chaudhry, low vision aids, Jaypee Brothers Medical Publishers (P) Ltd, Edition 1, 2006.

VIDEO LECTURES:

1. Online optometry learning series-OOLS
2. https://youtu.be/W6evBBzIJvQ?si=JQsLsaTfmxzCi-3z
3. https://www.youtube.com/live/cQVnG1hssbQ?si=q1WIFtIXIYmA7e3d

WEB RESOURCES:

1. https://www.afb.org/aw/17/2/15364
2. https://www.eophtha.com/posts/low-vision-assessment
3. https://www.aao.org/eye-health/diseases/low-vision-aids
4. https://www.aao.org/eye-health/diseases/low-vision-assistive-devices

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT101029	PAEDIATRIC OPTOMETRY AND GERIATRIC OPTOMETRY	4	-		-	4

Pre-Requisite

Anti-Requisite -

Co-Requisite

COURSE DESCRIPTION: This course provides insights into comprehensive eye care across different stages of life, from infancy to elderly care, addressing unique challenges and approaches for optimal vision health.,

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Gain knowledge about human eye development prenatal and postnatal stage.

CO2. Investigate the fundamentals of refractive examination and binocular status determination, alongside assessments of sensory-motor adaptability.

CO3. Gain expertise in assessing and recognizing normal appearances, pathologies, and structural anomalies spanning the entire ocular system.

CO4. Gain insight into ocular diseases prevalent in the elderly.

CO5 Learn about low vision care and dispensing of low vision aids.

C06 Work individually or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	-	-	-	-	-	-	-	-	2
CO2	3	-	-	2	-	-	-	-	-	2
CO3	2	2	-	3	-	-	-	-	-	2
CO4	2	3	-	-	-	-	-	-	-	2
CO5	3	-	-	3	-	-	-	-	-	2
CO6	3	-	-	3	-	-	-	-	-	-
Course Correlation Mapping	**3**	**3**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**2**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module1: Embryology of eye ***(11 Periods)***

The development of eye, normal appearance, pathology and structural anomalies of (orbit, eyelid lacrimal system, conjunctiva cornea, sclera, determine binocular status, determine sensory motor adaptability.

Module 2: Pediatric visual acuity ***(13 Periods)***

History taking of pediatric subjects, assessments of visual acuity, refraction, spectacle dispensing for children, pediatric contact lens. millstone of vision development. different types visual acuity charts for different age groups.

Module 3: Pediatrics eye disorders ***(12 Periods)***

Cataract, ROP, retinoblastoma, anterior segment dysgenesis aniridia, microphthalmos coloboma, albinism, compensatory treatment and remedial therapy: myopia, pseudo myopia and hypermetropia Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy).

Module 4: Aging eye ***(12 Periods***

Structural changes of eye, pathological changes of eye, nutrition in aging eye, age related ocular disease, special considering in the ophthalmic dispensing to the elderly patient. (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD)

Module 5: Systemic disease and low vision management. ***(12 Periods)***

Epidemiology, need for optometry, systemic disease (hypertension, arthrosclerosis, heart disease, diabetics), pharmacology aspects of aging, low vision cause management and rehabilitation in geriatric and pediatric patients

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS: PRACTICALS/ DEMONSTRATION:

1. Special types of visual acuity test.
2. Developmental millstone
3. Age related eye disease
4. counsel the elderly patient
5. Special test pediatric vision.
6. Glaucoma in aging patients
7. Diabetic eye problems

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. A.J. Rossenbloom Jr & M.W.Morgan: Vision and Aging, Butterworth Heinemann, Missouri, 2007.
2. OP Sharma: Geriatric Care –A textbook of geriatrics and Gerontology, viva books, New Delhi, 2005

REFERENCE BOOKS:

1. VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998
2. DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002.

VIDEO LECTURES:

1. https://youtu.be/UDPM0yUItNk?si=97BlNTd14852-uIb
2. https://youtu.be/-ukuGZpSfd8?si=X6zb5yjAqGxKUna2
3. https://youtu.be/MV-6b5PJIvQ?si=BGvvQj3plVriiGb

Web Resources:

1. https://youtu.be/X7zRRpiazwE?si=OsvmPenJ_kGcyJzY
2. https://youtu.be/oanFMlAWH-k?si=4BdhQKClWsShzhSl
3. https://youtu.be/hhZhg8zWst4?si=swlZX2qUkrcHe6F1

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT101030	PUBLIC HEATH, COMMUNITY, AND OCCUPATIONAL OPTOMETRY	4	-	-	-	4

Pre-Requisite

Anti-Requisite -

Co-Requisite

COURSE DESCRIPTION: This course provides a detailed discussion on understanding the Basic concepts public and community health, tele ophthalmology, pattern assistance under NPCB, VI, vision 2020 global, occupational hazards, hygiene and safety international bodies like ILO, WHO. eye banking.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Gain a comprehensive understanding of community health care.

CO2. comprehensive understanding primary eye care

CO3. Learn various concept of vision 2020, NGOs

CO4. Gain an understanding of the effects of Electromagnetic Radiation on eyes and occupational hazards, along with preventive measures.

C05 Gain a comprehensive understanding digital technologies for primary eye care**.**

C06 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	2	-	-	-	-	-	-	-
CO2	3	-	2	2	-	-	-	3	-	-
CO3	2	2	-	3	-	-	-	3	-	-
CO4	2	3	-	-	-	-	-	3	-	3
CO5	3	-	-	-	-	-	-	3	-	3
CO6	3	-	-	-	-	-	-	-	-	3
Course Correlation Mapping	**3**	**3**	**2**	**3**	**-**	**-**	**-**	**3**	**-**	**3**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module1: Concept of public heath ***(11 Periods)***

Core function and characteristics of public health, stages of disease, dimension, determination and indication of public health, needs for community ophthalmology practice.

Module 2: Primary eye care and practice ***(13 Periods)***

Define primary eye care, needs and essential of primary eye care, level of eye care delivery in India, pyramidal model or eye care, integrated people -center eye care, vision centers, health and wellness centers, health promotion, sustainable development, goals and health promotion, role of frontline workers in eye health. Intersectoral collaboration for heath promotion

Module 3: Vision 2020 and national program for control of blindness and vision impairment. ***(12 Periods)***

Introduction, patient of assistance, pattern assistance under NPCB, VI, vision 2020 global, recent development: world health assembly resolution, global commitments to eye health and universal health coverage, vision 2020 in India, key contribution to support, strategies plan, membership and governance.

Module 4: Occupational optometry ***(12 Periods***

Introduction to occupational health, hygiene and safety international bodies like ILO, WHO and national bodies etc., electromagnetic radiation and its effects on eye, occupational hazards and prevention, methods, industrial vision screening, vision standard-railways roads and airlines, visual display units.

Module 5: Ophthalmic human resource and teleophthalmology and digital technologies for primary eye care. ***(12 Periods)***

Indicators to assess human resource in eye care, basic infrastructure at district level, need for eye care in million population in India, the rationale for teleophthalmology and digital technologies in vision, work flow at VC and base hospital, role and responsibilities, benefits of teleophthalmology and digital technologies, eye banking.

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS: PRACTICALS/ DEMONSTRATION:

1. Vision screening.
2. List of NGOs
3. Creating awareness about occupational hazards
4. Vision 2020 -right to sight
5. Eye health promotion
6. Digital eye stain.
7. Industrial vision evaluation

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. PP Santanam, R Krishnakumar, Monica R. Dr. Santanam's text book of Occupational optometry. 1st edition, Published by Elite School of optometry , unit of Medical Research Foundation, Chennai, India , 2015.
2. R V North: Work and the eye, Second edition, Butterworth Heinemann, 2001.

REFERENCE BOOKS:

1. G Carson, S Doshi, W Harvey: Eye Essentials: Environmental & Occupational Optometry, Butterworth-Heinemann, 2008
2. N.A. Smith: Lighting for Occupational Optometry, HHSC Handbook Series, Safchem Services, 1999

VIDEO LECTURES:

1. https://youtu.be/TP_qTBgxhyA?si=XTFGXPbpoPGr4TxO
2. https://youtu.be/YLRnkOFxtZ8?si=PPxmc8Dt2jk1lxun
3. https://youtu.be/MV-6b5PJIvQ?si=BGvvQj3plVriiGb

Web Resources:

1. https://youtu.be/biPRmWTUXuo?si=b8MOeBbX1Rsjl6jy
2. https://youtu.be/Ec5WSkNgcyo?si=iXLqRN0G1L00cC6e.
3. https://youtu.be/uHeSvePAqnI?si=ffwnN8TG3hcVp9Go.

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT101028	**LAW IN OPTOMETRY PRACTICE**	**2**	**-**	**-**	**-**	**2**

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION:

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Gain an understanding of the historical evolution of legal frameworks.

CO2. Gain knowledge about licensure and ethical concepts underlying professional practice.

CO3 Acquire knowledge of international optometry laws and their significance.

CO4. Gain an understanding of insurance principles.

CO5. Understand the legal framework surrounding registered medical practitioners

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-
CO3	2	2	-	3	2	-	-	-	-	-
CO4	2	3	-	-	2	-	-	3	-	-
CO5	3	-	-	-	2	-	-	-	-	-
CO6	3	-	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**3**	**-**	**3**	**2**	**-**	**-**	**3**	**-**	**-**

Correlation Levels: 3: High;2: Medium;1: Low

COURSE CONTENT

Module 1: HISTORY OF LAW ***(06 Periods)***

Legal environment and techniques- History – law and equity, History, and theory of licensure.

Module 2: LICENSE ***(06 Periods)***

Licensure as a means of internal and external discipline- unprofessional conduct- incompetence- gross immorality, ethical concepts.

Module 3: INTERNATIONAL OPTOMETRY ***(06 periods)***

International optometry- important foreign optometry law Optometrist in court, Malpractice- theory of liability- damages –, minimizing malpractice claims, confidentially and data protection.

Module 4: ETHICS ***(06 Periods)***

Insurance, Negligence, Ethics – professional ethics, Laws governing practice of medical and paramedical profession in India, ethical dilemmas. practice and ethical theory, business ethics.

Module 5: OPTOMETRY PRACTICE ***(06 Periods)***

Registered medical practitioner- laws against practice of medicine of those unregistered- medical council of India- dental council- nursing council, Present rules and regulations – laws regarding optical product Manufacturers- dispensing in India, Opticians- are they registered? Dispensing opticians- rules in UK.

Total Periods: 30

EXPERIENTIAL LEARNING

1 Ethics

2 Case based learning

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES

TEXTBOOKS:

1. Barbara K. Pierscionek ,Law and ethics of eye, Butterworth Heinemann, Edition 4, 2002

2. Steve Taylor (Author), David P. Austen (Author),Law and management in optometry practice, , Butterworth-Heinemann Ltd, Edition 1, 2005.

VIDEO LECTURES:

1. Online optometry learning series-OOLS

2. https://youtu.be/aLDJS_yRTIM?si=JftMCAmU8nWeUogO

3. https://youtu.be/kKeqrdt22xQ?si=K5I8QxOtsrDZBc8M

WEB RESOURCES:

1. https://g.co/kgs/5n9ZSLw

2. https://www.eu.elsevierhealth.com/law-in-optometric-practice-9780750645782.html

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT105002	**ADVANCED ORTHOPTICS**	**-**	**1**	**2**	**-**	**2**

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION:

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. gain knowledge about Vision Therapy (VT) and its objective to enhance visual abilities

CO2. Gain knowledge of Amblyopia classification, , and evidence-based practices for effective management.

CO3 Understand and evaluate visual problems associated with behavioral disorders

CO4. Comprehensive Understanding of Visual Information Processing

CO5. Understand the protocols implemented in a Vision Therapy (VT) clinic.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	3	-	-	-	-	-	3
CO2	3	-	-	3	-	-	-	3	-	3
CO3	3	2	-	3	3	-	-	3	-	3
CO4	3	2	-	3	3	-	-	3	-	3
CO5	3	-	-	3	3	-	-	3	-	3
CO6	3	-	-	-	-	-	-	3	-	3
Course Correlation Mapping	**3**	**2**	**-**	**3**	**3**	**-**	**-**	**3**	**-**	**3**

Correlation Levels: 3: High; 2: Medium; 1: Low

EXPERIENTIAL LEARNING

1. Goals of vision therapy
2. Structural and functional modules of vision therapye
3. Squecnce of vision therapy
4. Classification of amblyopia and pedig studies
5. Vision therapy sequence and management for amblyopia
6. Visual probelm in behavioural disorders
7. Role of vision therapy in behavioural disorders
8. Models and components of developmental and aquried visual information processing disorders
9. Test battery for dvip and avip disorders
10. Vision therapy sequence for the management of vip disorder
11. Role of vision in sports
12. the Visual skill training to the change in sports performance
13. Vision therapy for accomadation and convergence related probelms
14. Normative data for orthoptics evaluation
15. Protocols followed to be followed in a VT clinic

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES

TEXTBOOKS:

1. B. Steinman, B. A. Steinman, R. P. Garzia, Foundations of Binocular Vision: A Clinical Perspective, McGraw-Hill, Edition1, 2000.
2. M. Scheiman and B. Wick, Clinical Management of Binocular Vision, Lippincott Williams and Wilkins, Edition 4, 2013.
3. S. A Cotter, Clinical uses of priam: A spectrum of Applications, Mosby-Year Book, Edition 1, 1995.
4. L. J. Press, Applied concepts in Vision Therapy, Mosby-Year Book, Edition 1, 2020.

VIDEO LECTURES:

1. www.youtube.com/@OptometryClub92
2. OOLS-ONLINE OPTOM LEARNING SERIES
3. www.youtube.com/@DoctorEyeHealth

WEB RESOURCES:

1. Care of the patient with learning disability (CPG 20)
2. https://www.aoa.org/documents/optometrists/CPG-4.pdf
3. https://www.aos.org/documents/optometrists/CPG-18.pdf
4. https://www.aos.org/documents/optometrists/CPG-12.pdf

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT105001	**MYOPIA CONTROL**	**-**	**1**	**2**	**-**	**2**

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION:

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the overall concept of myopia

CO2. Able to conduct the speciality examination needed to assess risk of myopia progression

CO3 Interpret different types of advanced imaging technologies used in comprehensive myopia management

CO4. Understand principles and prescribe different spectacle based and contact lens-based myopia control treatment options

CO5. Critically appraise journal articles and practice evidence-based myopia management

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	3	-	3	2	-	-	2	-	-
CO3	3	2	-	3	-	-	-	2	-	-
CO4	3	2	-	-	-	-	-	2	-	2
CO5	3	-	2	-	3	-	-	-	-	3
CO6	3	-	-	-	3	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**2**	**3**	**3**	**-**	**-**	**2**	**-**	**3**

Correlation Levels: 3: High; 2: Medium; 1: Low

EXPERIENTIAL LEARNING

1. History taking
2. Case based learning
3. Contact lens fitting in myopia patients
4. Evidence based practice
5. Understand data collection from various sources related to myopia.
6. Demonstrate the management of myopia.
7. Understand the diagnosis of myopia by using various imaging techniques.
8. Perform the clinical assessment of myopia.
9. Understand the classification, Pathophysiology and risk factors of myopia

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES

TEXTBOOKS:

1. B. Steinman, B. A. Steinman, R. P. Garzia, Foundations of Binocular Vision: A Clinical Perspective, McGraw-Hill, Edition 1, 2000.
2. M. Scheiman and B. Wick, Clinical Management of Binocular Vision, Lippincott Williams and Wilkins, Edition 4, 2013
3. S. A Cotter, Clinical uses of priam: A spectrum of Applications, Mosby-Year Book, Edition 1, 1995.

VIDEO LECTURES:

1. https://youtu.be/IeCDXLdKPyU?si=acCVR1padMdnc7ba
2. https://youtu.be/YXwhTfpcI4c?si=IqdmXnJEk1euOJjR
3. https://youtu.be/OAB7KYzgMwE?si=NFw4dd78otQe43DE

WEB RESOURCES:

1. https://www.fit-boston.eu/downloads/orthok/OrthoK_Guide_Intl_English1.pdf
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3023964/
3. https://reviewofmm.com/how-to-treat-myopic-patients-with-binocular-vision-issues/

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CC111004	**CLINICAL POSTING-IV**	-	-	-	-	4

Pre-Requisite Clinical Posting-III

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides basic knowledge on hospital setup, care of patient, primary illness observation, and handling basic clinical instruments at training hospital.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Develop case sheet of the concerned patient in the hospital.

CO2. Handled appropriate medical devices to generate patients' data.

CO3. Perform various instrumental handling techniques to analyse disorders.

CO4. Work individually and in teams following ethical practice.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	2	-	1
CO2	3	1	1	3	-	-	-	-	-	1
CO3	3	-	-	2	-	-	3	1	-	-
CO4	3	-	1	2	-	1	1	1	-	1
Course Correlation Mapping	**3**	**1**	**1**	**3**	**-**	**1**	**2**	**2**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

Note:

1. Students will attend to clinical posting weekly two days in 6th semester.
2. The Evaluation process is day to day, based on logbook and viva.

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22RT111001	**CLINICAL INTERNSHIP-I**	-	-	-	-	20

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Practical training to the students who have successfully completed three years of course work.

.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 To learn to identify the common ocular disease

CO2 Identify the refractive errors, routine vision checking, performing retinoscopy and prescribing of glasses.

CO3 To train them in contact lens evaluation, fitting and assessments

C04 Encouraged to perform all instrument

CO5 Attending school screening and eye camps in rural areas to identify common Causes of ocular disease and pick up cases needing surgical attention and referring those patients back to the institution.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3		3	3		3	3		3
CO2	3	3		3	3		3	3		3
CO3	3	3		3	3		3	3		3
CO4	3	3		3	3		3	3		3
Course Correlation Mapping	**3**	**3**		**3**	**3**		**3**	**3**		**3**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

Note:

AREAS OF CLINICAL EXPOSURE:

S. No	Name of the Posting	Duration of the Posting
1	General outpatient department	3 months
2	Community outpatient department	3 months

A log book shall be maintained and updated daily at the end of the day which would be monitored and signed by the concerned supervisor under whom the candidate is posted for the given period of time.

Based on the report given by the supervisor and satisfactory signature obtained in the log books, the head of the department shall issue a completion report at the end of the semester

SKILL ACQUISITION

The intern is expected to demonstrate competence and independence in carrying out the following activities:-

GENERAL OUTPATIENT DEPARTMENT

Be able to register, identify and follow-up patients, and independently maintain records

Should have acquired knowledge to diagnose and medically manage the immediate treatment and refer the patient to the concerned specialty.

Should be able to identify the prognostic parameters on follow-

up **COMMUNITY OPHTHALMOLOGY**

To assist postgraduate doctors in camp screening work and learn to identify cataract cases and refer the cases to SRMC for further evaluation and intervention if necessary.

They have to do required number of hours in the blind school for a period of 1 month in which they will identify cases of low vision and treat the same.

They are required to do present a project report of their work in a specified area.

They would be required to do school screening during this period

CORNEA AND CONTACT LENS

To learn to recognize corneal disorders through slit lamp examination

To do corneal staining through Fluorescein or other dyes as indicated

To see and obtain knowledge of corneal transplantation

To do Keratometry

Contact lens evaluation, trial fitting, and prescription of final lens

RETINA AND LOW VISION

To do a fundus examination with direct and indirect ophthalmoscope

To assist in taking fundus photograph of patients referred with systemic and primary ocular pathology.

To observe the use of lasers in Ophthalmology

Learn to assess the magnitude of low vision and prescribe low vision aids

PEDIATRICS AND ORTHOPTICS

To learn to recognize extraocular muscle imbalance and the components of binocular single vision

Learn the skills of administering the appropriate muscle exercise

To use the Horopter on patients & the use of major Amblyoscope

The use of prism bar cover test in measuring the deviation of squint.

To diagnose the accommodative and Non-accommodative squints

To identify diplopia with Worth`s four dot test and Hess` screen.

The use of double maddox rod test

ORBIT AND GLAUCOMA

To identify the signs and symptoms of glaucoma

To recognize the attack of acute angle closure glaucoma and learn the necessary protocols to be followed as treatment immediately

To calibrate, record tension and maintain sterility of tonometers

To learn to use Schiotz and Applanation tonometers

To learn to record visual field examination through confrontation tests and automated

perimetery To learn to recognize the changes in the fundus of patients of Glaucoma To do

a Gonioscopic examination

To learn the diagnoses of blunt and penetrating trauma

To learn to request for various radiological views in

trauma

To request the necessary emergency consults as part of ocular trauma treatment

To do automated perimetry in Neurological problems & interpretation of visual fields

To learn to do cadaveric enucleation

SPECIAL DIAGNOSTICS

To handle advanced equipments like fundus photo, ultrasound, optical coherence tomography and specular microscope

To interpret the test results

To maintain the calibration check and statistic records

CHILDREN WITH SPECIAL NEEDS

To provide early visual stimulation to children with special needs

To train the oculomotor system, accommodation and Vergence systems

To provide appropriate home therapies

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22RT111002	**CLINICAL INTERNSHIP-II**	-	-	-	-	20

Pre-Requisite 22RT111002 CLINICAL INTERNSHIP-I

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Practical training to the students who have successfully completed three years of course work.

.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 To learn to identify the common ocular disease

CO2 Identify the refractive errors, routine vision checking, performing retinoscopy and prescribing of glasses.

CO3 To train them in contact lens evaluation, fitting and assessments

C04 Encouraged to perform all instruments

CO5 Attending school screening and eye camps in rural areas to identify common Causes of ocular disease and pick up cases needing surgical attention and referring those patients back to the institution.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3		3	3		3	3		3
CO2	3	3		3	3		3	3		3
CO3	3	3		3	3		3	3		3
CO4	3	3		3	3		3	3		3
Course Correlation Mapping	**3**	**3**		**3**	**3**		**3**	**3**		**3**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

Note:

AREAS OF CLINICAL EXPOSURE:

S. No	Name of the Posting	Duration of the Posting
1.	Cornea and contact lens	1 month
2.	Retina and Low vision	1 month
3.	Pediatric and Orthoptics	1 month
4.	Orbit and Glaucoma	1 month
5.	Special Diagnostics	1 month
6.	Children with special needs	1 month

A log book shall be maintained and updated daily at the end of the day which would be monitored and signed by the concerned supervisor under whom the candidate is posted for the given period of time.

Based on the report given by the supervisor and satisfactory signature obtained in the log books, the head of the department shall issue a completion report at the end of the semester

SKILL ACQUISITION

The intern is expected to demonstrate competence and independence in carrying out the following activities:-

GENERAL OUTPATIENT DEPARTMENT

Be able to register, identify and follow-up patients, and independently maintain records

Should have acquired knowledge to diagnose and medically manage the immediate treatment and refer the patient to the concerned specialty.

Should be able to identify the prognostic parameters on follow-

up **COMMUNITY OPHTHALMOLOGY**

To assist postgraduate doctors in camp screening work and learn to identify cataract cases and refer the cases to SRMC for further evaluation and intervention if necessary.

They have to do required number of hours in the blind school for a period of 1 month in which they will identify cases of low vision and treat the same.

They are required to do present a project report of their work in a specified area.

They would be required to do school screening during this period

CORNEA AND CONTACT LENS

To learn to recognize corneal disorders through slit lamp examination

To do corneal staining through Fluorescein or other dyes as indicated

To see and obtain knowledge of corneal transplantation

To do Keratometry

Contact lens evaluation, trial fitting, and prescription of final lens

RETINA AND LOW VISION

To do a fundus examination with direct and indirect ophthalmoscope

To assist in taking fundus photograph of patients referred with systemic and primary ocular pathology.

To observe the use of lasers in Ophthalmology

Learn to assess the magnitude of low vision and prescribe low vision aids

PEDIATRICS AND ORTHOPTICS

To learn to recognize extraocular muscle imbalance and the components of binocular single vision

Learn the skills of administering the appropriate muscle exercise

To use the Horopter on patients & the use of major Amblyoscope

The use of prism bar cover test in measuring the deviation of squint.

To diagnose the accommodative and Non-accommodative squints

To identify diplopia with Worth‘s four dot test and Hess‘ screen.

The use of double maddox rod test

ORBIT AND GLAUCOMA

To identify the signs and symptoms of glaucoma

To recognize the attack of acute angle closure glaucoma and learn the necessary protocols to be followed as treatment immediately

To calibrate, record tension and maintain sterility of tonometers

To learn to use Schiotz and Applanation tonometers

To learn to record visual field examination through confrontation tests and automated

perimetery To learn to recognize the changes in the fundus of patients of Glaucoma To do

a Gonioscopic examination

To learn the diagnoses of blunt and penetrating trauma

To learn to request for various radiological views in

trauma

To request the necessary emergency consults as part of ocular trauma treatment

To do automated perimetry in Neurological problems & interpretation of visual fields

To learn to do cadaveric enucleation

SPECIAL DIAGNOSTICS

To handle advanced equipments like fundus photo, ultrasound, optical coherence tomography and specular microscope

To interpret the test results

To maintain the calibration check and statistic records

CHILDREN WITH SPECIAL NEEDS

To provide early visual stimulation to children with special needs

To train the oculomotor system, accommodation and Vergence systems

To provide appropriate home therapies

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT101033	**ACADEMIC RESEARCH WRITING AND INTELLECTUAL PROPERTY RIGHTS**	2	-	-	-	2
Pre-Requisite	-					
Anti-Requisite	-					
Co-Requisite	-					

COURSE DESCRIPTION: : This course is a brief overview about research design that is intended to cover the basics of designing and implementing a scientific study.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Search, select and critically analyze research articles and papers.

CO2. Formulate and evaluate research questions.

CO3 Develop the ability to apply the methods while working on a research project work.

CO4. Describe the appropriate statistical methods required for a particular research design.

CO5. Choose the appropriate research design and develop appropriate research hypothesis for a research project in the research methodology

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	-	-	-	-	-	-	-	-
CO2	-	3	-	-	3	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	2
CO4	-	-	-	3	-	-	-	2	-	2
CO5	-	-	-	-	3	-	2	-	-	-
CO6	3	-	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**3**	**3**	**3**	**3**	**-**	**2**	**2**	**-**	**2**

Correlation Levels: 3: High;2: Medium;1: Low

COURSE CONTENT

Module 1: ACADEMIC WRITING AND PRESENTATION ***(05 Periods)***

Technical writing skills - types of reports; layout of a formal report; standard of Journal (Impact Factor, Citation Index), Scientific writing skills - importance of communicating science; problems while writing a scientific document; plagiarism, software for plagiarism; scientific publication writing: elements of a scientific paper including abstract,

Module 2: ACADEMIC WRITING AND PRESENTATION-I ***(10 periods)***

introduction, materials & methods, results, discussion, references; drafting titles and framing abstracts; publishing scientific papers - peer review process and problems, recent developments such as open access and non-blind review; characteristics of effective technical communication; scientific presentations; ethical issues; scientific misconduct

Module 3: SCIENTIFIC COMMUNICATION SKILLS ***(05 periods)***

Concept of effective communication- setting clear goals for communication; determining outcomes and results; barriers to effective communication; non-verbal communication-importance of body language, power of effective listening; Presentation skills - formal presentation skills; preparing and presenting using over-head projector, PowerPoint; defending interrogation; scientific poster preparation & presentation; participating in group discussions; Computing skills for scientific research - web browsing for information search.

Module 4: INTRODUCTION TO IPR ***(05 periods)***

Introduction to intellectual property; types of IP: patents, trademarks, copyright & related rights, industrial design, traditional knowledge, geographical indications, protection of new GMOs; IP as a factor in R&D; IPs of relevance to biotechnology and few case studies; plant variety protection and farmers rights

Module 5: TYPES OF PATENTS ***(05 periods)***

Basics of patents: types of patents; Indian Patent Act 1970; recent amendments; WIPO Treaties; Budapest Treaty; Patent Cooperation Treaty (PCT) and implications; filing of a patent application; role of a Country Patent Office; precautions before patenting-disclosure/non-disclosure - patent application- forms and guidelines including those of National Bio-diversity Authority (NBA) and other regulatory bodies, fee structure, time frames; types of patent applications: provisional and complete specifications.

Total Periods: 30

EXPERIENTIAL LEARNING

1 Research protocol writing

2 Understanding the data anlaysis

Note: It's an indicative one. The course instructor may change the activities, which shall be reflected in CHO.)

RESOURCES

TEXTBOOKS:

1. *Geoffrey Marczyk, David De Matteo, David Festinger,* Essentials of Research Design and Methodology*, John Wiley & Sons, Inc, Edition 1, 2005.*
2. Carol Ellison *Concise Guide to Writing Research Papers*, McGraw-Hill, Standard Edition, 2005.
3. Kothari CR *Research Methodology: Methods and Techniques*, New Age Pvt Ltd, Edition 1, 2006.

REFERENCE BOOKS

1. Trochim, W.M.K., *Research Methods: the concise knowledge base*, Atomic Dog Publishing, Edition 1, 2005.
2. Wadehra, B.L. *Law relating to patents, trademarks, copyright designs and geographical indications*. Universal Law Publishing, Edition 1, 2000.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=LTeObbKXhSo
2. https://youtu.be/olGO_PTxIrU
3. https://www.youtube.com/watch?v=LP-LcFQlEyo

WEB RESOURCES:

1. https://patentinindia.com/documents-required-patent-filing-india/
2. https://patentattorneyworldwide.com/in/different-types-of-patent-application/#different-types-of-patent-application
3. https://patentattorneyworldwide.com/in/how-much-time-required-for-grant-of-patent/

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF102025	RESEARCH METHODOLOGY AND BIOSTATISTICS	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed Knowledge on the basic principles of research and methods applied to draw inferences from the research findings. The students will also be made aware of the need of biostatistics and understanding of data, sampling methods, in addition to being given information about the relation between data and variables.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand concepts of research methodology.

CO2 Collect data for research in various methods.

CO3 Analyse research data by using biostatistics

CO4 Write their research or review papers to publish in journal

CO5 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	3	1	-	-	-
CO2	1	1	2	-	2	-	-	-	3	-
CO3	1	1	2	-	1	-	-	1	-	1
CO4	2	1	2		2					1
CO5	1	2	2	-	3	2	1	-	-	-
Course Correlation Mapping	**1**	**1**	**2**	**1**	**2**	**3**	**1**	**1**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: FOUNDATIONS OF RESEARCH ***(10 Periods)***

Definition Research, Introduction to research methods, Objectives of Research, Identifying research problem, Types of Research & Research Approaches, Research Methods vs Methodology Ethical issues in research, Research design.

Module 2: RESEARCH PROBLEM AND DATA COLLECTION ***(09 Periods)***

Research Problem, Measurement & Scaling Techniques, Types of Data, Research tools and Data Research Problem, Measurement & Scaling Techniques, Types of Data, Research tools and Data collection methods, Sampling methods, randomization, crossover design, placebo, blinding techniques, Developing a research proposal.

Module 3: INTRODUCTION TO BIOSTATICS ***(09 Periods)***

Meaning, Definition, and Characteristics of Statistics, Importance of the Study of Statistics, Understanding of data in biostatistics, Statistics in Health Science, How & where to get relevant data, Relation between data & variables, Type of variables: defining data sets.

Module 4: DATA ANALYSIS AND DISSEMINATION ***(09 Periods)***

Basic Principles of Data Graphical Representation, Analysis of variance & covariance. Measures of central tendency include mean, median, and mode. Probability and standard distributions include binomial and normal distributions. Sample size calculation, Sampling techniques address sampling need, criteria, procedures, design errors, variation, and tests of significance. Statistical significance involves parametric and non-parametric tests.

Module 5: SCIENTIFIC WRITING ***(08 Periods)***

Introduction, reviewing literature, formulating research problems and proposals, integrating theory and data and understanding citation and referencing. types of reports, formal report layout, and journal standards (impact factor, citation index). importance of communicating science, challenges in scientific writing, plagiarism and its detection and writing scientific papers.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To practice problems on various biostatistics tools
2. Demonstrate types of data collection from hospital.
3. To determine research statistics tools.
4. Analyze data by using SPSS.

RESOURCES

TEXT BOOKS:

1. S.P. Gupta, Statistical Methods, Sultan Chand & Sons, Edition 46,2023.
2. C.R. Kothari, Research Methodology, New age International Publisher, Edition 4, 2019.

REFERENCE BOOKS:

1. Himanshu Tyagi, Biostatistics Buster, Jaypee Brothers Medical Publishers, Edition 1,2011.
2. Bratati Banerjee, Mahajans Methods in Bistatistical for medical students and research workers, Jaypee Brothers Medical Publishers, Edition 9, 2018.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=d77eQz0_Sfk
2. https://www.youtube.com/watch?v=yOU_s0xzc-Y
3. https://www.youtube.com/watch?v=txIS0N0l9xU&list=PLEIbY8S8u_DK7i4Fj6Hgq8sn_l42k9H1L
4. https://www.youtube.com/watch?v=1Q6_LRZwZrc

WEB RESOURCES:

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8764821/
2. https://www.scribbr.com/category/methodology/
3. https://www.easybiologyclass.com/biostatistics-introduction-significance-applications-and-limitations-of-statistics/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102017	**SYSTEM FOR OPHTHALMIC DISPENSING**	5	-	2	-	6

Pre-Requisite 22RT102001 Optical Physics

Anti-Requisite 22RT102007 Dispensing Optics
22RT101026 Advance Dispensing

Co-Requisite

COURSE DESCRIPTION: The course covers spectacle lenses and frames theory, materials, types, advantages and disadvantages, calculations involved in prescribing, and lens construction and design application. It also covers the role of optometrists in optical set-up.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Learn about the manufacturing process and materials of ophthalmic lenses, as well as how to record, order, and select lenses according to safety standards.

CO2. Recognize and suggest various types of spectacle lenses as per the patient's need.

CO3. Gain expertise in lens coatings and protective lenses.

CO4. Gain expertise in frame measurements.

CO5 Learn about spectacle frame manufacturing and materials and can recommend suitable frames as per patients' requirement.

C06 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-
CO3	3	2	-	3	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
CO6	3	2	-	3	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module1: Lens material ***(15 Periods)***

Manufacture of glass, Lens materials, Faults in lens material, Lens surfacing, Faults on lens surface. Principle of surface generation and Glass Cements, Terminology used in Lens workshop, Lens properties, Lens quality. Recording and ordering of lenses, Selection of lenses, Safety standards for ophthalmic lenses (FDA, ANSI, ISI, Others)

Module 2: Multifocal Lenses ***(15 Periods)***

Different types of multifocal lens, bifocal lens, classification, PAL lenses of PAL lens, Symmetrical versus Asymmetrical design PALs, Dispensing of Progressive Lens, spectacle repair-tools, methods, soldering riveting, frame

Module 3: COATING, TINTS & PROTECTIVE LENSES. ***(15 Periods)***

Reflection from spectacle lenses - ghost images, Reflections in bifocals at the dividing line, Antireflection coating, Mirror coating, Hard Multi Coating, Hydrophobic coating. Characteristics of tinted lenses Absorptive Glasses. Polarizing Filters, Photochromic & Reflecting filters. Safety Lenses-Toughened lenses, Laminated Lenses, CR 39, Polycarbonate lenses. Industrial safety glasses, Welding glasses

Module 4: Measurements of final dispensing of spectacles. ***(15 Periods***

Components of spectacle prescription, interpretation, transposition, add and near power relation, frame selection (based on age, face shapes), lens and frame marking, pupillary centers, bifocal heights, progressive making and pantoscopic tilt, recording and ordering of lens, final checking and dispensing of spectacle to maintaining of spectacles.

Module 5: Spectacle frames ***(15 Periods)***

Types and parts, classification of spectacle frames-material, weight, temple position, coloration, frame construction, frame selection, size, shape, mounting and field of view of ophthalmic lenses, frame availability in the Indian market. special types of spectacle frames - monocles, ptosis crutches, frame measurement system.

Total Periods: 75

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS: PRACTICALS/ DEMONSTRATION:

1. Components of spectacle prescription & interpretation, transposition, Add and near power relation
2. Frame selection –based on spectacle prescription, professional requirements, age group, face shape
3. Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height
4. Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments –facial wrap, pantoscopic tilt
5. Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements)
6. Faults in spectacles (lens fitting, frame fitting, patients' complaints, description, detection, and correction)
7. Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories –Bands, chains, boxes, slevets, cleaners, screwdriver kit

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. C. W. Brooks and I. M. Borish, System for Ophthalmic Dispensing, Butterworth-Heinemann, Edition 3, 2007.
2. T. E. Fannin and T. Grosvenor, Clinical Optics, Butterworth-Heinemann, Edition 3, 2013
3. B. Milder, M. Rubin, The Fine Art of Prescribing Glasses, Triad Scientific Publishers, Edition 3, 2004

VIDEO LECTURES:

1. Online optometry learning series-OOLS
2. www.youtube.com/@EssilorUSA
3. www.youtube.com/@optometry-with-samir

Web Resources:

1. https://www.jaypeedigital.com/eReader
2. Zeiss-pathasala
3. https://www.aurosiksha.org/lica/ebook/refraction_chapter13

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102018	**OPTOMETRIC INSTRUMENTS**	5	-	2	-	6

Pre-Requisite

Anti-Requisite Optometric Instruments-I (22RT101012)
Optometric Instruments-II (22RT101020)

Co-Requisite

COURSE DESCRIPTION: The principal objective of this course is to gain in-depth knowledge of the instrumentation and functioning of the instruments that are routinely used in optometric practice.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the construction principle of different test charts, and designs of trail frames, ensure optimal room illumination, and gain knowledge to operate a phoropter considering optical considerations.

CO2. Gain knowledge about different instruments for measuring corneal dimensions and properties along with handling of those.

CO3. Gain knowledge about different instruments for measuring color vision and properties along with handling of those.

CO4. Understand the construction and principles of gonioscope and visual field techniques

CO5 Demonstrate utilization of various instruments that are related to posterior segment evaluation.

C06 Work individually or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	2	-	-	-	2	-	-
CO2	3	-	-	2	-	-	-	2	-	2
CO3	2	2	-	3	-	-	-	2	-	2
CO4	2	3	-	3	-	-	-	2	-	2
CO5	3	-	-	3	-	-	-	2	-	-
CO6	3	2	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**2**	**-**	**2**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module1: INSTRUMENTATION FOR REFRACTION ***(15Periods)***

Construction of Test chart, Choice of test charts; Projection charts, Illumination of the consulting room. Trial frame design; Trial case lenses design and applications, Phoropter and its optical considerations. Near vision difficulties with phoropter and trial frame, Retinoscope types, optics and procedure, Interpretation of the objective finding; Autorefractors.

Module 2: CORNEAL MEASUREMENT ***(15 Periods)***

Javal Schiotz Keratometry construction and optics, Bausch, and Lomb keratometry construction, optics, calibration, procedure, and interpretation of results; Corneal Topography uses and applications, Placido disc, pachymetry, pentacam, aberrometer. Construction and optics of slit lamp, specular microscope, confocal microscope, tonometer, AS-OCT.

Module 3: COLOUR VISION AND EXOPHTHALMOMETRY ***(15 Periods)***

Theory on commonly available color vision tools, Advantage and disadvantage of each technique, documentation, and implication of color vision in clinical care. Principle and technique of Exophthalmometry, Clinical implication, documentation. contrast sensitivity testing, glare testing, Brightness acuity tester, Potential acuity meter and pupilometer.

Module 4: VISUAL FIELD AND GONIOSCOPY ***(15 Periods***

Introduction to different types of perimetry, Perimetry techniques, principles & clinical uses, Documentation and Interpretation of reports, commercially available instruments with advancements. Gonioscopy techniques, principle of Gonio methods & accessories, Advantage and disadvantage of each technique, Clinical implication and documentation

Module 5: INSTRUMENTS FOR POSTERIOR SEGMENT ***(15 Periods)***

Direct and indirect ophthalmoscopes-principle, instrumentation, clinical evaluation, clinical procedure, documentation. Fundus bio microscopy (+78D and +90D)- Condensing lens and slit lamp bio microscopy techniques, Use of filters in clinical evaluation, clinical procedure, and documentation, electroretinography, electro oculo-gram and visually evoked potentials, OCT, Fundus photography, B Scan and Angiography.

Total Periods: 75

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS: PRACTICALS/ DEMONSTRATION:

1. Special types of visual acuity test.
2. Developmental millstone
3. Age related eye disease
4. counsel the elderly patient
5. Special test pediatric vision.
6. Glaucoma in aging patients
7. Diabetic eye problems

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:	
1.	A.J. Rossenbloom Jr & M.W.Morgan: Vision and Aging, Butterworth Heinemann, Missouri, 2007.
2.	OP Sharma: Geriatric Care –A textbook of geriatrics and Gerontology, viva books, New Delhi, 2005
REFERENCE BOOKS:	
1.	VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998
2	DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002.
VIDEO LECTURES:	
1.	https://youtu.be/UDPM0yUItNk?si=97BlNTd14852-uIb
2.	https://youtu.be/-ukuGZpSfd8?si=X6zb5yjAqGxKUna2
3.	https://youtu.be/MV-6b5PJIvQ?si=BGvvQj3plVriiGb
Web Resources:	
1.	https://youtu.be/X7zRRpiazwE?si=OsvmPenJ_kGcyJzY
2.	https://youtu.be/oanFMlAWH-k?si=4BdhQKClWsShzhSl
3.	https://youtu.be/hhZhg8zWst4?si=swlZX2qUkrcHe6F1

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22EC101701	**AI IN HEALTHCARE**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on Concepts of Artificial Intelligence (AI) in Healthcare; The Present State and Future of AI in Healthcare Specialties; The Role of Major Corporations in AI in Healthcare; Applications of AI in Healthcare.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand the fundamental concepts of AI in Healthcare sector.

CO2 Analyse the present state and future of AI in Healthcare specialties for different scenarios.

CO3 Apply design concepts and metrics for AI in Healthcare.

CO4 Demonstrate basic concepts and terminologies of future applications of Healthcare in AI.

CO5 Develop AI applications through AI techniques for healthcare

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	2	2	-	-	-	-	-	-
CO2	2	3	-	2	-	2	2	-	-	-
CO3	2	-	2	2	-	-	-	-	-	-
CO4	2	-	-	-	2	2	-	-	-	-
CO5			3							
Course Correlation Mapping	2	-	3	2	2	2	2	-	-	-

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: INTRODUCTION TO ARTIFICIAL INTELLIGENCE IN HEALTHCARE ***(08 Periods)***

Introduction to AI in Healthcare, Benefits & Risks, AI in the health sector, AI versus human intelligence, The future of AI in health sector, AI & Neural networks.

Module 2: THE PRESENT STATE & FUTURE OF AI IN HEALTHCARE SPECIALTIES ***(10 Periods)***

Artificial Intelligence in: preventive healthcare, Radiology, Pathology, Surgery, Anesthesiology, Psychiatry, Cardiology, Pharmacy, Dermatology, Dentistry, Orthopedics, Ophthalmology.

Module 3: THE ROLE OF MAJOR CORPORATIONS IN AI IN HEALTHCARE ***(08 Periods)***

IBM Watson, The role of Google & Deep mind in AI in Healthcare, Baidu, Facebook & AI in Healthcare, Microsoft & AI in Healthcare.

Module 4: FUTURE OF HEALTHCARE IN AI ***(10 Periods)***

Evidence-based medicine, personalized medicine, Connected medicine, Virtual Assistants, Remote Monitoring, Medication Adherence, Accessible Diagnostic Tests, Smart Implantables, Digital Health and Therapeutics, Incentivized Wellness, Block chain, Robots, Robot-Assisted Surgery, Exoskeletons, Inpatient Care, Companions, Drones, Smart Places, Smart Homes, Smart Hospitals.

Module 5: APPLICATIONS OF AI IN HEALTHCARE ***(09 Periods)***

Case Study 1: AI for Imaging of Diabetic Foot Concerns and Prioritization of Referral for Improvements in Morbidity and Mortality.

Case Study 2: Outcomes of a Digitally Delivered, Low-Carbohydrate, Type 2 Diabetes Self-Management.

Case Study 3: Delivering A Scalable and Engaging Digital Therapy.

Case Study 4: Improving Learning Outcomes for Junior Doctors through the Novel Use of Augmented and Virtual Reality for Epilepsy.

Case Study 5: Big Data, Big Impact, Big Ethics: Diagnosing Disease Risk from Patient Data.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Analyze how the artificial intelligence is used to predict the disease result and Prognosis Assessment of a patient.
2. How does drug discovery happen and how does AI is helping in drug discovery and Labs.
3. Justify that artificial intelligence provide engineering solutions for early detection and Diagnosis of diseases.
4. Demonstrate the prediction of bladder volume of a patient.

(Note: It's an indicative one. Course Instructor may change activities and shall be reflected in course Handout)

RESOURCES

TEXT BOOKS:

1. Dr. Parag Mahajan, *Artificial Intelligence in Healthcare*, Med Manthra Publications, First Edition 2019.
2. Arjun Panesar, *Machine Learning and AI for Healthcare Big Data for Improved Health*, Apress Publications, 2019.

REFERENCE BOOKS:

1. Michael Matheny, Sonoo Thadaney Israni, Mahnoor Ahmed, and Danielle Whicher, *Artificial Intelligence in Health Care: The Hope, the Hype, the Promise, the Peril*, National Academy of Medicine Publication, First Edition 2019.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=-aHBwTQQyNU
2. https://intellipaat.com/blog/artificial-intelligence-in-healthcare/

WEB RESOURCES

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6616181/
2. https://www.ibm.com/topics/artificial-intelligence-healthcare
3. https://builtin.com/artificial-intelligence/artificial-intelligence-healthcare

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22DS101701	**BIOINFORMATICS**	3	-	-	-	3

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION: This course focus on Biological Data Acquisition, Databases, Data Processing, Methods of Analysis, Applications of Bio-informatics.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand basic biological data acquisition in bioinformatics.
CO2 Identify the proper databases for the information search by choosing the biological databases and also submission and retrieval of data from databases.
CO3 Analyze the results of bioinformatics data using text and sequence-based searching techniques.
CO4 Analyze the secondary and tertiary structures of proteins by applying different alignment programs
CO5 Design biological databases by using contextual knowledge on bioinformatics.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	-	-	-	-	-	-	-	-	-
CO2	2	3	-	-	-	-	-	-	-	-
CO3	2	3	-	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-
CO5	3	2	3	3	3	-	-	-	-	-
Course Correlation Mapping	3	3	3	3	3	-	-	-	-	-

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: BIOLOGICAL DATA ACQUISITION ***(09 Periods)***

Biological information, Retrieval methods for DNA sequence, protein sequence and protein structure information

Module 2: DATABASES ***(09 Periods)***

Format and Annotation: Conventions for database indexing and specification of search terms, Common sequence file formats. Annotated sequence databases - primary and secondary sequence databases, protein sequence and structure databases.

Module 3: DATA PROCESSING ***(09 Periods)***

Data – Access, Retrieval and Submission: Standard search engines; Data retrieval tools – Entrez, DBGET and SRS; Submission of (new and revised) data; Sequence Similarity Searches: Local and global. Distance metrics. Similarity and homology. Scoring matrices, PAM and BLOSUM

Module 4: METHODS OF ANALYSIS ***(09 Periods)***

Dynamic programming algorithms, Needleman-Wunsch and Smith-waterman.Heuristic Methods of sequence alignment, FASTA and BLAST; Multiple Sequence Alignment and software tools for pair wise and multiple sequence alignment, CLUSTAL program, Prediction of Tertiary structure of proteins.

Module 5: APPLICATIONS ***(09 Periods)***

Genome Annotation and Gene Prediction; ORF finding; Phylogenetic Analysis, Genomics, Proteomics, Genome analysis – Genome annotation, DNA Microarray, computer aided drug design (CADD).

Total Periods: 45

EXPERIENTIAL LEARNING

1. Calculate the dynamic programming matrix and one or more optimal alignment(s) for the sequences GAATTC and GATTA, scoring +2 for a match, −1 for a mismatch and with a linear gap penalty of d = 2.
2. Determine whether the RNA string GGACCACCAGG should be folded into two substructures.
3. Discuss how to carry out the multiple sequence alignment of the following three sequences: TTTTAAAA, AAAACCCC, CCCCTTTT.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXT BOOKS:

1. Lesk, A. K., *Introduction to Bioinformatics*, Oxford University Press, 4th Edition, 2013
2. Dan Gusfield, *Algorithms on Strings, Trees and Sequences: Computer Science and Computational Biology*, Cambridge University Press, 1997.

REFERENCE BOOKS:

1. Baldi, P. and Brunak, S., *Bioinformatics: The Machine Learning Approach*, MIT Press, 2nd Edition, 2001.
2. Mount, D.W., *Bioinformatics Sequence and Genome Analysis*, Cold Spring Harbor Laboratory Press, 2nd Edition, 2004.
3. Tindall, J., *Beginning Perl for Bioinformatics: An introduction to Perl for Biologists*, O'Reilly Media, 1st Edition, 2001.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=liNblw4x50E

2. https://www.youtube.com/watch?v=eZfyWdHnzR0

WEB RESOURCES

1. https://www.britannica.com/science/bioinformatics
2. https://www.ebi.ac.uk/training/online/courses/bioinformatics-terrified/what-bioinformatics/

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22SS101701	**CONSTITUTION OF INDIA**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides and in-depth knowledge about Constitution of India's Preamble and its Philosophy; Union Legislature; Federalism in India; Judiciary and Public Services; Nation Building. The students can gain first-hand information and knowledge about these dynamics and accordingly act based on these sources in their professional and routine activities.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

CO1: Demonstrate knowledge in the Parliamentary proceedings, Election Commission, Public Services and Foreign Policy of India.

CO2: Apply the reasoning informed by the various aspects of the Constitution and its provisions to assess societal issues and the consequent responsibilities relevant to the professional engineering practice.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	1	-	-	-	-	3	2	-	-	-
CO2	2	-	-	-	-	3	-	3	-	-
Course Correlation Mapping	**2**	**-**	**-**	**-**	**-**	**3**	**2**	**3**	**-**	**-**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: PREAMBLE AND ITS PHILOSOPHY ***(09 Periods)***

Introduction to Indian Constitution; Evolution of Indian Constitution; preamble and its philosophy

Module 2: UNION LEGISLATURE ***(09 Periods)***

The Parliament, Parliamentary Structure, Process of Legislation; President of India – Powers and Functions; Prime Minister and Council of Ministers; Constitution Amendment Procedure.

Module 3: FEDERALISM IN INDIA ***(09 Periods)***

Centre-State Administrative Relationship; Governors – Powers and Functions; State Legislature - Composition and powers; Chief Ministers - Powers and Functions; The Election Commission – Powers and Functions.

Module 4: JUDICIARY AND PUBLIC SERVICES ***(09 Periods)***

The Union Judiciary - Supreme Court and High Court; Fundamental Rights and Duties All India Services - Central Civil Services -State Services - Local Services.

Module 5: INTERNATIONAL PARTICIPATION ***(09 Periods)***

Foreign Policy of India; International Institutions Influence: UNO, WTO, WHO, SAARC, International Summits: BRICS, NSS, UNEP – India's Role in International Negotiations; Environmentalism in India.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Review newspapers and submit a report on critical analysis of Indian Civil Servants exercise of powers, in the awake of constitutionally assigned authority.
2. Visit your village Panchayat office or Municipality office and generate a report on your observations about maintained Constitutional symbolism.
3. Watch few videos on recent Indian Independence Day and Republic Day celebrations as marked in New Delhi and present a detailed report, by considering the following aspects:
    a. Comparatively analyze the speeches of the President of India and Prime Minister of India as delivered on these two occasions.
    b. Compare these two events relevance in terms of Indian Armed Forces presence.
    c. Observe, compare and analyse 'flag code' relevance as marked in these two events.
4. Watch a few videos on recent 'proceedings' of any state Legislative Assembly session and submit a detailed report.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXT BOOKS:

1. Briji Kishore Sharma, *Introduction to the Constitution of India*, Prentice Hall of India, 2005

REFERENCE BOOKS:

1. Mahendra Pal Singh,V. N. Shukla's, *Constitution of India*, Eastern Book Company, 2011.
2. Pandey J. N., *Constitutional Law of India*, Central Law Agency, 1998

VIDEO LECTURES:

1. Doctrine of Basic Structure: https://www.youtube.com/watch?v=cvUf9ZeEe8Y
2. Significance of the Constitution: https://www.youtube.com/watch?v=vr1Dc_-ZKbQ

WEB RESOURCES

1. The Constitution of India: https://www.youtube.com/watch?v=of2SoO8i8mM
2. Protection of Constitutional Democracy: https://www.youtube.com/watch?v=smJ99cdPrns

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22CM101702	**COST ACCOUNTING AND FINANCIAL MANAGEMENT**	3	-	-	-	3

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION: Cost accounting; cost sheet & preparation of cost sheet; standard costing & variance analysis; financial management & ratio analysis; introduction to investment**.**

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Demonstrate the concepts of Cost Accounting and Management Accounting and the elements of costing.

CO2 Determine the Cost of Production for pricing decisions.

CO3 Apply the Standard Costing and Variance techniques for the control of the cost of production

CO4 Analyze the Profitability and financial condition of an organization using Ratios.

CO5 Apply Capital Budgeting techniques for making investment decisions in an organization.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3				2			1		
CO2	3				2			1		
CO3	3				2			1		
CO4	3				2			1		
CO5	3				2			1		
Course Correlation Mapping	**3**				**2**			**1**		

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: COST ACCOUNTING ***(09 Periods)***

Meaning of Cost and Cost Accounting, Objectives, Scope, Advantages, and Disadvantages – Cost Accounting *Vs* Management Accounting – Elements of Costing – Installation of costing system – Material Control, Labor Control, Overhead Control.

Module 2: COST SHEET & PREPARATION OF COST SHEET (09 Periods)

Analysis of Cost – Preparation of cost sheet, estimate, tender, and quotation (Simple problems) – Importance of Costing while pricing the products

Module 3 STANDARD COSTING & VARIANCE ANALYSIS (09 Periods)

Introduction to Standard Costing & Variances – Variance Analysis: Material variances, Labor variances (Simple Problems).

Module 4 FINANCIAL MANAGEMENT & RATIO ANALYSIS (09 Periods)

Meaning, Objectives - Nature and Scope, Importance of FM – Ratio Analysis**:** Types of Ratios: Solvency Ratios, Liquidity Ratios, Turnover Ratios, and Profitability Ratios - Financial Statement Analysis through Ratios (Simple Problems).

Module 5 INTRODUCTION TO INVESTMENT ***(09 Periods)***

Investment - Meaning and Definition- concept of risk and returns - Capital budgeting techniques – Security Analysis and Portfolio Management (Basic concepts).

Total Periods: 45

EXPERIENTIAL LEARNING

1. Prepare a report on the role of cost accountants in the growth of a company.
2. To visit the manufacturing unit to observe how they used various techniques for analyzing the financial health of a company.
3. Prepare a report on factors influencing the form of business organization.
4. Prepare the cost sheet with practical examples of any two manufacturing companies.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXT BOOKS:

1. S.P. Jain and K.L. Narang: *Cost Accounting*, Kalyani Publishers, Ludhiana, 10th edition, 2016.
2. I.M. Pandey, *Financial Management*, Vikas Publishing House Pvt. Ltd., 14th edition, 2016.

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, *Cost and Management Study Material*, New Delhi.
2. CA Saravana Prasath, *Cost Accounting and Financial management*, Wolters Kluwer India Pvt. Ltd., New Delhi, 2018.

VIDEO LECTURES:

1 https://www.youtube.com/watch?v=ESqO8sFgQa0&list=PLLhSIFfDZcUVE2kzOhEubO9rkvUOAgZbz

2 https://www.youtube.com/watch?v=tzasFmP1CpAhttps://www.youtube.com/watch?v=tzasFmP1CpA

WEB RESOURCES

1 https://www.tutorialspoint.com/accounting_basics/management_versus_cost_accounting.htm

2 https://www.netsuite.com/portal/resource/articles/financial-management/financial-management.shtml

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22MG101701	**ENTREPRENEURSHIP FOR MICRO, SMALL AND MEDIUM ENTERPRISES**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: To understand the setting up and management of MSMEs and initiatives of Government and other institutions support for growth and development of MSMEs

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the basic of SME and challenges of MSMEs

CO2. Explain the opportunities to Set-Up SSI/SME Units and role of rural & women entrepreneurship.

CO3. Illustrate roles of various institutions supporting MSMEs.

CO4. Understand Management of MSME, NPA & sickness units

CO5. Evaluate role of Government in Promoting Entrepreneurship

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	2	1	2	1	-	-	-	-	-	-
CO2	1	1	2	-	-		2		1	
CO3	2	2	1	-	-	-	-	1	-	-
CO4	3	1	2	-	-	-	-	-	-	-
CO5	2	2	1	-	-	1	-	-	-	-
Course Correlation Mapping	**2**	**2**	**2**	**2**	**1**	**1**	**2**	**1**	1	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: Introduction2 ***(07 Periods)***

Concept & Definition, Role of Business in the modern Indian Economy SMEs in India, Employment and export opportunities in MSMEs. Issues and challenges of MSMEs

Module 2: MSME Setting ***(09 Periods)***

Identifying the Business opportunity, Business opportunities in various sectors, formalities for setting up an enterprise - Location of Enterprise – steps in setting up an enterprise – Environmental aspects in setting up, Incentives and subsidies.

Module 3: MSMEs Supporting Institutions ***(09 Periods)***

Forms of Financial support, Long term and Short term financial support, Sources of Financial support, Development Financial Institutions, Investment Institutions, Central level institutions, State level institutions, Other agencies, Commercial Bank – Appraisal of Bank for loans

Module 4: Management of MSME ***(10 Periods)***

Management of Product Line; Communication with clients – Credit Monitoring System - Management of NPAs - Restructuring, Revival and Rehabilitation of MSME, Problems of entrepreneurs – sickness in SMI – Reasons and remedies –– Evaluating entrepreneurial performance

Module 5: Entrepreneurship Promotion ***(10 Periods)***

MSME policy in India, Agencies for Policy Formulation and Implementation: District Industries Centers (DIC), Small Industries Service Institute (SISI), Entrepreneurship Development Institute of India (EDII), National Institute of Entrepreneurship & Small Business Development (NIESBUD), National Entrepreneurship Development Board (NEDB)

Total Periods: 45

EXPERIENTIAL LEARNING

1. Present a case study on MSMEs Business Strategies.
2. Collect the data about nearby MSMEs and Present their structures in a PPT
3. Discuss in the group MSMEs opportunities in terms of Orientation and Develop mentation.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXT BOOKS:

1. Vasant Desai, *Small Scale Industries and Entrepreneurship*, Himalaya Publishing House, 2003..
2. Poornima M Charanthimath, *Entrepreneurship Development Small Business Enterprises*, Pearson, 2006.

REFERENCE BOOKS:

1. Suman Kalyan Chaudhury, *Micro Small and Medium Enterprises in India Hardcover*, Raj Publications, 2013.
2. Aneet Monika Agarwal, *Small and medium enterprises in transitional economies, challenges and opportunities*, DEEP and DEEP Publications
3. Paul Burns & Jim Dew Hunt, *Small Business Entrepreneurship*, Palgrave Macmillan publishers, 2010.

VIDEO LECTURES:

1. https://sdgs.un.org/topics/capacity-development/msmes
2. https://blog.tatanexarc.com/msme/msme-schemes-in-india-for-new-entrepreneurs-and-start-ups/

WEB RESOURCES

4. ncert.nic.in/textbook/pdf/kebs109.pdf
5. https://www.jetir.org/papers/JETIR1805251.pdf

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22CB101703	**FORENSIC SCIENCE**	3	-		-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on Concepts of Forensic Science, Tools and Techniques in Forensic Science, Forensic Photography, Crime Scene Management, Crime Scene Management Laws and Forensic Science.

COURSE OUTCOMES: *After successful completion of the course, students will be able to*:

CO1 Understand the basic concepts of Forensic science.

CO2 Apply various tools and techniques in forensic science for crime investigation.

CO3 Understand Forensic Photography fundamentals.

CO4 Perform Crime scene investigation, scene reconstruction and prepare reports.

CO5 Understand Legal aspects of Forensic Science.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3									
CO2	3	3	2	2	2					
CO3	3	3								
CO4	3	3	2	2	2					
CO5	3	3	2	2	2					
Course Correlation Mapping	**3**	**3**	**2**	**2**	**2**					

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION ***(09 Periods)***

Introduction, Need, Scope, Concepts and Significance of Forensic Science, History and Development of Forensic Science, Laws and Basic principles of Forensic Science, Branches of forensic science, Organizational set-up of a Forensic Science Laboratory. Investigative strategies. Expert testimony and eye-witness report.

Module 2: TOOLS AND TECHNIQUES IN FORENSIC SCIENCE ***(09 Periods)***

Basic principles of microscopy, spectroscopy, chromatography, Electrophoresis, Enzyme_Linked Immunosorbent Assay (ELISA), Radio Immuno Assay (RIA). Measuring and optical instruments. Research methodologies; Formation of research design on a specific problem. Central tendency and Dispersion. Test of significance. Analysis of variance, Correlation and Regression.

Module 3: FORENSIC PHOTOGRAPHY ***(8 Periods)***

Basic principles of Photography, Techniques of black & white and color photography, cameras, lenses, shutters, depth of field, film; exposing, development and printing techniques; Different kinds of developers and fixers; UV, IR, fluorescence illumination guided photography; Modern development in photography- digital photography, working and basic principles of digital photography; Surveillance photography. Videography and Crime Scene & laboratory photography.

Module 4: CRIME SCENE MANAGEMENT ***(11 Periods)***

Crime scene investigations, protecting and isolating the crime scene; Documentation, sketching, field notes and photography. Searching, handling and collection, preservation and transportation of physical evidences, Chain of custody and Reconstruction of scene of crime. Report writing.

Module 5: LAW AND FORENSIC SCIENCE ***(8 Periods)***

Legal aspects of Forensic Science: Forensic Science in the Criminal Justice System, The Criminal Investigation Process, Production of Evidence: The Subpoena, The Rules of Evidence, Authentication of Evidence: The Chain of Custody, The Admissibility of Evidence, Laboratory Reports, Examples of Analysis and Reports, Expert Testimony, Getting into Court, Testifying, Being a Witness and an Expert, Considerations for Testimony.

Total Periods: 45

EXPERIENCIAL LEARNING

1. Study of Computer Forensics and different tools used for forensic investigation
2. **Identify and list the steps for hiding and extract any text file behind an image file/ Audio file using Command Prompt**

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXT BOOKS:

1. Houck M.M and Siegel J.A, *Fundamentals of Forensic Science*, Elsevier, 2nd edition, 2010.

2. Sharma B.R, *Forensic Science in Criminal Investigation and Trials*, Universal Publishing Co., New Delhi, 2003.

REFERENCE BOOKS:

1. Nanda B.B and Tewari, R.K, *Forensic Science in India- A vision for the Twenty First Century*, Select Publisher, New Delhi, 2001.
2. James, S.H and Nordby, J.J, *Forensic Science- An Introduction to Scientific and Investigative Techniques*, CRC Press, USA, 2003.
3. Saferstein, Criminalistics, *An Introduction of Forensic Science*, Prentice Hall Inc, USA,2007.
4. Barry, A.J. Fisher, *Techniques of Crime Scene Investigation*, CRC Press, NewYork, 7th edition, 2003.

VIDEO LECTURES:

1. https://nptel.ac.in/courses/106106178
2. https://www.youtube.com/watch?v=X5fo1H7bc0g

WEB RESOURCES

1. https://www.nist.gov/forensic-science
2. https://www.coursera.org/learn/forensic-science

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22SS101704	**INDIAN HISTORY**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Introduction; Ancient India; Classical and Medieval era; Modern India; India after independence.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Demonstrate contextual knowledge in the evolution of ancient and medieval Indian History and acquire an awareness of societal and cultural transformation.

CO2 Analyze the situations before and after Independence and assess the societal reforms implemented in India after Independence.

CO3 Practice culture transformations and appreciate its influence to adapt themselves in global scenarios.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	-	-	-	-	1	-	-	-	-
CO2	1	2	-	-	-	1	-	-	-	-
CO3	1	1	-	-	-	2	-	-	-	-
Course Correlation Mapping	2	1	-	-	-	2	-	-	-	-

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: INTRODUCTION TO INDIAN HISTORY ***(08 Periods)***

Elements of Indian History; History Sources: Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography; Sociological concepts-structure, system, organization, social institutions, Culture and social stratification (caste, class, gender, power), State& Civil Society.

Module 2: ANCIENT INDIA ***(09 Periods)***

Mohenjo-Daro civilization; Harappa civilization; Mauryan Empire.

Module 3: CLASSICAL & MEDIEVAL ERA ***(12 Periods)***

Classic Era (200 BC - 1200 AD); Hindu - Islamic Era (1200 - 1800 AD).

Module 4: MODERN INDIA ***(06 Periods)***

Age of Colonialism (17th - 19th centuries); First war of Indian Independence; Freedom Struggle (1857-1947)

Module 5: INDIA AFTER INDEPENDENCE (1947 -) ***(10 Periods)***

The Evolution of the Constitution and Main Provisions; Consolidation of India as a Nation; Politics in the States; Indian economy; Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and Inclusion, Changing Nature of Work and Organization.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Prepare a write-up on how to safeguard ancient monuments.
2. Analyze the most famous historically important place you visited.
3. Prepare a presentation on the ancient Seven Wonders of the World with their significance and how they are destroyed.
4. Prepare a presentation on "Wars of the past not only destroyed people and their livelihood but also the people's tradition and culture."
5. Prepare a poster on " Continents that No Longer Exist" with causes

(Note: It's an indicative one. Course Instructor may change activities and shall be reflected in course Handout)

RESOURCES

TEXT BOOKS:

1. K. Krishna Reddy, *Indian History,* Tata McGraw-Hill, 21st reprint, 2017.

REFERENCE BOOKS:

1. Guha, Ramachandra, *India after Gandhi*, Pan Macmillan, 2007.
2. Romila Thapar, *Early India***,** Penguin India, New Delhi 2002.

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22SS101705	**INDIAN TRADITION AND CULTURE**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Basic traits of Indian Culture; Humanistic Reforms under Jainism and Buddhism; Culture in the medieval period; Socio Religious reforms in Indian Culture; Reform movements for harmonious relations.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Demonstrate knowledge of Vedic and Upanishadic culture and society to consider human aspirations, values and theories.

CO2 Understand the contributions of Buddhism and Jainism to Indian culture.

CO3 Examine the cultural conditions and achievements of India under Mouryas and Guptas.

CO4 Analyze social religious reforms and reform movements.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	-	-	-	-	1	-	-	-	-
CO2	3	-	-	-	-	1	-	-	-	-
CO3	2	-	-	-	-	3	-	-	-	-
CO4	2	-	-	-	-	3	-	-	-	-
Course Correlation Mapping	**3**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: BASIC TRAITS OF INDIAN CULTURE ***(08 Periods)***

Meaning and definition and various interpretations of culture - Culture and its features - The Vedic and Upanishad culture and society - Human aspirations and values in these societies - Chaturvidha purushardhas, Chaturashrma and Chaturvarna theory.

Module 2: HUMANISTIC REFORMS UNDER JAINISM AND BUDDHISM ***(09 Periods)***

Salient features of Jainism - contributions of Jainism to Indian culture - Contributions of Aachaarya and Mahaapragya - Buddhism as a humanistic culture - The four noble truths of Buddhism - Contributions of Buddhism to Indian culture.

Module 3: CULTURE IN THE MEDIEVAL PERIOD ***(09 Periods)***

Unifications of India under Mouryas and Guptas and their cultural achievements - Cultural conditions under satavahanas - Contributions to Pallavas and cholas to art and cultural achievements of Vijayanagara rulers

Module 4: SOCIO RELIGIOUS REFORMS IN INDIAN CULTURE ***(09 Periods)***

Western impact on India - Introduction of Western education - social and cultural awakening and social reform movements of Rajaramohan Roy - Dayanandha Saraswathi - Anne Besant (theosophical society).

Module 5: REFORM MOVEMENTS FOR HARMONIOUS RELATIONS ***(09 Periods)***

Vivekananda, Eswarchandravidyasagar and Veeresalingam - emancipation of women and struggle against caste - Rise of Indian nationalism - Mahatma Gandhi – Non-violence and satyagraha and eradication of untouchability.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Identify different cultural festivals of Indian States and prepare a write-up on their uniqueness.
2. India has a rich history with numerous architectural wonders. Prepare a report on any three famous architectural wonders in India.
3. Explore the diverse flavors of Indian cuisine and prepare a poster on the different dishes and their distinctiveness.
4. India is a country of Unity in Diversity. Make a PowerPoint presentation on different traditional dresses of various cultural people.

(Note: It's an indicative one. Course Instructor may change activities and shall be reflected in course Handout)

RESOURCES

TEXT BOOKS:

1. Valluru Prabhakaraiah, *Indian Heritage and Culture*, Neelkamal Publications Pvt. Ltd. Delhi, 1/e, reprint 2015.

REFERENCE BOOKS:

1. L. P. Sharma, *History of Ancient India*, Konark Publishers, Pvt. Ltd. New Delhi, 2010.
2. L. P. Sharma, *History of Medieval India*, Konark Publishers, Pvt. Ltd. New Delhi, 2010.
3. The Cultural Heritage of India Vol-I, II, III, IV, V, The Ramakrishna Mission Institute of Culture, Calcutta

University Elective

Course Code	Course Title	L	T	P	S	C
22ME101704	MANAGING INNOVATION AND ENTERPRENEURSHIP	3	-	-	-	3

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION:
Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts of Shifting Composition of the Economy Purposeful Innovation & Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO1. Demonstrate the principles of innovation process for establishing Industrial ventures.
CO2. Identify and analyze the gaps in an organization for innovation in the context of developed economies
CO3. Develop a comprehensive and well-planned business structure for a new venture.
CO4. Demonstrate knowledge on intellectual property rights, patents, trademarks, copyrights, trade secrets and commercialization of intellectual property.
CO5. Apply ethics in constructive innovation framework and problem solving.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	1		1	1	1	1		
CO2	3	2	1		1					
CO3	3	3	1	1	1					
CO4	3	2	1	1	1	1				
CO5	3	3	3	1	1	1				
Course Correlation Mapping	**3**	**2**	**1**	**1**	**1**	**1**	**1**	**1**		

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: CREATIVITY AND INNOVATION ***(09 Periods)***

Introduction, Levels of innovation, Purposeful innovation and the sources of innovative opportunity, The innovation process, Innovative strategies, Strategies that aim at introducing and innovation, Dynamics of ideation and creativity – Inbound, Outbound; Context and process of new product development, Theories of outsourcing.

Module 2: PARADIGMS OF INNOVATION ***(09 Periods)***

Systems approach to innovation, Innovation in the context of developed economies and Emerging economies, Examining reverse innovation and itsapplication,Performancegap,Infrastructuregap,Sustainabilitygap,Regulatory gap, Preference gap, organizational factors effecting innovation at firm level.

Module 3: SOUCES OF FINANCE AND VENTURE CAPITAL ***(09 Periods)***

Importance of finance, Comparison of venture capital with conventional development capital, Strategies of venture funding, Investment phases, Investment process, Advantages and disadvantages of venture capital, Venture capital developments in India.

Module 4: INTELLECTUAL PROPERTY INNOVATION AND ENTREPRENEURSHIP ***(09 Periods)***

Introduction to Entrepreneurship, Evolution of entrepreneurship from economic theory, Managerial and entrepreneurial competencies, Entrepreneurial growth and development, Concepts, Ethics and Nature of International Entrepreneurship, Intellectual property – forms of IP, Patents, Trademarks, Design registration, Copy rights, Geographical indications, Patent process in India.

Module 5: OPEN INNOVATION FRAME WORK & PROBLEM SOLVING ***(09 Periods)***

Concept of open innovation approach, Difference between open innovations and Cloud innovation approaches, Limitations and Opportunities of open innovation frame work, Global context of strategic alliance, Role of strategic alliance, Problem Identification and Problem Solving, Innovation and Diversification

Total Periods:45

EXPERIENTIAL LEARNING

1. Identify the Innovative Marketing Strategies for Startups
2. Identify the Coca-cola Company Intellectual Property Rights

(Note: It's an indicative one. Course instructor may change the activities and the same shall be reflected in course handout)

CASE STUDIES/ARTICELS:

Contemporary relevant case studies/ Articles will be provided by the course instructor at the beginning.

1. Tesla Inc.: Disrupting the Automobile Industry
   This case study examines how Tesla Inc. disrupted the traditional automobile industry through its innovative electric vehicles and sustainable energy solutions. It discusses the sources of innovative opportunity that Tesla leverages, the ideation and creativity dynamics involved in new product development, and the strategies that the company uses to introduce and market its innovations.
2. Google Inc.: Innovation in Developed Economies
   This case study explores how Google Inc. became a global leader in the technology industry through its innovative search engine, advertising, and cloud computing solutions. It highlights the performance gap that Google addressed, the regulatory and sustainability gaps that it leveraged, and the impact of its innovation strategies on the company's growth and profitability.

3. Flipkart: From Startup to Unicorn
   This case study examines how Flipkart, an Indian e-commerce company, secured venture capital funding to become one of the largest online marketplaces in India. It discusses the importance of finance in entrepreneurship, the advantages and disadvantages of venture capital, and the strategies that Flipkart used to attract venture funding.

4. Patanjali Ayurved: Building a Brand through Intellectual Property
   This case study explores how Patanjali Ayurved, an Indian consumer goods company, built a strong brand through its intellectual property strategies. It discusses the forms of IP that Patanjali leverages, the patent process in India, and the impact of IP on the company's growth and profitability.

5. Procter & Gamble: Innovation through Open Innovation
   This case study analyzes how Procter & Gamble, a global consumer goods company, leveraged open innovation to achieve unprecedented success in product development and marketing. It discusses the difference between open and cloud innovation approaches, the limitations and opportunities of open innovation, and the role of strategic alliances in global innovation.

RESOURCES

TEXT BOOKS:

1. Vinnie Jauhari, Sudhanshu Bhushan, *Innovation Management*, Oxford University Press, 1st Edition, 2014.
2. Drucker, P.F., *Innovation and Entrepreneurship*, Taylor & Francis, 2nd Edition, 2007.

REFERENCE BOOKS:

1. Robert D Hisrich, Claudine Kearney, *Managing Innovation and Entrepreneurship,* Sage Publications, 1st Edition, 2014.
2. V.K. Narayanan, *Managing Technology and Innovation for Competitive Advantage,* Pearson India, 1st Edition, 2002.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=wWsl48VLfVY
2. https://www.youtube.com/watch?v=dDpQ9ALKX0U
3. https://www.youtube.com/watch?v=Eu_hkxkJGTg

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22LG201701	**PERSONALITY DEVELOPMENT**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course gives awareness to students about the various dynamics of personality development.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate knowledge in Self-Management and Planning Career

CO2. Analyze the functional knowledge in attitudes and thinking strategies

CO3. Learn and apply soft skills for professional success.

CO4. Function effectively as an individual and as a member in diverse teams

CO5. Communicate effectively in public speaking in formal and informal situations.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	2	1	-	-	-	-	-	-	-	-
CO2	2	3	-	-	-	-	-	-	-	-
CO3	2	2	-	-	3	-	-	-	-	2
CO4	1	1	-	-	-	-	-	-	3	3
CO5	-	-	-	-	-	-	-	-	-	3
Course Correlation Mapping	2	2	3	-	3	-	-	-	3	3

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: SELF-ESTEEM & SELF-IMPROVEMENT ***(09 Periods)***

Know Yourself – Accept Yourself; Self-Improvement: Plan to Improve - Actively Working to Improve Yourself- Exercises- case studies

Module 2: DEVELOPING POSITIVE ATTITUDES ***(09 Periods)***

How Attitudes Develop – Attitudes are Catching – Improve Your Attitudes – Exercises- case studies

Module 3 SELF-MOTIVATION & SELF-MANAGEMENT ***(09 eriods)***

Show Initiative – Be Responsible Self-Management; Efficient Work Habits – Stress Management – Employers Want People Who can Think – Thinking Strategies- Exercises- case studies

Module 4 GETTING ALONG WITH THE SUPERVISOR ***(09 Periods)***

Know your Supervisor – Communicating with your Supervisor – Special Communication with your Supervisor – What Should you Expect of Your Supervisor? – What your Supervisor expe of you - Moving Ahead Getting Along with your Supervisor- Exercises- case studies

Module 5 WORKPLACE SUCCESS ***(09 Periods)***

First Day on the Job – Keeping Your Job – Planning Your Career – Moving Ahead- Exercises- case studies

Total Periods: 45

EXPERIENTIAL LEARNING

1. List out the self-improvements in you on the charts and explain in detail.
2. Discuss different famous personalities and their attitudes.
3. Describe different personalities with respect to self-motivation and self-management.
4. Imagine you are a supervisor and illustrate different special communications.
5. Assume and Interpret different experiences on the first day of your job.

(Note: It's an indicative one. Course instructor may change the activities and the same shall be reflected in course handout)

RESOURCES

TEXTBOOK:

1. Harold R. Wallace and L. Ann Masters, *Personal Development for Life and Work*, Cengage Learning, Delhi, 10th edition Indian Reprint, 2011. (6th Indian Reprint 2015)
2. Barun K. Mitra, *Personality Development and Soft Skills,* Oxford University Press, 2011.

REFERENCE BOOKS:

1. K. Alex, *Soft Skills*, S. Chand & Company Ltd, New Delhi, 2nd Revised Edition, 2011.
2. Stephen P. Robbins and Timothy A. Judge*, Organizational Behaviour*, Prentice Hall, Delhi, 16th edition, 2014

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=6Y5VWBLi1es
2. https://www.youtube.com/watch?v=H9qA3inVMrA

WEB RESOURCES

1. https://www.universalclass.com/.../the-process-of-perso...
2. https://www.ncbi.nlm.nih.gov/pubmed/25545842
3. https://www.youtube.com/watch?v=Tuw8hxrFBH8

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22CS101702	**WEB DESIGN FUNDAMENTALS**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course is designed to introduce the student to the technologies and facilities of web design: CSS, javascript, and jquery. Students will understand the web design process and use these software technologies together to produce web design projects.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the fundamentals of HTML 5 and the principles of web design.

CO2. Construct basic websites using HTML and Cascading Style Sheets.

CO3. Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.

CO4. Learn how to use HTML5 and other Web technologies to develop interactive and responsive web pages.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	3	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	2	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-
CO4	2	3	3	-	-	-	-	2	-	-
Course Correlation Mapping	**3**	**3**	**3**	**-**	**-**	**-**	**2**	**2**	-	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION ***(09 Periods)***

Elements – Data types - Working with Text - Arranging Text - Displaying Lists - VAR Element - BDO Element - SPAN Element – DIV Element.

Module 2: LINKS AND URLS ***(09 Periods)***

Hyperlinks – URLs - Linking to a Mail System - Creating Tables - Inserting Images in a Web Page – Colors – Form Elements - Multiple-Choice Elements – Multimedia

Module 3: DYNAMIC HTML ***(09 Periods)***

Features of JavaScript - Programming Fundamentals - JavaScript Functions, Events, Image Maps, and Animations – JS Objects - Document Object - Validation, Errors, Debugging, Exception Handling, and Security

Module 4: CASCADING STYLE SHEET ***(09 Periods)***

CSS Syntax - CSS Selectors - Backgrounds and Color Gradients - Fonts and Text Styles - Creating Boxes and Columns - Displaying, Positioning, and Floating an Element - Table Layouts - : Effects, Frames, and Controls in CSS

Module 5: ADVANCED FEATURES OF HTML5 ***(09 Periods)***

Creating Editable Content - Checking Spelling Mistakes - Custom Data Attributes - Client-Side Storage - Drag and Drop Feature - Web Communication –**jQuery -** Fundamentals of jQuery - Callback Functions - jQuery Selectors - jQuery Methods to Access HTML Attributes.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Design a blog layout that includes header, navigation menu, content area, sidebar. Apply appropriate styling to each section.
2. Develop a java script based quiz that presents MCQs to the user and provides immediate feedback on their answers. Keep track of the score and display the final results at the end.
3. Build a web page that displays and image gallery. Each image should be a clickable link that opens the image in a larger view when clicked.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXTBOOKS

1. DT Editorial Services, *HTML 5 Black Book*, Dreamtech Press, 2nd Edition, 2016.

REFERENCE BOOKS

1. Jennifer Niederst Robbins, *HTML5 Pocket Reference,* O'Reilly, 5th Edition, 2018.
2. Ben Frain, *Responsive Web Design with HTML5 and CSS3*, Packt, 2nd Edition, 2020.

VIDEO RESOURCES

1. https://www.youtube.com/watch?v=h_RftxdJTzs
2. https://www.youtube.com/watch?v=dlkWNdnO8ek

WEB RESOURCES

1. https://www.w3schools.com/html/
2. https://www.w3schools.com/css/
3. https://www.geeksforgeeks.org/web-technology/
4. https://www.smashingmagazine.com/2021/03/complete-guide-accessible-front-end components/
5. https://css-tricks.com/
6. https://davidwalsh.name/css-optional

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22SS101706	**WOMEN EMPOWERMENT**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Concept & Framework, Status of Women, Women's Right to Work, International Women's Decade, and Women Entrepreneurship.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Demonstrate the knowledge of the characteristics and achievements of empowered women and women's empowerment techniques by analyzing women's legal and political status.

CO2 Apply the knowledge of women's rights by analyzing various societal issues and obstacles in different fields, including science and technology.

CO3 Demonstrate the knowledge of the significance of women's participation in policy debates, National conferences, and common forums for equality and development by identifying and analyzing issues.

CO4 Analyze the concept of women's entrepreneurship, government schemes, and entrepreneurial challenges and opportunities.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	-	-	1	3	-	1	–	–
CO2	3	1	-	-	-	2	-	-	-	–
CO3	3	1	-	-	-	2	-	-	-	3
CO4	3	1	-	-	-	-	-	-	-	-
Course Correlation Mapping	3	1	-	-	1	3	-	1	–	3

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: CONCEPT & FRAMEWORK ***(09 Periods)***

Introduction– Empowered Women's Characteristics – Achievements of Women's Empowerment **Concept of Empowerment:** Meaning & Concept – Generalizations about Empowerment – Empowerment Propositions – Choices women can make for empowerment – Women's participation in decision making, development process & in Governance. **Framework for Empowerment** – Five levels of equality – Tenets of Empowerment– Elements – Phases and aspects – Techniques – Categories and Models – Approaches.

Module 2: STATUS OF WOMEN ***(09 Periods)***

Legal Status: Present Scenario – Call for Social Change – Significant Trends – Legal & Schemes – Personal Law – Joint Family – Criminal Law – Shift towards Dowry – Deterrent Punishment – Criminal Law (II Amendment) – Discrimination in Employment.

Political Status: Present Scenario – Political Participation & its NatureSocio–economic Characteristics – Political Mobilization: Mass Media – Campaign Exposure – Group Orientation – Awareness of issues and participation – Progress & Future Thrust.

Module 3: WOMEN'S RIGHT TO WORK ***(09 Periods)***

Introduction – Present Scenario – Changes in Policy & Programme – National Plan of Action– Women's Cells and Bureau – Increase in the work participation rate – Discrimination in the labour market – Women in unorganized sector – Issues and Obstacles– Women in Education – Women in Science & Technology – Case Study: Linking Education to Women's Access to resources.

Module 4: WOMEN'S PARTICIPATORY DEVELOPMENT ***(09 Periods)***

Dynamics of social change – conscious participation – Information Explosion – Organized Articulation – National Conference – Common Forums – Participatory Development – New Issues Identified – Role of other Institutions.

Module 5: WOMEN ENTREPRENEURSHIP ***(09 Periods)***

Introduction – Definition – Concept – Traits of women Entrepreneurs – Role of Women Entrepreneurs in India – Reasons for Women Entrepreneurship – Government schemes & Financial Institutions to develop Women Entrepreneurs – Key policy recommendations – Project Planning – Suggestions and measures to strengthen women entrepreneurship – Growth & Future challenges – Training and Opportunities – Case Study: Training Women as Hand–pump Mechanics– Case Study: Literacy for Empowering Craftswomen

Total Periods: 45

EXPERIENTIAL LEARNING

1. Prepare poster presentation on "impact of women's self-help groups on their empowerment and socio-economic development."
2. Prepare a comparative analysis chart on the status of women in various countries.
3. Prepare a presentation on women and cultural responsibilities in different societies.
4. Prepare a presentation on the women of the past, present and future in terms of responsibilities and duties.
5. Prepare a presentation on the great women entrepreneurs of India.

(Note: It's an indicative one. Course Instructor may change activities and shall be reflected in course Handout)

RESOURCES

TEXT BOOKS:

1. SahaySushama, *Women and Empowerment,* Discovery Publishing House, New Delhi, 2013.
2. NayakSarojini, Jeevan Nair, *Women's Empowerment in India*, Pointer Publishers, Jaipur, 2017.

REFERENCE BOOKS:

1. Baluchamy. S, *Women's Empowerment of Women*, Pointer Publishers, Jaipur, 2010.
2. Khobragade Grishma, *Women's Empowerment: Challenges and Strategies Empowering Indian Women*, Booksclinic Publishing, Chhattisgarh, 2020.

WEB RESOURCES

1. https://www.economicsdiscussion.net/entrepreneurship/women–entrepreneurs–in–india
2. https://www.businessmanagementideas.com/entrepreneurship–2/women entrepreneurs

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF101001	**RESEARCH METHODOLOGY AND BIOSTATISTICS FOR HEALTH PROFESSIONALS**	4	-	-	-	4

Pre-Requisite -

Anti-Requisite 22DF102025 Research Methodology and Biostatistics

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed Knowledge on the basic principles of research and methods applied to draw inferences from the research findings. The students will also be made aware of the need of biostatistics and understanding of data, sampling methods, in addition to being given information about the relation between data and variables.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand concepts of research methodology.

CO2 Collect data for research in various methods.

CO3 Analyse research data by using biostatistics

CO4 Write their research or review papers to publish in journal

CO5 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	3	1	-	-	-
CO2	1	1	2	-	2	-	-	-	3	-
CO3	1	1	2	-	1	-	-	1	-	1
CO4	2	1	2		2					1
CO5	1	2	2	-	3	2	1	-	-	-
Course Correlation Mapping	**1**	**1**	**2**	**1**	**2**	**3**	**1**	**1**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: FOUNDATIONS OF RESEARCH ***(10 Periods)***

Definition Research, Introduction to research methods, Objectives of Research, Identifying research problem, Types of Research & Research Approaches, Research Methods vs Methodology Ethical issues in research, Research design.

Module 2: RESEARCH PROBLEM AND DATA COLLECTION ***(09 Periods)***

Research Problem, Measurement & Scaling Techniques, Types of Data, Research tools and Data Research Problem, Measurement & Scaling Techniques, Types of Data, Research tools and Data collection methods, Sampling methods, randomization, crossover design, placebo, blinding techniques, Developing a research proposal.

Module 3: INTRODUCTION TO BIOSTATICS ***(09 Periods)***

Meaning, Definition, and Characteristics of Statistics, Importance of the Study of Statistics, Understanding of data in biostatistics, Statistics in Health Science, How & where to get relevant data, Relation between data & variables, Type of variables: defining data sets.

Module 4: DATA ANALYSIS AND DISSEMINATION ***(09 Periods)***

Basic Principles of Data Graphical Representation, Analysis of variance & covariance. Measures of central tendency include mean, median, and mode. Probability and standard distributions include binomial and normal distributions. Sample size calculation, Sampling techniques address sampling need, criteria, procedures, design errors, variation, and tests of significance. Statistical significance involves parametric and non-parametric tests.

Module 5: SCIENTIFIC WRITING ***(08 Periods)***

Introduction, reviewing literature, formulating research problems and proposals, integrating theory and data and understanding citation and referencing. types of reports, formal report layout, and journal standards (impact factor, citation index). importance of communicating science, challenges in scientific writing, plagiarism and its detection and writing scientific papers.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To practice problems on various biostatistics tools
2. Demonstrate types of data collection from hospital.
3. To determine research statistics tools.
4. Analyze data by using SPSS.

RESOURCES

TEXT BOOKS:

1. S.P. Gupta, Statistical Methods, Sultan Chand & Sons, Edition 46,2023.
2. C.R. Kothari, Research Methodology, New age International Publisher, Edition 4, 2019.

REFERENCE BOOKS:

1. Himanshu Tyagi, Biostatistics Buster, Jaypee Brothers Medical Publishers, Edition 1,2011.
2. Bratati Banerjee, Mahajans Methods in Bistatistical for medical students and research workers, Jaypee Brothers Medical Publishers, Edition 9, 2018.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=d77eQz0_Sfk
2. https://www.youtube.com/watch?v=yOU_s0xzc-Y
3. https://www.youtube.com/watch?v=txIS0N0l9xU&list=PLEIbY8S8u_DK7i4Fj6Hgq8sn_l42k9H1L
4. https://www.youtube.com/watch?v=1Q6_LRZwZrc

WEB RESOURCES:

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8764821/
2. https://www.scribbr.com/category/methodology/
3. https://www.easybiologyclass.com/biostatistics-introduction-significance-applications-and-limitations-of-statistics/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22RT102020	**OCULAR ANATOMY & PHYSIOLOGY**	4	-	2	-	5

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a comprehensive study of the anatomical structures and physiological functions of the human eye and visual pathways, focusing on developing students' knowledge and understanding of the visual system and the processes involved in vision.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the developmental processes and structural organization of the human eye, including associated structures such as the eyebrows, eyelids, conjunctiva, and ocular surface.

CO2. Describe the detailed anatomy of the orbit, lacrimal apparatus, cornea, sclera, lens, and anterior chamber, along with their functional relevance.

CO3. Identify and describe the histology and functional roles of all three coats of the eyeball—the fibrous, vascular (uvea), and neural (retina)—as well as the visual pathway.

CO4. Understand the physiology of vision including visual acuity, neurophysiological mechanisms, and the roles of the lacrimal system and extraocular muscles in ocular protection and function.

CO5 Gain knowledge of the brain's interpretation of visual stimuli including color vision, depth perception, visual field processing, and the role of the visual cortex.

C06 Work individually or collaboratively to analyse and solve problems, demonstrating effective communication and application of ocular anatomical and physiological principles.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	2	-	-	-	2	-	-
CO2	3	-	-	2	-	-	-	2	-	2
CO3	2	2	-	3	-	-	-	2	-	2
CO4	2	3	-	3	-	-	-	2	-	2
CO5	3	-	-	3	-	-	-	2	-	-
CO6	3	2	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**2**	**-**	**-**	**-**	**2**	**-**	**2**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module1: DEVELOPMENT AND COATS OF THE EYEBALL ***(12 Periods)***

Embryology of the Eye, Formation of the optic vesicle & optic stalk, lens vesicle, optic cup. Mesodermal contributions to the eye, Development of structures, retina, optic nerve, crystalline lens, cornea, sclera, choroid, ciliary body, iris, vitreous, Development of accessory structures: eyelids, lacrimal apparatus, extraocular muscles, orbit, Key developmental milestones of the eye, Coats of the Eyeball, Cornea, Introduction, layers, blood & nerve supply, histology, corneal transparency & its theories, hydration regulation, corneal vascularization, Uveal Tissue, Iris (macroscopic & microscopic features), sphincter & dilator muscles, pupillary reflexes (light, near, darkness, psychosensory, lid closure), ciliary body, choroid, Uveo-scleral drainage, Schlemm's canal, vascular supply (short & long posterior arteries, anterior arteries), venous drainage, Lens, Structure (capsule, anterior epithelium, lens fibers, zonules), accommodation (mechanism, theories, stimulus, ocular changes), age-related changes, transparency, cataract, far/near point, Aqueous Humor, Formation, drainage, circulation, flow rate, functions, intraocular pressure regulation, Vitreous Humor, Composition, structure (hyaloid membrane, cortical and medullary vitreous), attachments, base, functions.

Module 2: OCULAR ADNEXA, GLANDS & PROTECTIVE MECHANISMS ***(12 Periods)***

Ocular Adnexa & Glands, Eyebrows: Gross anatomy, structure, blood & nerve supply, Eyelids: Skin, subcutaneous areolar layer, striated muscle, submuscular areolar tissue, fibrous layer, conjunctiva, Lid glands, Meibomian glands, glands of Zeiss, glands of Moll, Blood, nerve supply & lymphatic drainage of lids, Conjunctiva, Parts (palpebral, bulbar, fornix), caruncle, plica semilunaris, Microscopic structure (epithelium, substantia propria), conjunctival glands (Krause, Wolfring, Henle, Manz), blood & nerve supply, Protective Mechanisms, Blinking muscles and reflexes, Lacrimation, Lacrimal gland structure (palpebral part, ducts), blood & nerve supply, lacrimal passages, Tear Film Dynamics, Secretion, formation, retention, redistribution, evaporation, drying, breakup, elimination during blinking.

Module 3: ORBIT, OCULAR MOTILITY & VISUAL PATHWAY ***(12 Periods)***

Orbit: Bony orbit (size, shape, relations, walls, base, apex), orbital fascia (fascia bulbi, muscle sheaths, septa), orbital spaces, fat & reticular tissue, apertures, contents, Nerves, Oculomotor, trochlear, abducent, trigeminal, facial—course, functional components, clinical relevance,
Ocular Motor System, Extraocular muscles, Function & innervation, Physiology of eye movement, Monocular and binocular movements, position of gaze, Fick's axes, Retina & Visual Pathway ,Gross & microscopic structure, vascular supply, blood-retinal barrier, Anatomy of optic nerve, optic chiasma, optic tract, lateral geniculate body, optic radiations, visual cortex, Blood supply of pathway (circle of Willis & branches), Lesions and fiber arrangement in the visual pathway.

Module 4: PHYSIOLOGY OF VISION, COLOR & CONTRAST ***(14 Periods)***

Visual Sensation, Vision basics, visual acuity (components: minimum visible, resolution, recognition, hyperacuity), factors, measurement, Refractive errors, Visual Perception, Binocular vision, stereoscopic depth perception, Neurophysiology of Perception, Higher visual pathways, Primary to cerebral centres, LGN, non-geniculate targets, visual cortex, Spatial analysis, dual visual processing pathways, Colour Vision, Physiological, photochemical, and neurological basis, Theories, Young-Helmholtz, Granit's modulator-dominator, Purkinje phenomenon,
Types of colour defects, colour blindness, neural analysis, Contrast Sensitivity, Spatial & temporal contrast sensitivity, neural mechanisms, Measurement: Arden gratings, Cambridge gratings, Pelli–Robson chart.

Module 5: ELECTROPHYSIOLOGY OF VISION ***(10 Periods)***

Visual cortex and its functions, Geniculate cortex and retinal projection, ERG (Electroretinography), EOG (Electrooculography), VEP (Visual Evoked Potential).

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS: PRACTICALS/ DEMONSTRATION:

1. Examination of the crystalline lens for transparency and abnormalities.
2. Observation of menace and dazzle reflex; aural blinking
3. Assessment of ocular motility: Ductions, Versions, and Vergence.
4. Measurement of corneal diameter – Horizontal Visible Iris Diameter (HVID).
5. Assessment of pupillary reflexes (light and near response).
6. Identification and observation of tear glands and puncta.
7. A screening test for detecting color vision defects

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. A.K. Khurana & Indu Khurana – Anatomy and Physiology of Eye, CBS Publishers, Edition 1, 2017.
2. Albert Alm, James Ver Hoeve – Adler's Physiology of the Eye, Saunders, Edition 11, 2011.

REFERENCE BOOKS:

1. VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998
2 DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002.

VIDEO LECTURES:

1. Khan Academy – The Structure of the Eye
2. Ted Montgomery's Eye Video Resource
3. Eye Guru – Educational Platform for Ophthalmology

4 YouTube: Ocular Anatomy Overview

5 YouTube: Physiology of Vision

WEB RESOURCES:

1. University of Michigan – The Eyes Have It (List View Anatomy Resource): umich.edu
2. Atlas of Ophthalmology – atlasophthalmology.net
3. e-Anatomy – Orbits and Eye Illustrations – imaios.com

4 Netter Images – Welcome to Netter's Eye Anatomy Collection

5 Stat Pearls – Comprehensive Clinical Eye Anatomy Overview: NCBI Bookshelf