

# **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)**



## **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:

- P01. Knowledge:** Study and apply concepts, theories, and practices of health care system to gain fundamental knowledge.
- P02. Analysis:** To identify, analyze and evaluate various experiences and perspectives using knowledge of paramedical & Allied Health sciences for substantiated conclusions.
- P03. Development;** Individual or teamwork skills to support shared goals with the interdisciplinary healthcare team to improve societal health
- P04. Tools & Techniques:** To create, select, and apply appropriate techniques, resources and modern tools with an understanding of the limitations in Health care system.
- P05. Environment and Sustainability:** Understand the impact of Health care professionals in environmental contexts and demonstrate the knowledge for sustainable development.
- P06. Ethics and Society:** Apply the ethical principles of health care practices for sustainable development of society
- P07. 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.
- P08. 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.
- P09. Entrepreneurship:** Entrepreneur and leadership skills to practice independently as well as in collaboration with the interdisciplinary healthcare team.
- P010. 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	60-75
2	PROGRAM CORE	80-100
3	PROGRAM ELECTIVE	24-36
4	UNIVERSITY ELECTIVE	9-12
<b>TOTAL CREDITS</b>		<b>Min. 195</b>

## School Core (60-75 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	-
<b>Mandatory Courses (Min. 8 Credits to be earned, Earned Credits will not be considered for CGPA )</b>							

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
22CE107601	Environmental Science	2	-	-	-	2	-
22LG101402	Telugu	2	-	-	-	2	-
22LG101404	Sanskrit	2	-	-	-	2	-

## Program Core (65-85 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	Medical Biochemistry
22RT102004	Ocular Microbiology	2	-	2	-	3	
22RT101008	Ocular Anatomy	2	1	-	-	3	Human Anatomy
22RT102003	Ocular Physiology	2	-	2	-	3	Human Physiology
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
22RT102015	Contact Lens-II	3	-	2	-	4	Contact Lens -I
22RT111001	Optometry Internship-I	-	-	-	-	20	Clinical Posting-IV
22RT111002	Optometry Internship-II	-	-	-	-	20	Optometry Internship-I



## Program Elective (15-25 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	Dispensing Optics
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-I	3	-	2	-	4	-
22RT101024	Ocular Pharmacology	3	-	-	-	3	Basic Pharmacology and Drug Administration

## University Elective (9-12 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	-

## SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
<b>22DF102001</b>	<b>MEDICAL TERMINOLOGY AND RECORD KEEPING</b>	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
<b>CO1</b>	3	-	-	-	-	3	1	-	-	-
<b>CO2</b>	3	1	-	-	-	-	-	-	3	-
<b>CO3</b>	3	1	3	-	-	-	-	-	-	1
<b>CO4</b>	2	1								1
<b>CO5</b>	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, Edition 2, 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](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
<b>22DF102002</b>	<b>INTRODUCTION TO QUALITY AND PATIENT SAFETY</b>	4	1	2	-	6
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	3	2	-	-	2
<b>CO2</b>	3	-	-	-	-	-	-	-	-	-
<b>CO3</b>	3	-	-	-	-	-	-	-	-	1
<b>CO4</b>	3	-	-	-	-	-	-	-	-	-
<b>CO5</b>	3	-	-	-	-	1	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	-	-	-	-	<b>3</b>	<b>2</b>	-	-	<b>2</b>

**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. Anjaneyulu and 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.
5. Gireesh Kumar KP and Eng "Handbook of antibiotics" Paras Medical Books, Edition 1, 2014.

### **REFERENCE BOOKS:**

1. Alan R. Hauser "Antibiotics for Clinicians" LWW Exclusive NP, Standard Edition, 2019.

### **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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22LG101406</b>	<b>PROFESSIONAL ENGLISH</b>	2	-	-	-	2
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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:

- C01.** Demonstrate knowledge of literary works of various pieces of eminent writers.
- C02.** Adapt general and technical vocabulary in communication.
- C03.** Apply grammatically correct English in writing.
- C04.** Analyze texts using reading techniques.
- C05.** 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
<b>C01</b>	3	-	-	-	-	-	2	-	-	-
<b>C02</b>	2	2	-	-	-	-	2	-	3	-
<b>C03</b>	2	2	-	-	3	-	2	-	3	-
<b>C04</b>	2	3	2	-	2	-	2	-	3	-
<b>C05</b>	2	2	-	-	3	-	2	-	3	-
<b>Course Correlation Mapping</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>-</b>

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

## **COURSE CONTENT**

### **Module 1: BE THE BEST OF WHATEVER YOU ARE BY DOUGLAS MALLOTT (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=-ITliZO85YM>
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](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/](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
<b>22MG101006</b>	<b>PRINCIPLES OF MANAGEMENT</b>	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
<b>CO1</b>	3	-	-	-	-	-	-	1	-	-
<b>CO2</b>	3	1	-	1	-	-	-	1	1	-
<b>CO3</b>	3	1	-	1	-	-	-	1	1	-
<b>CO4</b>	3	1	-	-	-	-	-	1	1	-
<b>CO5</b>	3	1	-	-	-	1	-	-	1	-
<b>CO6</b>	3	-	-	-	-	-	-	1	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>1</b>	-	<b>1</b>	-	<b>1</b>	-	<b>1</b>	<b>1</b>	-

**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, Span 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](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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22CS102402</b>	<b>BASIC COMPUTERS AND INFORMATION SCIENCES</b>	3	-	2	-	4
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	2	-	-	-	-	-	-	-	-
<b>CO2</b>	3	2	2	-	-	-	-	-	-	-
<b>CO3</b>	3	2	3	-	-	-	-	-	-	-
<b>CO4</b>	2	2	3	-	-	-	-	-	-	-
<b>CO5</b>	3	2	2	-	-	-	-	-	-	-
<b>CO6</b>	-	-	-	-	-	-	-	3	3	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>3</b>	-	-	-	-	<b>3</b>	<b>3</b>	-

**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
<b>22CE107601</b>	<b>ENVIRONMENTAL SCIENCE</b>	2	-	-	-	2
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	2	-	-	2	-	-	1	-	1
<b>CO2</b>	3	2	-	-	2	2	1	1	-	1
<b>CO3</b>	3	2	2	1	2	2	2	-	-	-
<b>CO4</b>	3	2	2	2	2	-	-	2	-	1
<b>CO5</b>	3	2	2	2	2	2	2	-	-	1
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>		<b>1</b>

**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, 6<sup>th</sup> Edition, 2018.
2. ErachBarucha, *Environmental Studies*, Orient Blackswan, 3<sup>rd</sup> Edition, 2021.

### **REFERENCE BOOKS:**

1. Cunningham, W. P. and Cunningham, M. A., *Principles of Environmental Science*, Tata McGraw-Hill Publishing Company, New Delhi, 8<sup>th</sup> Edition, 2016.
2. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2<sup>nd</sup> 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, 3<sup>rd</sup> Edition, 2015.

### **VIDEO LECTURES:**

1. [http:// nptel.ac.in/courses/109/104/109104047](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](https://www.tutorialspoint.com/environmental_studies/environmental_studies_environment.htm)

## SCHOOL CORE

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22DF105001</b>	<b>BIOMEDICAL WASTE MANAGEMENT</b>	-	1	2	-	2
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	1								1
<b>CO2</b>	3	1	2	-	-	-	-	-	-	1
<b>Course Correlation Mapping</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>

**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. ShishirBasarkar "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
<b>22PT102006</b>	<b>HUMAN ANATOMY</b>	4	1	2	-	6
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	1	1	-	-	1	1	-	-	1
<b>CO2</b>	3	2	1	-	-	1	1	-	-	1
<b>CO3</b>	3	2	1	-	-	1	1	-	-	1
<b>CO4</b>	3	2	1	-	-	1	1	-	-	1
<b>CO5</b>	3	2	1	-	-	1	1	-	-	1
<b>CO6</b>	3	-	-	-	-	-	-	-	-	1
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>

**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; 6<sup>th</sup> Edition, 2021
3. Inderbir Singh's book of Anatomy; Vol 1,2,3, 3<sup>rd</sup> Edition, 2020
4. Inderbir Singh's Text book of Human Histology, Jaypee Publishers, 10<sup>th</sup> Edition, 2022
5. Inderbir Singh's Text book of Human Embryology, Jaypee Publishers, 12<sup>th</sup> Edition, 2022

### **REFERENCE BOOKS**

1. A. k. Datta, Essentials of human anatomy; Current books international publishers; Volume: 1,2,3,4; 10<sup>th</sup> Edition 2019.
2. Richard Tunstall and Susan Standring, Gray's Anatomy - The anatomical basis of clinical practice, Elsevier publishers, 42<sup>nd</sup> Edition 2020.
3. Rachel koshi, Cunningham's manual of practical Anatomy, Oxford University Press publishers, Volume - 1,2,3; 16<sup>th</sup> Edition 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](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](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](https://www.freebookcentre.net/medical_books_download/Clinical-Anatomy.html)
5. [https://www.academia.edu/42079859/ESSENTIAL\\_CLINICAL\\_ANATOMY](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
<b>22PT102007</b>	<b>HUMAN PHYSIOLOGY</b>	4	1	2	-	6
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	2	-	2	-	-	-	-	-	-
<b>CO2</b>	3	-	-	1	-	-	-	-	-	-
<b>CO3</b>	3	-	-	-	-	-	-	-	-	-
<b>CO4</b>	3	2	-	-	-	-	-	-	-	-
<b>CO5</b>	3	2	-	2	-	-	-	-	-	-
<b>CO6</b>	3	-	-	-	-	-	3	3	-	3
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>3</b>

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

## **COURSE CONTENT**

### **MODULE 1: GENERAL PHYSIOLOGY, BLOOD AND NERVE MUSCLE 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-dioxide 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: NERVOUS SYSTEM 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, 13<sup>th</sup> Edition, Saunders publisher, 2015.
2. K Sembulingam, Essentials of Medical Physiology, 9<sup>th</sup> 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](https://www.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](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
<b>22PT101004</b>	<b>NATIONAL HEALTH CARE DELIVERY SYSTEM</b>	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
<b>CO1</b>	3	-	-	-	1	-		-	-	-
<b>CO2</b>	3	1	-	-	2	-	1	-	-	-
<b>CO3</b>	3	2	-	-	1	-	1	-	-	-
<b>CO4</b>	3	-	-	-	1	-		-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	-	-	<b>1</b>	-	<b>1</b>	-	-	-

**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 Health 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 & Bartlett Learning, Edition 4, 2019.
2. Sharon B .Buchbinder, Introduction to Health Care Management, Jones & Bartlett 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](https://youtu.be/It_cv56DxTk)
2. [https://youtu.be/VIrdH\\_3RKKk](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
<b>22DF102003</b>	<b>MEDICAL BIOCHEMISTRY</b>	3	-	2	-	4
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	2	-	1	-	-	-	-	-	-
<b>CO2</b>	3	2	-	-	-	-	-	-	-	-
<b>CO3</b>	3	2	-	-	-	1	-	-	-	-
<b>CO4</b>	3	2	-	2	-	-	-	-	-	-
<b>CO5</b>	3	2	-	-	-	-	-	-	-	-
<b>CO6</b>	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, 3<sup>rd</sup> 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](https://www.youtube.com/watch?v=jcz99_-JcZ8)

**WEB RESOURCES:**

1. [https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture\\_notes/health\\_sci\\_ence\\_students/medicalbiochemistry.pdf](https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_sci_ence_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](https://rajneeshrajoria.weebly.com/uploads/4/9/0/6/49069889/biochemistry_bicm101.pdf)

## PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
<b>22RT102001</b>	<b>OPTICAL PHYSICS</b>	3	-	2	-	4
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	1	-	-	-	-	-	-
<b>CO2</b>	3	-	-	1	-	-	-	-	-	-
<b>CO3</b>	3	-	-	1	-	-	-	-	-	-
<b>CO4</b>	3	-	-	1	-	-	-	-	-	-
<b>CO5</b>	3	2	-	2	-	-	-	-	-	-
<b>CO6</b>	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 BIREFRINGENCE**

**(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 and extraordinary 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. Subrahmanyam 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](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
<b>22RT102002</b>	<b>GEOMETRICAL OPTICS – I</b>	3	-	2	-	4
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	2	-	-	-	-	-	-
<b>CO2</b>	3	-	-	1	-	-	-	-	-	-
<b>CO3</b>	3	-	-	2	-	-	-	-	-	-
<b>CO4</b>	3	-	-	3	-	-	-	-	-	-
<b>CO5</b>	3	-	-	2	-	-	-	-	-	-
<b>CO6</b>	-	-	-	-	-	-	-	-	-	2
<b>Course Correlation Mapping</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>

**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**

### **LIST OF EXPERIMENTS:**

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=7JGqLC00ifY>
2. <https://www.youtube.com/watch?v=kIRn1AIEd38>
3. [https://www.youtube.com/watch?v=EV\\_nUsAT4ZI&t=183s](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](https://www.aao.org/Assets/e7131c2d-217b-43bb-937a64976243356/637151349560970000/bo1r-pdf?inline=1)

## SCHOOL CORE

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
22LG101402	<b>తెలుగు</b>	2	-	-	-	2
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

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

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

- C01.** విద్యార్థులలో మానవీయ విలువలు పెరిగి నైతిక వలువలతో జీవించడం
- C02.** సమాజంలో మనకు చేతనైన సాయం చెయ్యడం ప్రతి మనిషి బాధ్యత అనే సందేశం
- C03.** త్రికరణ శుద్ధితో కృషి చేస్తే ఏదైనా సాధించ వచ్చు అనే సందేశం
- C04.** వ్యవసాయ రంగం గూర్చి విద్యార్థులలో అవగాహన కలగడం
- C05.** తెలుగు వ్యాకరణం

### CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>C01</b>	3	-	-	-	-	-	-	-	-	-
<b>C02</b>	3	-	-	-	-	-	-	-	-	-
<b>C03</b>	3	-	-	-	-	-	-	-	-	-
<b>C04</b>	3	-	-	-	-	-	-	-	-	-
<b>C05</b>	3	-	-	-	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

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

## పాఠ్య ప్రణాళిక

**Module 1: ఎక్కట్లు – తుమ్మల సీతారామమూర్తి**

**(06 Periods)**

సత్ప్రవర్తన, సచ్చీలత, సన్మార్గం, సమసమానత్వం గూర్చి వివరించడం.

**Module 2: నాడీజంఘాపాఖ్యానం – తిక్కన**

**(06 Periods)**

సహాయం చేసినవారిని 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. నాడీజంఘాపాఖ్యానం – 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](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](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
<b>22RT101007</b>	<b>OCULAR BIOCHEMISTRY</b>	3	-	-	-	3
<b>Pre-Requisite</b>	22DF102003 Medical Biochemistry					
<b>Anti-Requisite</b>						
<b>Co-Requisite</b>						

**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
<b>CO1</b>	3	2	-	1	-	-	-	-	-	-
<b>CO2</b>	3	2	-	1	-	-	-	-	-	-
<b>CO3</b>	3	2	-	-	-	-	-	-	-	-
<b>CO4</b>	3	2	-	-	-	-	-	-	-	-
<b>CO5</b>	3	2	-	1	-	-	-	-	-	-
<b>CO6</b>	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
<b>22RT102004</b>	<b>OCULAR MICROBIOLOGY</b>	2	-	2	-	3
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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:

- C01.** Understand fundamentals of microbiology and basic laboratory techniques
- C02.** Acquire basic knowledge about sterilization and disinfection in relation to ophthalmic practice
- C03.** Demonstrate an understanding of different aspects of ocular immunology
- C04.** Gain knowledge on various microbial ocular infections and their pathological mechanism
- C05.** Acquire knowledge of hospital-borne ocular infections and laboratory diagnostic tests involved in ocular infections
- 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
<b>C01</b>	3	-	-	1	-	-	-	-	-	-
<b>C02</b>	3	-	-	2	-	-	-	-	-	-
<b>C03</b>	3	2	-	-	-	-	-	-	-	-
<b>C04</b>	3	-	-	-	-	-	-	-	-	-
<b>C05</b>	3	2	-	2	-	-	-	-	-	-
<b>C06</b>	3	-	-	-	-	-	-	1	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>-</b>

**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](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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22RT101008</b>	<b>OCULAR ANATOMY</b>	2	1	-	-	3
<b>Pre-Requisite</b>	22PT102006 HUMAN ANATOMY					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	2	-	-	-	-	-	-	-	-
<b>CO2</b>	3	2	-	-	-	-	-	-	-	-
<b>CO3</b>	3	2	-	-	-	-	-	-	-	-
<b>CO4</b>	3	2	-	-	-	-	-	-	-	-
<b>CO5</b>	3	2	-	-	-	-	-	-	-	-
<b>CO6</b>	3	2	-	3	-	-	-	1	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>-</b>

**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 its 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](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
<b>22RT102003</b>	<b>OCULAR PHYSIOLOGY</b>	2	-	2	-	3

**Pre-Requisite**     22PT102007 Human Physiology

**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
<b>CO1</b>	3	2	-	1	-	-	-	-	-	-
<b>CO2</b>	3	3	-	1	-	-	-	-	-	-
<b>CO3</b>	3	2	-	2	-	-	-	-	-	-
<b>CO4</b>	3	3	-	1	-	-	-	-	-	-
<b>CO5</b>	3	3	-	1	-	-	-	-	-	-
<b>CO6</b>	3	-	-	-	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

**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 Hyperacuity, 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 contrast 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 tear 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](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
<b>22RT101009</b>	<b>GEOMETRICAL OPTICS–II</b>	3	-	-	-	3
<b>Pre-Requisite</b>	22RT102002 Geometrical Optics-I					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**COURSE DESCRIPTION:** This course provides a detailed discussion on the study of light and its behavior 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:

- C01.** Understand the concepts of vergence
- C02.** Understanding the concept of vision and its assessment
- C03.** Applying power calculation for various refractive errors of the eye
- C04.** Understanding the Natural Lens of the eye and associated Optical Conditions.
- C05.** Explain the principle of Basic Optical Instruments & aberration
- 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
<b>C01</b>	3	-	-	3	-	-	-	-	-	-
<b>C02</b>	3	-	-	2	-	-	-	-	-	-
<b>C03</b>	3	2	-	3	-	-	-	-	-	-
<b>C04</b>	3	2	-	-	-	-	-	-	-	-
<b>C05</b>	3	-	-	-	-	-	-	-	-	-
<b>C06</b>	3	-	-	-	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

**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. Tunnacliffe 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=a3K8LLFJrwlqLQ2I>
2. [https://youtu.be/eji8zKa7H7s?si=ICRpDi6BCResGem\\_](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/](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
<b>22RT102005</b>	<b>VISUAL OPTICS</b>	4	-	2	-	5
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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. Understand effective power, magnification, and factors affecting refractive error, accommodation, and retinal image quality, essential for precise optical corrections and clinical assessments.
- 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
<b>CO1</b>	3	2	-	2	-	-	-	-	-	-
<b>CO2</b>	3	2	-	2	-	-	-	1	-	-
<b>CO3</b>	3	2	-	2	-	-	-	1	-	-
<b>CO4</b>	3	2	-	3	-	-	-	-	-	-
<b>CO5</b>	3	-	-	2	-	-	-	-	-	-
<b>CO6</b>	3	2	-	-	-	-	-	1	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>-</b>

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

## **COURSE CONTENT**

### **MODULE 1: 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 ophthalmometry, 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)  
Retinoscopy – Practice of retinoscopy (Dry & wet) in Emmetropia, Myopia, Hypermetropia, Astigmatism, Anisometropia, Presbyopia, Aphakia, Pseudophakia, media opacities, strabismus & Eccentric fixation  
Interpretation of retinoscopic findings
4. 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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22DF102009</b>	<b>PATHOLOGY</b>	3	-	2	-	4
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	3	1	-	-	-
<b>CO2</b>	3	1	-	-	-	-	-	-	3	-
<b>CO3</b>	3	1	3	-	-	-	-	-	-	1
<b>CO4</b>	2	1	-	-	-	-	-	-	-	1
<b>CO5</b>	3	-	-	-	-	3	1	-	-	-
<b>CO6</b>	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, Radiation injury, 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, Rickettsia, Chlamydial infection, HIV infection. d. Fungal disease and opportunistic infections. e. Parasitic diseases: Malaria, Filariasis, 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 tumours Eg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumours Eg: 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, 8<sup>th</sup> Edition, 2019.
2. Ramadas Nayak " Textbook of Pathology for Allied Health Sciences" Jaypee Brothers Medical Publishers, 1<sup>st</sup> 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. 2<sup>nd</sup> 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](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](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
<b>22CC111001</b>	<b>CLINICAL POSTING-I</b>	-	-	-	-	4
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	-	-	2	-	1
<b>CO2</b>	3	1	1	3	-	-	-	-	-	1
<b>CO3</b>	3	-	-	2	-	-	3	1	-	-
<b>CO4</b>	3	-	1	2	-	1	1	1	-	1
<b>Course Correlation Mapping</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>1</b>

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

**Note:**

1. Students will attend to clinical posting weekly two days in 3<sup>rd</sup> 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
<b>22RT102006</b>	<b>CLINICAL EXAMINATION OF VISUAL SYSTEM</b>	3	-	2	-	4
<b>Pre-Requisite</b>	22RT101008 Ocular Anatomy					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	3	-	3	-	-	-	2	-	-
<b>CO2</b>	3	3	-	3	-	-	-	2	-	-
<b>CO3</b>	3	3	-	3	-	-	-	2	-	-
<b>CO4</b>	3	3	-	3	-	-	-	2	-	-
<b>CO5</b>	3	-	-	-	-	-	-	-	-	-
<b>CO6</b>	3	-	-	3	-	-	-	2	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>

*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](http://www.youtube.com/@SKOptics_OOLS)
2. [www.youtube.com/@optometry-with-samir](http://www.youtube.com/@optometry-with-samir)
3. [www.youtube.com/@DoctorEyeHealth](http://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
<b>22RT101010</b>	<b>OPTOMETRIC OPTICS</b>	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
<b>CO1</b>	3	3	-	2	-	-	-	-	-	-
<b>CO2</b>	3	3	-	2	-	-	-	-	-	-
<b>CO3</b>	3	3	-	2	-	-	-	-	-	-
<b>CO4</b>	3	3	-	2	-	-	-	-	-	-
<b>CO5</b>	3	3	-	2	-	-	-	-	-	-
<b>CO6</b>	3	3	-	2	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

**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](http://www.youtube.com/@SKOptics_OOLS)
2. [www.youtube.com/@optometry-with-samir](http://www.youtube.com/@optometry-with-samir)
3. [www.youtube.com/@DoctorEyeHealth](http://www.youtube.com/@DoctorEyeHealth)

### **WEB RESOURCES:**

1. [ools.co.in](http://ools.co.in)
2. [Zeiss-pathasala](http://Zeiss-pathasala)
3. [American academy of ophthalmology](http://American academy of ophthalmology)

## PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
<b>22RT102007</b>	<b>DISPENSING OPTICS</b>	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
<b>CO1</b>	3	3	-	3	-	-	-	2	-	-
<b>CO2</b>	2	3	-	-	-	-	-	3	-	-
<b>CO3</b>	3	2	2	-	-	-	-	-	-	-
<b>CO4</b>	3	3	-	2	-	-	-	3	-	-
<b>CO5</b>	2	-	-	3	-	2	-	3	-	-
<b>CO6</b>	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](http://www.youtube.com/@EssilorUSA)
3. [www.youtube.com/@optometry-with-samir](http://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](https://www.aurosiksha.org/lica/ebook/refraction_chapter13)

## PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
<b>22RT101011</b>	<b>OCULAR DISEASE-I</b>	4	-	-	-	4
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	3	-	3	-	2	-	3	-	-
<b>CO2</b>	3	3	-	3	-	2	-	3	-	-
<b>CO3</b>	3	3	-	3	-	2	-	3	-	-
<b>CO4</b>	3	3	-	3	-	2	-	3	-	-
<b>CO5</b>	3	3	-	3	-	2	-	3	-	-
<b>CO6</b>	3	2	-	3	-	2	-	3	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>

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



*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](https://www.youtube.com/@OptometryClub92)
2. OOLS-ONLINE OPTOM LEARNING SERIES
3. [www.youtube.com/@DoctorEyeHealth](https://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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22RT101012</b>	<b>OPTOMETRIC INSTRUMENTS-I</b>	3	1	-	-	4
<b>Pre-Requisite</b>	22RT102001 Optical Physics					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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 trial 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
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	-	-	2	-	-	-	-	-	-
<b>CO3</b>	2	2	-	3	-	-	-	-	-	-
<b>CO4</b>	2	3	-	-	-	-	-	-	-	-
<b>CO5</b>	3	-	-	-	-	-	-	-	-	-
<b>CO6</b>	3	2	-	3	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

**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](http://www.youtube.com/@SKOptics_OOLS)
2. [www.youtube.com/@optometry-with-samir](http://www.youtube.com/@optometry-with-samir)
3. [www.youtube.com/@DoctorEyeHealth](http://www.youtube.com/@DoctorEyeHealth)

### **WEB RESOURCES:**

1. [aurosiksha.org](http://aurosiksha.org)
2. Eye wiki
3. American Academy Ophthalmology

## PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22CC101006	<b>BASIC PHARMACOLOGY AND DRUG ADMINISTRATION</b>	3	-	-	-	3
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	3	1	-	-	-
<b>CO2</b>	3	1	-	-	-	-	-	-	-	-
<b>CO3</b>	3	1	3	-	-	-	-	-	-	-
<b>CO4</b>	2	1	-	-	-	-	-	-	-	-
<b>CO5</b>	3	-	-	-	-	3	1	-	-	-
<b>CO6</b>	3	-	-	-	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>1</b>	<b>3</b>	-	-	<b>3</b>	<b>1</b>	-	-	-

**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/lis-hs/nur/120/sdolezal/lesson8\\_files/lesson8.ppt](http://www.harpercollege.edu/lis-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
<b>22CC101015</b>	<b>MEDICAL PSYCHOLOGY</b>	3	-	-	-	3
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	2	2	-	-	1	-	-	-	-
<b>CO2</b>	3	3	-	-	-	-	-	-	-	-
<b>CO3</b>	2	3	1	-	-	1	-	-	-	-
<b>CO4</b>	3	2	2	-	-	-	-	-	-	-
<b>CO5</b>	3	2	2	-	-	-	-	-	-	-
<b>CO6</b>	2	2	-	-	-	2	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>2</b>	-	-	<b>1</b>	-	-	-	-

**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](http://www.britannica.com)
2. [www.alliant.edu](http://www.alliant.edu)

## **WEB RESOURCES:**

1. [www.psychology.com](http://www.psychology.com)
2. <http://www.guides.lib.uw.edu>



## SCHOOL CORE

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22CC111002</b>	<b>CLINICAL POSTING-II</b>	-	-	-	-	4
<b>Pre-Requisite</b>	Clinical Posting-I					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	-	-	2	-	1
<b>CO2</b>	3	1	1	3	-	-	-	-	-	1
<b>CO3</b>	3	-	-	2	-	-	3	1	-	-
<b>CO4</b>	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 4<sup>th</sup> 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
<b>22LG101404</b>	<b>SANSKRIT</b>	2	-	-	-	2
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**COURSE DESCRIPTION:** अस्मिन् पाठ्यक्रमे संस्कृत गद्य, पद्य, व्याकरणेन सह महाभारतम् अपि च रामायणस्य कान्धन 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
<b>CO1</b>	3	-	-	-	-	-	-	-	-
<b>CO2</b>	3	-	-	-	-	-	-	-	-
<b>CO3</b>	3	-	-	-	-	-	-	-	-
<b>CO4</b>	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 संदर्भं च नैतिक उपयुक्ततायाः एकः दृढतर भावनायाः विकासार्थम्।
- 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 करणं तथा सामाजिक अपि च सांस्कृतिक प्रासंगिकतायाः अध्ययने अभिवृद्धि करणम्।

<b>CO5</b>	3	-	-	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	-	-	-	-	-	-	-	-

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

## COURSE CONTENT

<b>Module-1:</b> प्राचीन पद्यसाहित्यम्	<b>(06 Periods)</b>
1 आर्य पादका पदाभिषेकः - वल्मीकिः - श्रीमदामायणम्	
<b>Module-2:</b> चम्पूकाव्यम् & आधुनिक पद्यकाव्यम्	<b>(06 Periods)</b>
3. गङ्गावतरणम् - भोजराजः - चम्पूरामायणम्	
4. मोहापनोदः - श्री पमिडिपाटि पट्टाभिरामारावः - मूलकथा-‘धर्मसौहृदम्’ इति संस्कृत पद्यकाव्यम्	
<b>Module-3:</b> गद्यसाहित्यम्	<b>(06 Periods)</b>
5. अत्युत्कटैः पापपुण्यैः इहैव फलमश्नुते - नारायणपण्डितः - हितोपदेशः	
6. शूद्रकवीरवरकथा - हितोपदेशः	
<b>Module-4:</b> शब्दाः	<b>(6 Periods)</b>
देव, कवि, भानु, पितृ, धातृ, गो, रमा, मति	
<b>Module 5:</b> महाकवि, शास्त्रकाराः	<b>(6 Periods)</b>
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](https://cbpbu.ac.in/study_mat_sanskrit.php)

## PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
<b>22RT101022</b>	<b>OCULAR DISEASE-II</b>	3	-	-	-	3
<b>Pre-Requisite</b>	22RT101011 Ocular Disease-I					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

### 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
<b>CO1</b>	3	3	-	3	-	2	-	3	-	-
<b>CO2</b>	3	3	-	3	-	2	-	3	-	-
<b>CO3</b>	3	3	-	3	-	2	-	3	-	-
<b>CO4</b>	3	3	-	3	-	2	-	3	-	-
<b>CO5</b>	3	3	-	3	-	2	-	3	-	-
<b>CO6</b>	3	2	-	3	-	2	-	3	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>

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

## **COURSE CONTENT**

### **Module 1      DISEASES OF VITREOUS & RETINA      (12 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 vitreochoroidal retinopathy, 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      (12 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      (12 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      (12 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      (12 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: 60**

## **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](http://www.youtube.com/@OptometryClub92)
2. OOLS-ONLINE OPTOM LEARNING SERIES
3. [www.youtube.com/@DoctorEyeHealth](http://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

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

**COURSE DESCRIPTION:** The objective of this course is to help the learner appreciate the working of the two eyes together and its neurophysiology. Learners will learn the mechanisms by which the visual system extracts a single unified view of the external visual world from the two disparate visual images that are formed on the retina of the two eyes. The course aims to help the learner understand the binocular vision related to clinically manifested binocular vision problems. The course intends to prepare the learners 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.** Relate to the need for two eyes, advantages and disadvantages of binocular vision, visual axes, laws of binocular vision, visual directions, corresponding points.
- CO2.** Understanding how binocular vision works and gain insights on theories of binocular summation
- CO3.** Describe the interaction between accommodation & vergence systems,
- CO4.** Analyze and summarize the classification and criteria for NSBVA, and the Sequential treatment approach to providing vision therapy
- CO5.** understand Optometric management of strabismus, and prescribing spectacles and prisms in strabismus
- 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
<b>CO1</b>	3	3	-	-	-	2	-	3	-	-
<b>CO2</b>	3	-	-	-	-	2	-	3	-	-
<b>CO3</b>	3	3	-	3	-	2	-	3	-	-
<b>CO4</b>	3	3	-	3	-	2	-	3	3	3
<b>CO5</b>	3	3	-	3	-	2	-	3	-	-
<b>CO6</b>	3	2	-	3	-	2	-	3	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>3</b>

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

## **COURSE CONTENT**

### **Module 1 INTRODUCTION AND BASICS OF BINOCULAR VISION: (10 Periods)**

Need for two eyes, Evolution, advantages and disadvantages of binocular vision, Reference Planes, Eye ar vision, Re anes, Eye positions, Axes of Vision and Oculocentric and egocentric Visual Directions, Visual distance, empirical cues, Overview of EOM physiology & eye movements, Laws of binocular vision (Listing's law, Hering's law, Sherrington's Law), Corresponding points, local signs

### **Module 2: BINOCULAR SUMMATION (10 Periods)**

Theories of Probability summation and neural summation, binocular suppression, facilitation, Fusion, Confusion, Rivalry and Suppression suppression, Grades of Binocular vision, and the fusion mechanisms: Overview, Sensory and motor evaluation, Simultaneous macular perception, Fusion, Fixation Disparity, Stereopsis, Horopter, Panum's Fusional Area, Anomalous Retinal Correspondence, Eccentric Fixation

### **Module 3: ACCOMMODATION, VERGENCE & THE OCULOMOTOR SYSTEM: (10 Periods)**

Types of accommodation, vergence, Interaction between accommodation & vergence systems, AC/A and CA/C ration, Open and closed loop accommodation and vergence; near visual motor response, Types of eye movements and assessment techniques

### **Module 4: NON-STRABISMIC BINOCULAR VISION ANOMALIES (NSBVA): (15 Periods)**

Classification and criteria for NSBVA, Convergence insufficiency, convergence excess, divergence insufficiency. divergence excess, fusional vergence dysfunction, accommodative insufficiency, accommodative excess, accommodative infacility, ill sustained accommodation, Diagnosis of accommodation, vergence and ocular motor anomalies, Sequential treatment approach, Scientific approach vision therapy, Vision therapy equipment, Introduction visual perceptual disorders

### **Module 5 STRABISMUS AND AMBLYOPIA (15 Periods)**

Esodeviations, exodeviations, A-V patterns and cyclovertical deviations, special forms and neurological oculomotor disorders, case analysis, optometric management of strabismus, prescribing prims. Amblyopia and its management.

**Total Periods: 60**

## **EXPERIENTIAL LEARNING:**

- 1 Test for accommodation and convergence
- 2 Phoria assessment
- 3 Sequence of vision therapy
- 4 Procedures of vision therapy
- 5 Amblyopia management
- 6 Case based learning
- 7 Normative data for all bv assessment tests

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



## RESOURCES

### TEXTBOOKS:

1. S. 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 prism: A spectrum of Applications, Mosby-Year Book, Standard Edition, 1995.
4. L. J. Press, Applied concepts in Vision Therapy, Mosby-Year Book, Edition 2, 2020.

### VIDEO LECTURES:

1. [www.youtube.com/@OptometryClub92](http://www.youtube.com/@OptometryClub92)
2. OOLS-ONLINE OPTOM LEARNING SERIES
3. [www.youtube.com/@DoctorEyeHealth](http://www.youtube.com/@DoctorEyeHealth)

### WEB RESOURCES:

1. Care of the patient with learning disability (CPG 20)
2. Care of the patient with amblyopia (CPG-4)  
<https://www.aoa.org/documents/optometrists/CPG-4.pdf>
3. Care of the patient with accommodative and vergence dysfunction (CPG-18)  
<https://www.aos.org/documents/optometrists/CPG-18.pdf>
4. Care of the patient with strabismus (CPG-12)  
<https://www.aos.org/documents/optometrists/CPG-12.pdf>

## PROGRAM ELECTIVE

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22RT102014</b>	<b>CONTACT LENS-I</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>5</b>
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**COURSE DESCRIPTION:** This course gives students an understanding of the basics of contact lenses, their properties, and design It also helps in recognizing fitting types, fitting procedures, and managing adverse effects of contact lenses.

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

- CO1.** Gain an introduction to contact lenses, covering their definition, types, and historical development
- CO2.** Gain an understanding of contact lens materials, encompassing their physiological, physical, and optical properties.
- CO3.** Understand fit assessment, including types of fitting assessment.
- CO4.** Learn the process of ordering contact lenses, including writing prescriptions, and ensuring accuracy through checking and verification procedures
- CO5.** Understand the potential complications of soft lenses.
- 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
<b>CO1</b>	3	3	-	2	-	-	-	-	-	-
<b>CO2</b>	3	-	-	2	-	-	-	-	-	-
<b>CO3</b>	3	-	-	2	-	-	-	-	-	3
<b>CO4</b>	2	3	-	2	-	2	-	2	-	3
<b>CO5</b>	3	-	-	2	-	-	-	2	-	3
<b>CO6</b>	3	2	-	-	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>3</b>

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

## **COURSE CONTENT**

### **MODULE 1: INTRODUCTION**

**(15 Periods)**

Introduction to contact lenses, Definition, Types, and History of Contact Lenses  
Optics of Contact Lenses, Review of Anatomy & physiology of, Tear film , Cornea , Lids & conjunctiva. Properties of CL materials (Physiological, Physical Optical), Parameters/ Designs of Contact Lenses & Terminology,

### **MODULE 2: MATERIAL AND PROPERTY**

**(15 Periods)**

Introduction to CL materials, Properties of CL materials, Physiological (DK, Ionicity, Water content)  
Physical (Elasticity, Tensile strength, Rigidity), Optical (Transmission, Refractive index)

### **MODULE 3: SOFT CONTACT LENS**

**(15 Periods)**

SCL Materials & Review of manufacturing techniques, Indication and contraindication Pre-fitting considerations for SCL, fitting philosophies for SCL, Fit assessment in Soft Contact Lenses: Types of Fit-Steep, Flat, Optimum, Disposable lenses, Advantages and availability, Soft Toric CL, Stabilization techniques, Parameter selection, Fitting assessment,

### **MODULE 4: ORDERING, VERIFICATION**

**(10 Periods)**

Ordering of contact Lenses- writing a prescription, Checking and verifying Contact lenses, Common Handling Instructions, Insertion & Removal Techniques

### **MODULE 5: CARE AND MAINTAINANCE**

**(05 Periods)**

Do's and Don'ts, Care and Maintenance, Complications of Soft lenses, Cleaning agents & Importance, Rinsing agents & Importance, Disinfecting agents & Importance, Lubricating &, Follow up visit examine.

**Total Periods: 60**

## **EXPERIENTIAL LEARNING**

### **LIST OF EXPERIMENTS:**

1. Measurement of ocular dimensions (cornea, pupil, and lid characteristics)
2. Slit lamp examination of tear film – Blink rate and TBUT, Schimers test
3. History taking for contact lenses
4. Vertex distance calculations
5. Fitting Assessment of SCL
- 6 Fitting and assessment of soft toric contact lenses-axis stabilization
- 7 Selection of contact lens parameters
- 8 Radioscope & Keratometer & V guage

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

### **RESOURCES:**

#### **TEXT BOOKS:**

1. N. Efron, Contact lens practice, Elsevier, Edition3, 2017.
2. E. S. Bennett and V. A. Henry, Clinical Manual of Contact Lenses, Lippincott Williams and Wilkins, Edition 5, 2019.
3. L. W. Jones and D. A. Jones, Common Contact Lens Complication & Their Recognition and Management, Butterworth-Heinemann, Edition 3, 2000.

#### **REFERENCE BOOKS:**

1. R. Mahadevan, Trouble Shooting and Problem Solving in Contact Lens Practice, Medical Research Foundation, Standard Edition, 2015.
2. P. P. Santanam, R. Krishna Kumar, R. Monica, Dr Santanam's Text Book of Occupational Optometry, Medical Research Foundation, Edition 1, 2016

#### **VIDEO LECTURES:**

1. [https://youtu.be/m\\_U-zwBQKjA?si=h1C7Df19vqbicTZI](https://youtu.be/m_U-zwBQKjA?si=h1C7Df19vqbicTZI)
2. [https://youtu.be/2JHQmwvEcj0?si=t2QF\\_FLjY41Vy9oc](https://youtu.be/2JHQmwvEcj0?si=t2QF_FLjY41Vy9oc)

#### **WEB RESOURCES:**

1. <https://coopervision.com.sg/practitioner/fitting-tips-and-tools/toolkits/biofinity/toric-fitting-guidelines>
2. [https://www.jnjvisioncare.ae/sites/default/files/public/ae/documents/soft\\_toric\\_contact\\_lens\\_fiting.pdf](https://www.jnjvisioncare.ae/sites/default/files/public/ae/documents/soft_toric_contact_lens_fiting.pdf)
3. <https://iacle.org/download-the-iacle-contact-lens-course/>

## PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
<b>22RT101023</b>	<b>OPTOMETRIC INSTRUMENTS-II</b>	3	1	-	-	4
<b>Pre-Requisite</b>	22RT101012 Optometric Instruments-I					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	2	-	-	-	2	-	-
<b>CO2</b>	3	-	-	2	-	-	-	2	-	2
<b>CO3</b>	2	2	-	3	-	-	-	2	-	2
<b>CO4</b>	2	3	-	3	-	-	-	2	-	2
<b>CO5</b>	3	-	-	3	-	-	-	2	-	-
<b>CO6</b>	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 Exophthalmometer 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](http://www.youtube.com/@SKOptics_OOLS)
2. [www.youtube.com/@optometry-with-samir](http://www.youtube.com/@optometry-with-samir)
3. [www.youtube.com/@DoctorEyeHealth](http://www.youtube.com/@DoctorEyeHealth)

### WEB RESOURCES:

1. [aurosiksha.org](http://aurosiksha.org)
2. Eye wiki
3. American Academy Ophthalmology

## PROGRAM ELECTIVE

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22RT101024</b>	<b>OCULAR PHARMACOLOGY</b>	3	-	-	-	3
<b>Pre-Requisite</b>	22CC101006 Basic Pharmacology and Drug Administration					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	-	-	2	-	-	-	-	-	-
<b>CO3</b>	3	2	-	3	-	-	-	-	-	-
<b>CO4</b>	2	3	-	-	-	-	-	-	-	-
<b>CO5</b>	3	-	-	-	-	-	-	-	-	-
<b>CO6</b>	3	3	-	2	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

**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. 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 Wilkins, 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](https://youtu.be/2Fz935_gC5s?si=tAcGavVWxY_WDrA6)
2. [https://youtu.be/OP0LR-r\\_Dtk?si=ATuoWKJRB-vzso5F](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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
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
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	-	2	2	-	-	-	-	-	-
<b>CO3</b>	2	2	-	-	-	-	-	-	-	-
<b>CO4</b>	2	3	-	-	-	-	-	-	-	2
<b>CO5</b>	3	-	2	2	-	-	-	-	-	-
<b>CO6</b>	3	-	-	2	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	-	-	-	-	-	<b>2</b>

**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
<b>22RT101026</b>	<b>ADVANCE DISPENSING</b>	<b>2</b>	-	-	-	<b>2</b>

**Pre-Requisite**      22RT102007 Dispensing Optics

**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 the manufacturing process and materials of ophthalmic lenses.
- CO2.**      Learn about spectacle frame manufacturing and materials and can recommend suitable frames as per patients' requirement.
- CO3**      Gain expertise in frame measurements.
- CO4.**      Learn how to record, order, and select lenses according to safety standards.
- 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
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	-	-	2	-	-	-	-	-	-
<b>CO3</b>	3	2	-	3	-	-	-	-	-	-
<b>CO4</b>	3	3	-	-	-	-	-	-	-	-
<b>CO5</b>	3	-	-	-	-	-	-	-	-	-
<b>CO6</b>	3	2	-	3	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

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

## **COURSE CONTENT**

### **Module 1: INTRODUCTION TO DISPENSING OPTICS (05 Periods)**

Definition, terminology, and properties of lens. manufacturing and dispensing, types and prescription, lens coatings.

### **Module 2: FRAMES (05 Periods)**

Introduction to spectacle frames, mode of selection, frame selection, frame measurements and marking

### **Module 3: FRAME AND FACIAL MEASUREMENTS (10 Periods)**

IPD measurement, markings and adjustments, special type of spectacles, special type of lenses

### **Module 4: SPECIAL GLASSES (05 Periods)**

Spectacle fitting strategies, safety glasses, progressive and bifocals.

### **Module 5: TROUBLE SHOOTING (05 Periods)**

Occupational dispensing, safety gadgets, trouble shooting

**Total Periods: 30**

## **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**

### **TEXTBOOKS:**

1. C. W. Brooks and I. M. Borish, System for Ophthalmic Dispensing, Butterworth-Heinemann, Elsevier, Edition 3, 2007
2. T. E. Fannin and T. Grosvenor, Clinical Optics, Butterworth-Heinemann, Elsevier, Edition 2, 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](http://www.youtube.com/@EssilorUSA)
3. [www.youtube.com/@optometry-with-samir](http://www.youtube.com/@optometry-with-samir)

### **WEB RESOURCES:**

4. <https://www.jaypeedigital.com/eReader>
5. Zeiss-pathasala
6. [https://www.aurosiksha.org/lica/ebook/refraction\\_chapter13](https://www.aurosiksha.org/lica/ebook/refraction_chapter13)



## SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
<b>22CC111003</b>	<b>CLINICAL POSTING-III</b>	-	-	-	-	4
<b>Pre-Requisite</b>	22CC111002 Clinical Posting-II					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	-	-	2	-	1
<b>CO2</b>	3	1	1	3	-	-	-	-	-	1
<b>CO3</b>	3	-	-	2	-	-	3	1	-	-
<b>CO4</b>	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 5<sup>th</sup> 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
<b>22RT102015</b>	<b>CONTACT LENS-II</b>	3	-	2	-	4
<b>Pre-Requisite</b>	22RT102014 CONTACT LENS-I					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**COURSE DESCRIPTION:** This course gives students an understanding of the basics of contact lenses, their properties, and design. It also helps in recognizing fitting types, fitting procedures, and managing adverse effects of contact lenses.

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

- CO1.** Understand contact lenses, including their optics, materials, fitting parameters.
- CO2.** Develop expertise in contact lens materials, manufacturing techniques, pre-fitting examinations.
- CO3.** Master in soft contact lens materials, manufacturing, fitting philosophies, assessment, and management of complications,
- CO4.** Gain knowledge on Proficiently prescribing, ordering, and verifying contact lenses.
- CO5.** Expertise in therapeutic and special contact lenses for different conditions and needs of an individual
- 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
<b>CO1</b>	3	3	-	2	-	-	-	-	-	-
<b>CO2</b>	3	2	-	2	-	-	-	-	-	-
<b>CO3</b>	3	2	-	2	-	-	-	-	-	-
<b>CO4</b>	2	3	-	2	-	2	-	2	-	-
<b>CO5</b>	3	-	-	2	-	-	-	-	-	-
<b>CO6</b>	3	-	-	2	-	-	-	-	-	3
Course Correlation Mapping	3	3	-	2	-	2	-	2	-	3

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

## **COURSE CONTENT**

### **MODULE 1: REVIEW**

**(09 Periods)**

Soft Contact Lens related Polymer Chemistry (detailed study) Contact Lens Terminology: A revision, Contact Lens Design (aspheric Toric Multifocal), Gas Transmission through contact lenses (Dk, Dk / l , EOP, critical study of measuring techniques and their application to various types of contact lenses, Adaptive symptoms of RGP Contact Lenses,

### **MODULE 2: HARD CONTACT LENS**

**(09 Periods)**

Introduction to CL materials, Indications and Contraindications, RGP contact Lens materials, Manufacturing Rigid and Soft Contact Lenses- various methods, Pre-fitting examination Correction of Astigmatism with RGP lens, Types of fit (Steep, Flat, Optimum)- on the spherical cornea with spherical lenses, Enzymatic cleaners, Common Handling Instructions

### **MODULE 3: TORIC HARD LENS**

**(09 Periods)**

Toric RGP, Types of fit (Steep, Flat, Optimum)- on Toric cornea with spherical lenses, Calculation and finalizing Contact lens parameters, Common Handling Instructions

### **MODULE 4: DIFFERENT TYPES OF CL**

**(09 Periods)**

Extended wear contact lenses, Disposable and frequent replacement contact lenses, Scleral contact lens, transition contact lens, Diffractive vision and Aspheric contact lenses, Contact lenses as prosthetics, Cosmetic contact lenses, Piggy Bag System, ROSE K 2

### **MODULE 5: CONTACT LENSES IN SPECIAL CASES**

**(09 Periods)**

Post corneal grafting contact CL fitting, Pediatric and geriatric contact lens fitting, corneal scars Contact Lens fitting, Scleral contact lenses, Orthokeratology, Management of presbyopia with contact lens, Contact lens on Sports occupation.

**Total Periods: 45**

### **EXPERIENTIAL LEARNING**

- 1 Fitting cosmetic contact lenses. Bandage contact lenses
- 2 Insertion & removal of RGP contact lenses, Teaching techniques of RGP
- 3 Special RGP fittings case discussions ( aphakia, Pseudophakia and Keratoconus
- 4 Scleral lenses
- 5 Rose k lens fitting
- 6 Kerasoft lens fitting and assessment
- 7 Fitting and assessment of ortho k lens
- 8 Contact lens handling, cleaning & maintenance

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

## RESOURCES

### TEXTBOOKS:

1. N. Efron, Contact lens practice, Elsevier, Edition 3, 2017.
2. E. S. Bennett and V. A. Henry, Clinical Manual of Contact Lenses, Lippincott Williams and Wilkins, Edition 5, 2019
3. L. W. Jones and D. A. Jones, Common Contact Lens Complication & Their Recognition and Management, Butterworth-Heinemann, Edition 3, 2000.
4. P. P. Santanam, R. Krishna Kumar, R. Monica, Dr Santanam's Text Book of Occupational Optometry, Medical Research Foundation, Edition 1, 2016

### VIDEO LECTURES:

1. Online optometry learning series-OOLS
2. [https://youtu.be/m\\_U-zwBQKjA?si=6-\\_7NLEkxvqALRXP](https://youtu.be/m_U-zwBQKjA?si=6-_7NLEkxvqALRXP)
3. [https://youtu.be/PvYJ58Jd\\_1U?si=vz8dTd-1OJQUdW-D](https://youtu.be/PvYJ58Jd_1U?si=vz8dTd-1OJQUdW-D)

### WEB RESOURCES:

1. <https://www.jaypeedigital.com/eReader>
2. <http://www.kerasoftlens.com/professional/fitting-guidance/>
3. [https://www.fit-boston.eu/downloads/orthok/OrthoK\\_Guide\\_Intl\\_English1.pdf](https://www.fit-boston.eu/downloads/orthok/OrthoK_Guide_Intl_English1.pdf)

## PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22RT102016	LOW VISION MANAGEMENT	4	-	2	-	5
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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 paediatric 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
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	-	-	3	-	-	-	-	-	3
<b>CO3</b>	2	2	-	3	-	-	-	2	-	3
<b>CO4</b>	2	3	-	3	-	-	-	3	-	3
<b>CO5</b>	3	3	-	3	-	-	-	3	-	-
<b>CO6</b>	3	-	-	-	-	-	3	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>3</b>

**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**

### **TEXTBOOKS:**

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
<b>22RT101029</b>	<b>PAEDIATRIC OPTOMETRY AND GERIATRIC OPTOMETRY</b>	4	-	-	-	4
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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 expertise in assessing visual acuity and recognizing normal appearances, pathologies, and structural anomalies spanning the entire ocular system.
- CO2.** Investigate the fundamentals of refractive examination and binocular status determination, alongside assessments of sensory-motor adaptability..
- CO3** Understand the diagnosis and management of ocular conditions involved in paediatric age group
- CO4.** Understand the structural and morphological changes that occur in the eyes of older individuals.
- CO5.** Gain insight into ocular diseases prevalent in the elderly.
- 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
<b>CO1</b>	3	-	-	-	-	-	-	-	-	2
<b>CO2</b>	3	-	-	2	-	-	-	-	-	2
<b>CO3</b>	2	2	-	3	-	-	-	-	-	2
<b>CO4</b>	2	3	-	-	-	-	-	-	-	2
<b>CO5</b>	3	-	-	3	-	-	-	-	-	2
<b>CO6</b>	3	-	-	3	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>

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



## **COURSE CONTENT**

### **Module 1: PAEDIATRIC OPTOMETRY**

**(10 Periods)**

The Development of Eye and Vision History taking Paediatric subjects Assessment of visual acuity Normal appearance, pathology and structural anomalies of a) Orbit, Eye lids, Lacrimal system, Conjunctiva, Cornea, Sclera Anterior chamber, Uveal tract, Pupil c) Lens, vitreous, Fundus, Oculomotor system

### **Module 2: CLINICAL EXAMINATION**

**(10 Periods)**

Refractive Examination Determining binocular status Determining sensory motor adaptability Compensatory treatment and remedial therapy for : Myopia, Pseudo myopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia Remedial and Compensatory, treatment of Strabismus and Nystagmus

### **Module 3: PAEDIATRIC EYE DISORDERS**

**(10 Periods)**

Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetics Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism,

### **Module 4: GERIATRIC OPTOMETRY**

**(15 Periods)**

Structural and morphological changes of the eye in elderly Physiological changes in eye during aging. Introduction to geriatric medicine - epidemiology, need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD) Optometric Examination of the Older Adult

### **Module 5: COMMON AGE-RELATED DISEASES AND MANAGEMENT**

**(15 Periods)**

Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, and vascular diseases of the eye, Management-Spectacle dispensing for children Paediatric contact lenses Low vision assessment in children Contact lenses in elderly, Pharmacological aspects of aging Low vision causes, management and rehabilitation in geriatrics. Spectacle dispensing in elderly - Considerations of spectacle lenses and frames

**Total Periods: 60**

## **EXPERIENTIAL LEARNING**

- 1 Diagnosing strategies for paediatric patients
- 2 Management for paediatric patients
- 3 Management for geriatric patients
- 4 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. A.J. Rossenbloom Jr & M.W .Morgan: Vision and Aging, Butterworth-Heinemann, Missouri, Edition 1, 2007
2. Jerome Rosner, Pediatric Optometry, Butterworth, Edition 1, 1982
3. DE Rosenblatt, VS Natarajan Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Edition, 2002.
4. LJ Press, BD Moore, Clinical paediatric optometry., Butterworth Heinemann, Edition 1, 2000

### **VIDEO LECTURES:**

1. Online optometry learning series-OOLS
2. [https://youtu.be/R0Uta2i9d6w?si=vSVWV245hjEF0\\_Yj](https://youtu.be/R0Uta2i9d6w?si=vSVWV245hjEF0_Yj)

### **WEB RESOURCES:**

1. <http://biomed.science.ulster.ac.uk/vision/-Visual-Acuity-.html>
2. <http://www.lea-test.fi/leaweb/>

## PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
<b>22RT101030</b>	<b>PUBLIC HEALTH, COMMUNITY AND OCCUPATIONAL OPTOMETRY</b>	4	-	-	-	4
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**COURSE DESCRIPTION:** This course deals with general aspects of occupational health, Visual demand in various job, task analysing method ,visual standards for various jobs , occupational hazards and remedial aspects through classroom sessions and field visit to the factories.

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

- CO1.** Gain a comprehensive understanding of community health care.
- CO2.** understand the concept of community-based rehabilitation.
- CO3** Understand the concept of Tele Optometry for remote eye care services and its practical applications.
- CO4.** Gain insights into occupational health, hygiene, and safety regulations.
- CO5.** Gain an understanding of the effects of Electromagnetic Radiation on eyes and occupational hazards, along with preventive measures.
- 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
<b>CO1</b>	3	-	2	-	-	-	-	-	-	-
<b>CO2</b>	3	-	2	2	-	-	-	3	-	-
<b>CO3</b>	2	2	-	3	-	-	-	3	-	-
<b>CO4</b>	2	3	-	-	-	-	-	3	-	3
<b>CO5</b>	3	-	-	-	-	-	-	3	-	3
<b>CO6</b>	3	-	-	-	-	-	-	-	-	3
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>3</b>

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

## **COURSE CONTENT**

### **Module 1: INTRODUCTION TO PUBLIC HEALTH**

**(10 Periods)**

Community health care delivery system; the concept – Global & Indian perspective, Levels of disease prevention and levels of health care patterns, Concepts of national health programs, Contrasting between clinical & community health program, Magnitude across the globe & in India.

### **Module 2: COMMUNITY HEALTH CARE**

**(10 Periods)**

Blindness & vision impairment – Definition, Description about community-based rehabilitation, Community eye care models in India – Arvind model, Community eye care models in India – LVP and SN models, Structure & Primary tasks of a community eye care team.

### **Module 3: RECENT ADVANCEMENT**

**(10 Periods)**

Primary objectives, structure and the various action plans, Main agencies involved in the mission of prevention of blindness, Concept of Tele Optometry, and its applications

### **Module 4: INTRODUCTION TO OCCUPATIONAL HEALTH**

**(15 Periods)**

Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc, Acts and Rules - Factories, Definitions and units, Sources & standards, Definition, Color theory, Color coding, Color defects, Color Vision tests

### **Module 5: OCCUPATIONAL HAZARDS**

**(15 Periods)**

Electromagnetic Radiation, its effects on Eye, Occupational hazards, Preventive/protective methods, Vision Screening – Modified clinical method, Industrial Vision test, Railways, Roadways, Airlines, CVS, Ergonomics, Contact Lens and work.

**Total Periods: 60**

## **EXPERIENTIAL LEARNING**

### **Experiments**

- 1 Community eye care models in different hospitals
- 2 Community based optometry
- 3 Tele optometry
- 4 Occupational hazards and solution

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

## **RESOURCES**

### **TEXTBOOKS:**

1. Robert.D.Newcomb, "Public health and community Optometry" 1<sup>st</sup> Edition, Butterworth-Heinemann Ltd, 1980.
2. Margeret Dowaliby -, Practical aspects of ophthalmic optics , 4th edition, Butterworth-Heinemann Ltd. 2001.
3. M.O.Jalie -, Ophthalmic lenses & Dispensing , 2nd edition, Butterworth-Heinemann, 2003

### **VIDEO LECTURES:**

1. Online optometry learning series-OOLS
2. <https://youtu.be/aG8u-anOefs?si=Vb1GRaL-950rg8J2>
3. <https://youtu.be/vDLRFs4v7Xg?si=y4q7i3b52NnkUdjm>

### **WEB RESOURCES:**

1. <https://www.jaypeedigital.com/eReader>
2. <https://www.slideshare.net/askararipra/01-public-health-optometrypptx-258908859>
3. <https://www.slideshare.net/askararipra/13-role-of-optometrist-in-public-healthpptx>

## PROGRAM ELECTIVE

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22RT101028</b>	<b>LAW IN OPTOMETRY PRACTICE</b>	<b>2</b>	-	-	-	<b>2</b>
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	-	-	2	-	-	-	-	-	-
<b>CO3</b>	2	2	-	3	2	-	-	-	-	-
<b>CO4</b>	2	3	-	-	2	-	-	3	-	-
<b>CO5</b>	3	-	-	-	2	-	-	-	-	-
<b>CO6</b>	3	-	-	-	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	-	<b>3</b>	<b>2</b>	-	-	<b>3</b>	-	-

**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, confidentiality 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](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
<b>22RT105002</b>	<b>ADVANCED ORTHOPTICS</b>	-	1	2	-	2
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	3	-	-	-	-	-	3
<b>CO2</b>	3	-	-	3	-	-	-	3	-	3
<b>CO3</b>	3	2	-	3	3	-	-	3	-	3
<b>CO4</b>	3	2	-	3	3	-	-	3	-	3
<b>CO5</b>	3	-	-	3	3	-	-	3	-	3
<b>CO6</b>	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 therapy
3. Sequence of vision therapy
4. Classification of amblyopia and pedig studies
5. Vision therapy sequence and management for amblyopia
6. Visual problem in behavioural disorders
7. Role of vision therapy in behavioural disorders
8. Models and components of developmental and acquired 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 accommodation and convergence related problems
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 prism: 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](http://www.youtube.com/@OptometryClub92)
2. OOLS-ONLINE OPTOM LEARNING SERIES
3. [www.youtube.com/@DoctorEyeHealth](http://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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22RT105001</b>	<b>MYOPIA CONTROL</b>	-	1	2	-	2
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-
<b>CO2</b>	3	3	-	3	2	-	-	2	-	-
<b>CO3</b>	3	2	-	3	-	-	-	2	-	-
<b>CO4</b>	3	2	-	-	-	-	-	2	-	2
<b>CO5</b>	3	-	2	-	3	-	-	-	-	3
<b>CO6</b>	3	-	-	-	3	-	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	-	-	<b>2</b>	-	<b>3</b>

*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 prism: A spectrum of Applications, Mosby-Year Book, Edition 1, 1995.

### **VIDEO LECTURES:**

1. <https://youtu.be/IeCDXLdKPyU?si=acCVR1padMdc7ba>
2. <https://youtu.be/YXwhTfpcI4c?si=IqdmXnJEk1euOjR>
3. <https://youtu.be/OAB7KYzgMwE?si=Nfw4dd78otQe43DE>

### **WEB RESOURCES:**

1. [https://www.fit-boston.eu/downloads/orthok/OrthoK\\_Guide\\_Intl\\_English1.pdf](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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22CC111004</b>	<b>CLINICAL POSTING-IV</b>	-	-	-	-	4
<b>Pre-Requisite</b>	Clinical Posting-III					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	-	-	2	-	1
<b>CO2</b>	3	1	1	3	-	-	-	-	-	1
<b>CO3</b>	3	-	-	2	-	-	3	1	-	-
<b>CO4</b>	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 6<sup>th</sup> 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	OPTO INTERNSHIP-I	-	-	-	-	20
<b>Pre-Requisite</b>	Clinical Posting-IV					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
- CO4** 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
<b>CO1</b>	3	3		3	3		3	3		3
<b>CO2</b>	3	3		3	3		3	3		3
<b>CO3</b>	3	3		3	3		3	3		3
<b>CO4</b>	3	3		3	3		3	3		3
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>		<b>3</b>

**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 Schiötz and Applanation tonometers

To learn to record visual field examination through confrontation tests and automated perimetry 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
<b>22RT111002</b>	<b>OPTO INTERNSHIP-II</b>	-	-	-	-	20
<b>Pre-Requisite</b>	22RT111002 OPTO INTERNSHIP-I					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
- CO4** 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
<b>CO1</b>	3	3		3	3		3	3		3
<b>CO2</b>	3	3		3	3		3	3		3
<b>CO3</b>	3	3		3	3		3	3		3
<b>CO4</b>	3	3		3	3		3	3		3
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>		<b>3</b>	<b>3</b>		<b>3</b>

**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 Hopter 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 perimetry 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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22RT101033</b>	<b>ACADEMIC RESEARCH WRITING AND INTELLECTUAL PROPERTY RIGHTS</b>	2	-	-	-	2
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	3	-	-	-	-	-	-	-	-
<b>CO2</b>	-	3	-	-	3	-	-	-	-	-
<b>CO3</b>	-	-	3	-	-	-	-	-	-	2
<b>CO4</b>	-	-	-	3	-	-	-	2	-	2
<b>CO5</b>	-	-	-	-	3	-	2	-	-	-
<b>CO6</b>	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 analysis

*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](https://youtu.be/olGO_PTxIrU)
3. <https://www.youtube.com/watch?v=LP-LcFQIEyo>

### 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
<b>22DF102025</b>	<b>RESEARCH METHODOLOGY AND BIOSTATISTICS</b>	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
<b>CO1</b>	3	2	-	1	-	3	1	-	-	-
<b>CO2</b>	1	1	2	-	2	-	-	-	3	-
<b>CO3</b>	1	1	2	-	1	-	-	1	-	1
<b>CO4</b>	2	1	2		2					1
<b>CO5</b>	1	2	2	-	3	2	1	-	-	-
<b>Course Correlation Mapping</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>1</b>

*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 BIOSTATISTICS**

**(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](https://www.youtube.com/watch?v=d77eQz0_Sfk)
2. [https://www.youtube.com/watch?v=yOU\\_s0xzc-Y](https://www.youtube.com/watch?v=yOU_s0xzc-Y)
3. [https://www.youtube.com/watch?v=txIS0N0I9xU&list=PLEIbY8S8u\\_DK7i4Fj6Hgq8sn\\_l42k9H1L](https://www.youtube.com/watch?v=txIS0N0I9xU&list=PLEIbY8S8u_DK7i4Fj6Hgq8sn_l42k9H1L)
4. [https://www.youtube.com/watch?v=1Q6\\_LRZwZrc](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/>

## UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
<b>22EC101701</b>	<b>AI IN HEALTHCARE</b>	3	-	-	-	3
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	2	2	2	-	-	-	-	-	-
<b>CO2</b>	2	3	-	2	-	2	2	-	-	-
<b>CO3</b>	2	-	2	2	-	-	-	-	-	-
<b>CO4</b>	2	-	-	-	2	2	-	-	-	-
<b>CO5</b>			3							
<b>Course Correlation Mapping</b>	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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
22DS101701	BIOINFORMATICS	3	-	-	-	3
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-
<b>CO2</b>	2	3	-	-	-	-	-	-	-	-
<b>CO3</b>	2	3	-	-	-	-	-	-	-	-
<b>CO4</b>	2	3	-	-	-	-	-	-	-	-
<b>CO5</b>	3	2	3	3	3	-	-	-	-	-
<b>Course Correlation Mapping</b>	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, 4<sup>th</sup> 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, 2<sup>nd</sup> Edition, 2001.
2. Mount, D.W., *Bioinformatics Sequence and Genome Analysis*, Cold Spring Harbor Laboratory Press, 2<sup>nd</sup> Edition, 2004.
3. Tindall, J., *Beginning Perl for Bioinformatics: An introduction to Perl for Biologists*, O'Reilly Media, 1<sup>st</sup> 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	<b>CONSTITUTION OF INDIA</b>	3	-	-	-	3
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**COURSE DESCRIPTION:** This course provides an 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
<b>CO1</b>	1	-	-	-	-	3	2	-	-	-
<b>CO2</b>	2	-	-	-	-	3	-	3	-	-
<b>Course Correlation Mapping</b>	<b>2</b>	-	-	-	-	<b>3</b>	<b>2</b>	<b>3</b>	-	-

*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. Brijji 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](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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
22CM101702	<b>COST ACCOUNTING AND FINANCIAL MANAGEMENT</b>	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
<b>CO1</b>	3				2			1		
<b>CO2</b>	3				2			1		
<b>CO3</b>	3				2			1		
<b>CO4</b>	3				2			1		
<b>CO5</b>	3				2			1		
<b>Course Correlation Mapping</b>	<b>3</b>				<b>2</b>			<b>1</b>		

**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, 10<sup>th</sup> edition, 2016.
2. I.M. Pandey, *Financial Management*, Vikas Publishing House Pvt. Ltd., 14<sup>th</sup> 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=tzasFmP1CpA><https://www.youtube.com/watch?v=tzasFmP1CpA>

**WEB RESOURCES**

- 1 [https://www.tutorialspoint.com/accounting\\_basics/management\\_versus\\_cost\\_accounting.htm](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
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	2	1	2	1	-	-	-	-	-	-
<b>CO2</b>	1	1	2	-	-		2		1	
<b>CO3</b>	2	2	1	-	-	-	-	1	-	-
<b>CO4</b>	3	1	2	-	-	-	-	-	-	-
<b>CO5</b>	2	2	1	-	-	1	-	-	-	-
<b>Course Correlation Mapping</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>-</b>

**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](http://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
<b>22CB101703</b>	<b>FORENSIC SCIENCE</b>	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
<b>CO1</b>	3									
<b>CO2</b>	3	3	2	2	2					
<b>CO3</b>	3	3								
<b>CO4</b>	3	3	2	2	2					
<b>CO5</b>	3	3	2	2	2					
<b>Course Correlation Mapping</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>					

**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, 2<sup>nd</sup> 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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
22SS101704	<b>INDIAN HISTORY</b>	3	-	-	-	3
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	2	-	-	-	-	1	-	-	-	-
<b>CO2</b>	1	2	-	-	-	1	-	-	-	-
<b>CO3</b>	1	1	-	-	-	2	-	-	-	-
<b>Course Correlation Mapping</b>	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, 21<sup>st</sup> 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
<b>22SS101705</b>	<b>INDIAN TRADITION AND CULTURE</b>	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
<b>CO1</b>	3	-	-	-	-	1	-	-	-	-
<b>CO2</b>	3	-	-	-	-	1	-	-	-	-
<b>CO3</b>	2	-	-	-	-	3	-	-	-	-
<b>CO4</b>	2	-	-	-	-	3	-	-	-	-
<b>Course Correlation Mapping</b>	<b>3</b>	-	-	-	-	<b>2</b>	-	-	-	-

**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 Achaarya 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

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>S</b>	<b>C</b>
<b>22ME101704</b>	<b>MANAGING INNOVATION AND ENTERPRENEURSHIP</b>	3	-	-	-	3
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	1	1		1	1	1	1		
<b>CO2</b>	3	2	1		1					
<b>CO3</b>	3	3	1	1	1					
<b>CO4</b>	3	2	1	1	1	1				
<b>CO5</b>	3	3	3	1	1	1				
<b>Course Correlation Mapping</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>		

**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 its application, Performance gap, Infrastructure gap, Sustainability gap, Regulatory gap, Preference gap, organizational factors effecting innovation at firm level.

### **Module 3: SOURCES 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 Closed 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/ARTICLES:**

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 closed 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, 1<sup>st</sup> Edition, 2014.
2. Drucker, P.F., *Innovation and Entrepreneurship*, Taylor & Francis, 2<sup>nd</sup> Edition, 2007.

### **REFERENCE BOOKS:**

1. Robert D Hisrich, Claudine Kearney, *Managing Innovation and Entrepreneurship*, Sage Publications, 1<sup>st</sup> Edition, 2014.
2. V.K. Narayanan, *Managing Technology and Innovation for Competitive Advantage*, Pearson India, 1<sup>st</sup> 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](https://www.youtube.com/watch?v=Eu_hkxkJGTg)

## UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
<b>22LG201701</b>	<b>PERSONALITY DEVELOPMENT</b>	3	-	-	-	3
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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:

- C01.** Demonstrate knowledge in Self-Management and Planning Career
- C02.** Analyze the functional knowledge in attitudes and thinking strategies
- C03.** Learn and apply soft skills for professional success.
- C04.** Function effectively as an individual and as a member in diverse teams
- C05.** 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
<b>C01</b>	2	1	-	-	-	-	-	-	-	-
<b>C02</b>	2	3	-	-	-	-	-	-	-	-
<b>C03</b>	2	2	-	-	3	-	-	-	-	2
<b>C04</b>	1	1	-	-	-	-	-	-	3	3
<b>C05</b>	-	-	-	-	-	-	-	-	-	3
<b>Course Correlation Mapping</b>	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 expects 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, 10<sup>th</sup> edition Indian Reprint, 2011. (6<sup>th</sup> 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, 2<sup>nd</sup> Revised Edition, 2011.
2. Stephen P. Robbins and Timothy A. Judge, *Organizational Behaviour*, Prentice Hall, Delhi, 16<sup>th</sup> 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
<b>22CS101702</b>	<b>WEB DESIGN FUNDAMENTALS</b>	3	-	-	-	3
<b>Pre-Requisite</b>	-					
<b>Anti-Requisite</b>	-					
<b>Co-Requisite</b>	-					

**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
<b>CO1</b>	3	3	3	-	-	-	-	-	-	-
<b>CO2</b>	3	3	-	-	-	-	2	-	-	-
<b>CO3</b>	3	3	3	-	-	-	-	-	-	-
<b>CO4</b>	2	3	3	-	-	-	-	2	-	-
Course Correlation Mapping	3	3	3	-	-	-	2	2	-	-
<i>Correlation Levels:</i>		<b>3: High;</b>			<b>2: Medium;</b>			<b>1: Low</b>		

### 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, 2<sup>nd</sup> 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](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
<b>22SS101706</b>	<b>WOMEN EMPOWERMENT</b>	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
<b>CO1</b>	3	1	-	-	1	3	-	1	-	-
<b>CO2</b>	3	1	-	-	-	2	-	-	-	-
<b>CO3</b>	3	1	-	-	-	2	-	-	-	3
<b>CO4</b>	3	1	-	-	-	-	-	-	-	-
<b>Course Correlation Mapping</b>	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 Nature Socio–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.economicdiscussion.net/entrepreneurship/women-entrepreneurs-in-india>
2. <https://www.businessmanagementideas.com/entrepreneurship-2/women-entrepreneurs>